MASTERS OF MEDICINE

An Historical Sketch of the College of Medical Sciences of the University of Minnesota, 1888-1966

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An Historical Sketch of the College of Medical Sciences University of Minnesota 1888 - 1966

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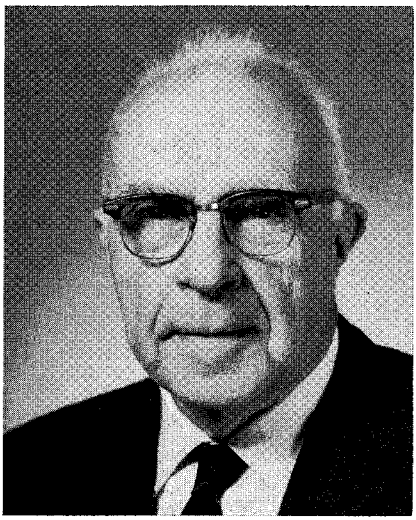
Sponsor's Page

Martha R. McKinney



Frank S. McKinney

Dr. Frank S. McKinney of Minneapolis, Minnesota, has provided a generous gift of $20,000 toward the publication of this book as a memorial to his wife, Martha, who died January 7, 1964. A true, loyal friend of the College of Medical Sciences, with keen interest in the history of medicine, Dr. McKinney also contributed $25,000 in 1964 to the establishment of the Department of Medical History at the University of Minnesota.

Dr. McKinney met Martha Ronge, a tall student nurse of Swedish descent while taking an internship in Wesley Hospital in Chicago, and he says:

"From the beginning of our acquaintance she had a marked influence over the course of my life."

Born at Chapin, Illinois in 1886, Dr. McKinney graduated from Northwestern University School of Medicine in 1911. On completing his internship, he went to Europe at Martha's urging, where he visited the most important medical centers and also served as surgeon in the Second Balkan War in Serbia at Nisch. He came to Minneapolis where he and Martha were married in 1916 and he began his surgical practice. Except for the

World War I years, Dr. McKinney has maintained this practice in Minneapolis to the present time.

In 1918, Dr. McKinney volunteered for military service. He and Martha were stationed at Fort Riley, Kansas where, as a lieutenant, he delivered lectures on "The Medical Service in Campaign" to student officers. Martha secured a position in a nearby civilian hospital where she participated in the surgical service and in the care of large numbers of patients suffering from influenza.

On resuming his practice, Dr. McKinney also became a member of the staff of the Department of Surgery in the School of Medicine, University of Minnesota where, for a time, he was in charge of the outpatient surgery dispensary.

In helping underwrite the publication of this book, Dr. McKinney pays tribute to his wife in a manner which others will appreciate. His own testimonial as to the high esteem he held for her is found in his words:

"Martha was an ideal physician's wife. She had an outgoing personality, loved by people, and had a keen sense of Swedish humor. A leader in church, fraternal, and medical organizations. At the end of her year as president of the Woman's State Medical Auxiliary, 1943-1944, R. R. Rossell, secretary of the Minnesota State Medical Association said of her 'What this organization needs is more Marthas'."

It seems fitting to exclaim that what this *world* needs is more Martha and Frank McKinneys! Emerson said "There is properly no history: only biography." Because of the lives of these two and their generous gifts, the history of the College of Medical Sciences will be given the recognition it deserves!

Foreword

THE CHARACTER and flavor of educational institutions are always matters of recurring universal interest, and rightfully so because of the potential impact and influence upon young minds, the community, and society. A small band of dedicated individuals brought the University of Minnesota's Medical School into being approximately 80 years ago. Its first group of teachers were essentially practitioners in the various disciplines of Medicine. A departmental structured organization begun under Dean Frank F. Wesbrook, was strengthened considerably with the arrival of the University's third President, George Edgar Vincent, who, by the force of strong appointments, breathed the spirit of life, scholarship, and creativity into a sleeping group of colleges. To the Medical School came Dr. Elias Potter Lyon, a physiologist, to serve as Dean in a trying and difficult period of the School's history, distinguished by Gown and Town strifes that were intensified by the establishment of the Mayo Foundation as an affiliate of the University's Graduate School. With the wise guidance of Guy Stanton Ford, Graduate School Dean, the persuasive eloquence of Dr. William J. Mayo, and support of the Medical School's Faculty under the leadership of Dean Lyon, the affiliation became a reality. On his retirement almost two decades later, Lyon remarked that the greatest Dean to his knowledge was Gunga Din, Kipling's regimental water carrier.

Sources of new strength and kindling of an interest in research gradually spread from its mentors in anatomy, Clarence M. Jackson and Richard E. Scammon, to other departments of the School. Dean Lyon thus passed on to his successors a well illumined torch, which, in the hands of Deans Harold S. Diehl and Robert B. Howard, has continued to lead the School from small beginnings to a merited place in the sun amongst medical schools that seek to provide professional training and to advance medicine by the enlargement of knowledge.

Dr. Jay A. Myers is well qualified to tell the engrossing story of the University of Minnesota's Medical School. He has been a member of

its Faculties for 54 years, first in the Department of Anatomy, subsequently in Medicine, and later in Public Health. All students of tuberculosis know him well for his impact upon the decline of that "Captain of Death." Dr. Myers is the author of several monographs outlining his attack upon the problem of tuberculosis and is a talented editor of large experience. He and his collaborators march across the stage of our memories the names of those who are a part of the saga of our School.

Indian trails, military forts, transportation by river via canoe and ship, horse and buggy, the railroad, and streetcar, automobile, and airplane are intermingled in the woof and web of the story, as are radio, television and computer. But most important of all, the History documents medical discoveries and triumphs that have contributed significantly to the betterment of men's lot and health.

This, the first portrayal of the life and history of the University of Minnesota's Medical School, undertaken as a labor of love by Dr. Myers, will become the sourcebook and the vade mecum for all seeking to learn about the growth and development of our School.

Three items in this century have contributed greatly to the improvement of all medical schools: 1. Abraham Flexner's report (1910-12) upon the decadent and sorry status of medical education, which undoubtedly had a telling effect upon President Vincent; 2. The quickening invigoration of veterans hospitals by Deans' Committees of medical schools; 3. A growing concern by the public in health research, accounting for establishment of the National Institutes of Health and the Federal Government's largesse in the support of medical schools and research programs. The architects of these significant developments include many distinguished public servants. It all began with President Franklin Roosevelt and his illustrious advisor on scientific exploration, Vannevar Bush. Minnesota's own Dr. C. J. Van Slyke played a primary role in enlisting legislative support of the Program in the Congress, as did Vice President Hubert H. Humphrey, then one of Minnesota's Senators.

One ordinarily thinks of a state university medical center complex as a gift of its people. The faith and confidence of the citizens of Minnesota in their state university and colleges, including the medical school, has been praiseworthy. However, voluntary help from a number of sources gave us the original Elliot Memorial, the Christian and the

Eustis Wings, the Heart Hospital, Lyon Hall, the Mayo Memorial, Diehl Hall which includes the Bio-Medical Library and a labyrinth of research laboratories, and the Masonic Hospital. There is no longer a very valid distinction between voluntary and public institutions. In the final analysis, all institutions are voluntary and accountable to society. The stature and growth of the Medical School and its Medical Center Complex in men, opportunity, and liberal support will need a continuing and abiding concern for the School's welfare by many loyal and philanthropic friends of the community which it is privileged to serve.

Overpopulation, scarcity of physicians, the rising cost of medical care, balancing research, instruction and training, and a multitude of other baffling problems confront deans and their faculties today, some of which may be solved by the time the next historian of the University's Medical School addresses himself to a reconsideration of the story and its sequels. Involvement of voluntary hospitals with strong staffs in metropolitan medical school areas can do much to broaden the educational base and resolve some heavy burdens of administrative officers of medical schools in meeting their obligations to society, while lending a strong forward thrust to the advancement and patrimony of knowledge. New interphase disciplines are being spawned at a rapid rate between existing bodies of knowledge which a decade or more ago were often regarded as unrelated, an occurrence that will quicken medicine's advance.

Dr. Myers' story traces back to the beginnings of appreciation in a few medical circles of the importance of research in extending medicine's scope and performance. His History of the University of Minnesota's Medical School documents the School's slow growth from mediocre beginnings, to a second phase in which good men in many Departments had poor fiscal help, to the present era, when men, physical facilities, and support are present in an abundance undreamed of by our predecessors. Even so, the demands continue. It is a tale that will captivate not only those who have followed the fortunes of Minnesota's School with special interest but all who are concerned with medical education and its problems.

The fate of any enterprise is in the hands of those from whom it derives its strength and inspiration. The great impetus lent the School at the time of its rejuvenation, under Vincent, Lyon, Ford, and Jackson,

and continued under Deans Diehl and Howard and a succession of sympathetic and energetic presidents, still sustains its momentum.

The fortunes of institutions fluctuate. A certain reciprocal and synergistic constellation of cooperating forces and influences is often the driving force which propels a venture forward with great and sustained momentum. Mysterious and intangible as are the decrees of fate—good will, dedication, and selfless devotion of responsible participants to the highest principles and ideals of universities weigh heavily in the scales of fortune. Dr. Myers' story suggests too, I believe, that our Founders would lend a forebearant nod of approval to their lengthening line of successors for sustaining the high hopes of the University so ably expressed by William Folwell, its first president, almost a century ago.

Scientific discovery has revolutionized our lives, but man remains the same. There have been great gains in social attitudes in our society during the period reflected in Dr. Myers' story but man's creative power still exceeds by far his ability to understand or live at peace with his fellowman. Will the historian of our School another 80 years hence be able to record a notable harvest in this, the most important aspect of our lives? Medicine will continue to extend its borders and range of productive accomplishment. Little wonder that the history of advances in medicine is an unending and fascinating Arabian Nights story!

OWEN H. WANGENSTEEN

Preface

On my arrival at the Medical School of the University of Minnesota in September 1914 to begin duties as an instructor in Anatomy, the School was 26 years old. The first two University presidents, William Folwell and Cyrus Northrop, were active on the campus, although on an emeritus basis. The third president, George Vincent, had just reorganized the Medical School faculty and was working on an affiliation between the Medical School and Mayo Clinic. Of the 28 original medical faculty members appointed in 1888, 10 were still alive. The Medical School faculty of 1914 consisted of 70 members. The three buildings had been constructed only two or three years before and were then regarded as one of the most modern and best equipped medical school plants in the United States.

Over the next 54 years the original generation of faculty members passed as did those who were so active of middle age in 1914. Many of the young members of the faculty of 1914 have also passed. The remaining survivors have grown very old. All of these faculty members I have known, including each University president, all but three deans of the School of Medicine, and all but one dean of the Graduate School.

In 1962, the thought was conceived of requesting each department head to write a departmental history for medical journal publication, with the hope that someday it might be compiled into a history of the College of Medical Sciences.

On February 25, 1964 Dr. Owen H. Wangensteen, chairman of the Committee on Medical History, wrote Dean Robert Howard recommending that work begin on an historical sketch of the College of Medical Sciences. This met with the approval of the Administrative Board and all concerned. Thus was begun the machinery which has produced this book.

Each Medical School head and director was invited to write a sketch of his department or school concerning those items, past and present, most important for future readers. They were asked to write in their

own styles and to include the items they considered most important. While this procedure sacrificed the uniformity of departmental sketches, it seemed better than for one person to attempt to interpret the work of each department for the sake of uniformity. When the departmental sketches were completed, a brief profile was added containing items which modesty prevented authors from including.

While heads of departments and directors of schools were preparing their sketches, Chapters I to XVIII were written on the development of health problems in Minnesota, early attempts to solve them, creation of the University of Minnesota and organization of its Department of Medicine and Surgery, and developments through the tenure of each dean from 1888 to 1966.

I am proud to be able to prepare this history of the development of one of the most outstanding medical schools in the United States—this biography of medical education in the State of Minnesota. It is referred to as a biography because it is a composite biography of the lives of many men and women who helped create this magnificent institution. All, together, contributed toward making the University of Minnesota one of the top ten of the nation's public and private schools despite the fact that Minnesota has only 2 per cent of the nation's population and less than 2 per cent of its resources.

"The past is of value only so far as it is funded into the present—into the character of the men who have made it what it is." On delving into the past there was found, over and over, an intertwining story of the establishment of our state, our university and our medical school. From the time the federal government ordered the first military post into the forested wilderness territory and its first physician—to now—we find an outstanding saga of men with vision and determination.

Our founders of state and university endured many discouraging deviations from their goals. A peek into our past is revealed in this comment made by John Pillsbury, president of the Board of Regents, at the inauguration of William Watts Folwell as first president of the University in 1869: "---history includes a record of many a dark day and many a struggle for light and life—financial revulsions—threatened bankruptcy—ready to surrender hope—we built the *present structure* 12 years ago—*10 years it stood empty* to laugh at our youthful trials."

A challenge is found in President Folwell's response which must

have sparked a resolve in our ancestors to strengthen our state by strengthening our men. When we realize that this took place just five years after the close of the Civil War we know that the times were not easy—and yet these people saw the great need for education. Folwell said: "Then, let boys learn those things which they will practice when they become men. The American boy growing up to manhood is to be something more than a workman whether with hands or brains. He will be friend and neighbor, a member of society, of a family, of the church, and will practice the duties of these relations. What is more, he will be a citizen of this state and of the great Republic.

"The University in organizing colleges of medicine and law owes it to the people not merely to instruct a few how to heal diseases and manage suits at law but to teach the many how to keep well and out of litigation.

"The University then is not merely *from* the people but *for* the people."

It is with pride that this history recounts the many firsts which our Medical School innovated in all fields of medical technique and training and in those persons who expended great effort in fund-raising for the numerous building projects. But, even as these records of dollars and buildings are placed here to impress and amaze our readers, cognizance must be taken of the fact once more that behind figures and buildings are *women and men.* All those now working *with* and *in* the Medical School are equally conscious of our history's many envisioned, ambitious people and their contributions. This same acknowledgment of men is recognized in many of the speeches down through the years some of which are quoted. Particularly, a quotation from a speech made by the present dean of the Medical School, Dr. Robert Howard at a symposium in Mayo Memorial Auditorium on November 4, 1960 in which he said: "--the past and its traditions are still a very important and vital link to the future. As we look ahead to anticipated innovations and developments in medicine, we cannot close the door to the rich medical heritage of the past nor to the community which has enabled us to grow and develop to our present position. Yesterday's, today's and tomorrow's prime obligation still depends upon the people who receive our services."

In this manuscript, an effort has been made to acquaint the reader with the people who provided the Medical School and those who

have worked in various capacities including administration, teaching and research in developing the School from 1888 when 28 faculty members were housed in a rented building, to a faculty now exceeding 700 members in a $34,000,000 plant.

The preparation of this manuscript is in no way intended as a gift to the Medical School or the University. It is offered as a small payment on my great indebtedness to this institution incurred over the past 54 years.

JAY ARTHUR MYERS

Introduction

Taine pointed out that history was made by men, that men had bodies, that bodies are now healthy, now disordered, and that the state of the body inevitably affected the action of the mind. The study of the human body was part of the historian's duty. The accidents of health had more to do with the march of great events than was ordinarily expected.

—H. A. L. Fisher

The physician was a vital force in the development of the territories which encompassed pre-statehood Minnesota. As a healer, practitioner, and consoler, he was diverse in ability but singular in purpose, and he has grown into a contemporary plains legend without being aware of it. His mid-winter treks of mercy through the elements, his dedication to service, his long working hours and primitive working factors—all constituted the physician's professional training and testified to his personal endurance.

It is this physician's background and his environment which interest one in the context of An Historical Sketch of the College of Medical Sciences, University of Minnesota; for behind the individual practitioner grew an environment which has produced the health care enterprise of modern Minnesota. A look at this background, of men and the country, expands the concept of history, reminding us of legends of the individual as well as lending new insight into the total story of health care in Minnesota and the Upper Midwest.

The imagination is captured in recalling the medical facts, the historical precedents, and the progression of medicine from the Indian village to the public reform of the early Twentieth Century and on to the internationally-reputed medical complexes of the Mayo Clinic and of our own University of Minnesota Medical Center. Legends give way to factual knowledge of medical progress far more impressive. Our history, then, becomes History in a very real sense—not only a set of integrated, chronological facts, but a base upon which to build now and in years to come.

An Historical Sketch of the College of Medical Sciences, University of Minnesota tells how the Medical Center, as it exists today, is the direct result of the historical patterns of the health care of Minnesotans and their predecessors. Within the following pages, these patterns are set down in a style which both informs and adds dimensions of perspective. The book is a chronicle of the Medical Center from pre-conception days to Today.

Dr. J. A. Myers conveys, through fact upon fact, the steady growth and potential for continued growth of the Medical Center. Through his words, the people and events which form the development of the Medical Center are seen to represent a remarkable complexity. It becomes evident that the history of the Medical Center must be a history of its people and aspirations, plans and progress. In a broader sense, it becomes a history of both sociologic and geographic Minnesota. Within this framework, one may view not only the problems of growth connected with the institution, but also the means to solutions and solutions themselves.

It is with genuine gratitude that I acknowledge this work—the product of Dr. Myer's devotion to the ideals of the Medical Center and of his labor of several years. Through his pages, the frontier doctor walks, bringing with him, through the advancing years, all the factors which produced the high health standards and practices known at our Medical Center and throughout the area. His book helps us to realize that the compounded efficiency which evolves from a group of individuals reacting to their environment has accomplished what we see today. We view with both pride and awe the total framework that has been presented and the hopeful future of the University of Minnesota Medical Center that is so clearly portended.

ROBERT B. HOWARD, M.D.
Dean, College of Medical Sciences
University of Minnesota

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I AM DEEPLY INDEBTED to Dr. Owen H. Wangensteen, Head of the Department of Surgery and Chairman of the Committee on Medical History, Dr. Cecil J. Watson, Head of the Department of Internal Medicine, and Dr. Robert B. Howard, Dean of the College of Medical Sciences for their confidence in proposing and encouraging the writing of this manuscript and supporting it wholeheartedly throughout the course of its preparation.

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Deep indebtedness is acknowledged to Mrs. Maxine Clapp, archivist and Miss Clodaugh Neiderheiser, assistant archivist, University of Minnesota, who devoted much time and work to procuring and arranging president's reports, minutes of Board of Regents and medical school faculty meetings as well as bulletins, books, etc., etc., to facilitate assembling of data.

Especial thanks are due Eivind Hoff, Executive Secretary of the Minnesota Medical Foundation, Owen H. Wangensteen and Mrs. Mary Lockhart for a tremendous volume of work in reading and rereading the manuscript and making important suggestions and recommendations.

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J.A.M.

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MASTERS OF MEDICINE

An Historical Sketch of the College of Medical Sciences of the University of Minnesota, 1888-1966

Chapter I

Minnesota in Its True Wilderness Era!

Two Frenchmen, Medart Chouart des Groseilliers and his brother-in-law, Pierre Radisson were the first white men to appear in what is now Minnesota. In the summer of 1659, they beached their canoes on a sandy shore of what became known as Knife Lake in Kennebec County. This began an intermingling of the white and red races destined to create and perpetuate serious health problems in this area. The two men spent two weeks with the Indians on Knife Lake feasting and bartering with them, exchanging mirrors, hatchets, and other white men's goods for skins of beaver, otter and muskrat. They apparently had much contact with the Indians, for a year later they returned to Montreal with a fleet of Indian canoes packed with furs manned by Indians.[1, 2, 3]

First, the French Warm up the Melting Pot! In 1671, a number of Frenchmen attended a convocation at Sault Saint Marie where 14 Indian nations were represented. By proclamation, King Louis IV of France assumed domination over Lakes Huron and Superior together with "all countries, rivers, lakes and streams contiguous and adjacent thereto and those that have been discovered and which may be discovered hereafter bound by the seas of the north, west, east and south . . ." [3] For more than a century thereafter, the powerful French crown controlled the area now known as Minnesota as well as nine-tenths of the North American continent. Before the opening of the 18th Century, several French explorers including Duluth, La Salle, Father Hennepin, Mankato, Nicollet and Frontenac visited this area. Indeed, Frenchmen then came in impressive numbers, built forts, trading posts, and mission stations, and had much contact with the Indians.

Then, the British Stir up the Pot. On September 8, 1760 the British took over all of Canada and 200 new rangers took possession of the western trading posts. Those posts adjacent to Minnesota which languished under French control were reopened and revived by the English.

The great Northwest Fur Company ruled all of what is now Minnesota except the extreme northern edge which was firmly held by the Hudson Bay Company.

In European countries, consumption (phthisis) was rife. For example, John Locke[4] states that in 1667 this disease caused 20 per cent of all deaths in London. In 1799, five of every 16 deaths were due to consumption. It is probable that both the French and the English brought this and other communicable diseases to our area.

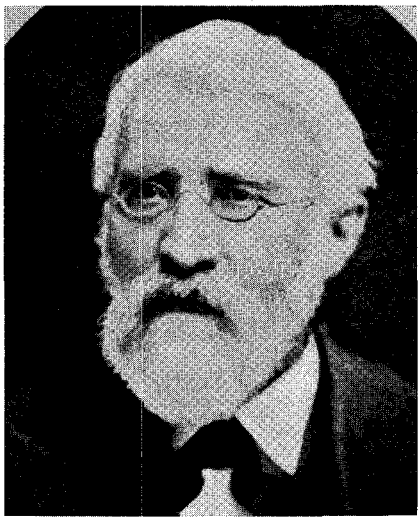
United States Flag is Hoisted and the Pot Starts Boiling! In July 1796, by terms of the Jay Treaty, the British evacuated their western garrisons and the United States Flag waved for the first time over what was to become Minnesota. However, not until 1816 did John Jacob Astor arrange for enactment of laws which restricted the Indian trade to American citizens. Thus, the Northwest Fur Company was forced to withdraw. Astor's new firm, called the American Fur Company, purchased all the trading posts and companies south of the Canadian border. All of this resulted in more intermingling of the red and white races, at a time when acute and chronic communicable diseases were prevalent among Europeans and Eastern Americans. Large numbers of half-breeds were born.

Armies in those days notoriously spread communicable diseases, so a bad health situation became worse when military detachments from the East began to move into this area. On September 21, 1805, Lieutenant Z.M. Pike arrived, with a military detachment, at the confluence of the Minnesota and Mississippi Rivers. There he met 156 Sioux warriors led by Little Crow, whose grandson was to lead the Sioux uprising of 1862. Little Crow signed a treaty with Pike granting the United States two parcels of land along the rivers (consisting of 155,520 acres). A fort was constructed and named St. Anthony.

Military Post Established. In 1819, the government established a military post at the junction of the Minnesota and the Mississippi Rivers and a detachment of the Fifth Infantry consisting of 82 persons arrived on August 23. In September, a reinforcement of 120 persons arrived. The next July (1820), the command passed to Colonel Joseph Snelling. His daughter was the first white child born in Minnesota. His efficiency and enterprise resulted in the post being renamed Fort Snelling. The first upper Mississippi steamboat, *Virginia* docked at a landing below the fort on May 10, 1823.

In 1834, Henry Hastings Sibley came to Mendota as chief factor and partner of the American Fur Company. He quickly gained the respect of the Indians. He became Justice of the Peace and later was elected the first Governor of the State. Samuel and Gideon Pond operated a Sioux mission established in 1834 on the east shore of Lake Calhoun. They worked as missionaries without credentials from any particular church.

Now the First Physicians Enter the Area—Four Doctors in the Next 22 Years! Dr. Edward Purcell came to this area with the military post in 1819. He apparently was the first physician in Minnesota. Dr. Thomas S. Williamson came in 1835 as a missionary. The St. Croix Lumber Camp engaged the professional services of a Dr. Fitch in 1838. At Stillwater, Dr. Christopher Carli arrived from Heidelberg,



Christopher Carli

Germany. After practicing in Buffalo, New York, Chicago and New Orleans, he settled in Dakotah (where Stillwater now stands) on May 24, 1841. "His practice extended from Lake Pepin to Lake Superior and from Menomonie, Wisconsin westward." He walked, traveled on skates or snow shoes, by horse and canoe.[5]

F.W. Hodge wrote: [6] "There is little evidence to show what diseases prevailed among the Indians north of Mexico prior to the advent of white people. The traditions of the Indians, the existence among them

of elaborate healing rites of undoubtedly ancient origin, their plantlore, in which curative properties are attributed to many vegal substances, and the presence among them of a numerous class of professed healers, honored, feared, and usually well paid, would seem to indicate that diseases were not rare, but actual knowledge and even tradition as to their nature are wanting. The condition of the skeletal remains, the testimony of early observers, and the present state of some of the tribes in this regard, warrant the conclusion that on the whole, the Indian race was a comparatively healthy one. It was probably spared at least some of the epidemics and diseases of the Old World, such as smallpox and rachitis, while other scourges, such as tuberculosis, syphilis (Pre-columbian), typhus, cholera, scarlet fever, cancer, etc. were rare, if occurring at all." The observations of Hrdlicka[7] and Morse[8] revealed no well-documented evidence of tuberculosis among American Indians before Caucasians reached the Americas.

One of the first references to health of the Indians in this area was made by Reverend Samuel William Pond.[9] He said, "The reason why the Dakotas did not increase faster was not because so few were born but because so many died. I kept for a time the records on births in one village, and am confident that the number was greater than is common among an equal number of white people."

In 1835, the American Board of Commissioners for Foreign Missions appointed Thomas S. Williamson, a graduate of Yale University, as missionary and physician. Other missionaries were delegated to work in the vicinity of Fort Snelling. They opened a school on the shores of Lake Harriet, the nucleus of which was a number of half-breed daughters of traders and military men. Joseph Renville, who had married a Sioux woman and had a large family of small children, invited Dr. Williamson to establish a mission near him where his own children might be taught. The mission opened in July 1835, second only to the one at Fort Snelling. It had a long existence during which time Dr. Williamson contributed very much to the *health* of the Indians and left *extremely valuable* records.[10] He became such a student of the language of the Sioux Indians that he later translated the Bible into that tongue.

Dr. Williamson left *authentic records pertaining* to health in the community of Lac qui Parle. He wrote a letter to a medical friend, later published in the *Northwestern Medical and Surgical Journal*

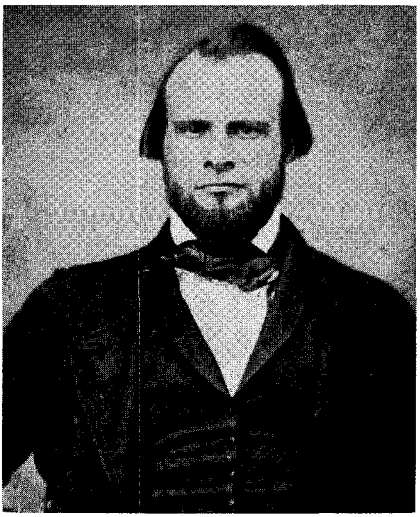
of 1874. It contains the following excerpts: [10] "My acquaintances with the Indians of Minnesota dates from the time of my arrival with my family at Fort Snelling May 16, 1835. After residing there little more than a month, I proceeded to Lac qui Parle, where I arrived on the 9th of July; and made my home there from that time until November 1846.

"Though the medicine men bitterly opposed me because I refused to give medicines to those over whom they performed their incantations and by my success deprived them of half their fees, I was called to see nearly every fatal case of disease which occurred among the Indians residing there; and for the last ten years of my residence there I heard of nearly all the deaths occurring in a population of about 1,000.

"Of those over ten years old who died of disease, I think fully half died of consumption (Phthisis Pulmonalis) --.

"Notwithstanding the many deaths from violence while I was at Lac qui Parle, the number of births very much exceeded the number of deaths. The great proportion of phthisis was chiefly owing to so few dying of other diseases."

In 1883, 185 Roman Catholics were living in the vicinity of Mendota, and the next year Father Galtier opened a mission there. Across the river from Mendota a small colony of people built a log chapel, and in 1841 Father Galtier dedicated it to St. Paul. Until 1845, it served



James J. Dewey

about 35 French families and a small floating population. In 1846, a post office was established there and a year later steam boats began a regular schedule on the river to and from the village of St. Paul.

In 1847, *two physicians came to St. Paul.*[12] One was William C. Renfro, who died the following year. The other was John Jay Dewey who arrived to establish practice on October 15. In 1848, he opened a drug store in St. Paul which was the first in the Minnesota area (this was a common practice among the frontier doctors). In 1870, he retired from all business activities and died from pneumonia in 1891. With only one physician in St. Paul, the Army Surgeons at Fort Snelling were frequently called upon by St. Paul residents. Dr. Carli of Stillwater was also often called to see patients in St. Paul.

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Chapter II

From Wilderness to Territory to State

When Wisconsin became a state in 1836, a bill was introduced into the legislature to establish the territory of Minnesota. This name is from the Indian words "mini" meaning water, and "sota" meaning gray-blue or sky-color. Thirteen years later, March 3, 1849, it became a territory by an act of Congress. After the bill was passed in Washington, it required 37 days for the news to reach St. Paul.

Land of Sky-Blue Water Considered a Health Resort. About the time Congress declared Minnesota a territory, its citizens began to offer numerous inducements to persons residing in eastern states and Europe to join them. Word spread about an elixir in the air of Minnesota that would cure consumption, bronchitis and other diseases of the chest. No one knew just what it was in the air that had this curative effect. Some thought it was the extra-ordinary purity and dryness of the air and the richness of ozone content. Others believed it was due to the cold, stimulating winters and pleasant summers. When it was rumored in the East and in Scandinavian countries that Minnesota winters were often very cold and the curious inquired of those residing here, the response was: it is a cold we do not feel because of the dryness of the air. Tremendous numbers of persons in Europe particularly England, Germany, Ireland and Scandinavia suffered from tuberculosis. While New England was just at the pinnacle of its literary fame, it was also at the height of an extensive tuberculosis problem. When told of the beneficial effect of the air in Minnesota, large numbers of Eastern sufferers journeyed to this area.

Transportation—Slow. In the early years of the *Territory* of Minnesota, immigrants who reached Chicago travelled to the Mississippi River by horse-drawn vehicles. There they boarded steam boats which were the only conveyance to Minnesota. However, in 1854, the Rock Island and Pacific Railroad was extended to the Mississippi River. Immigrants came in large numbers increasing the population

from 5,000 in 1849 to more than 150,000 at the end of the territorial period. Until 1854, the population was largely composed of native Americans and French Canadians. Then immigrants of foreign birth began entering in large numbers.[1]

Health Publicity—Breathe Minnesota Air! Minnesota became a state in 1858. Prior to 1855, there were 14 weekly and 4 daily newspapers. By 1858, eighty newspapers were circulating in the new state. From time to time, special articles appeared in these papers concerning the good health qualities of Minnesota along with items to lure people to this area. Large numbers of pamphlets extolling Minnesota's unique air and other qualities favorable to ill persons were sent to Scandinavian countries, Germany, Ireland and others.[2, 3] Indeed, a State Board of Immigration printed and distributed 59,000 copies of immigration pamphlets glorifying the health-building qualities of Minnesota climate.

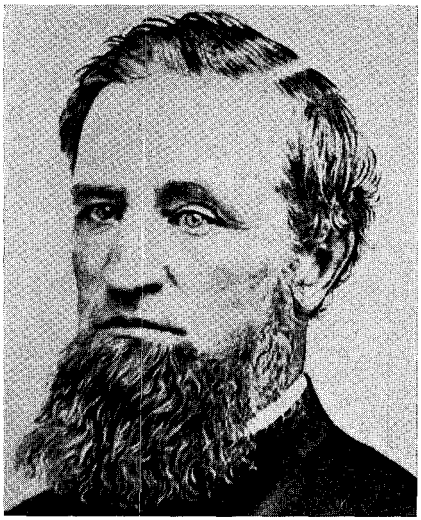
First Medical Society Organized 114 Years Ago. In July 1853, 20 physicians lived in the Minnesota territory.[4, 5, 6] Most of them attended a meeting on July 23rd to organize a Minnesota Territory Medical Society. The next meeting was scheduled for June 1854 but no definite record has been found that it took place.

However, the Minnesota *Republican* published a list of officers on January 17, 1856 which suggests that there had been a recent conference. The health problem was of such magnitude, particularly with communicable diseases, that physicians felt the need of an official organization to aid their control.

Public Health Law Enacted. In 1857, the legislatures enacted a law which provided for Municipal Boards of Health consisting of Justices of the Peace, Trustees of Villages and Aldermen of Cities and authorized to appoint health officers to reduce nuisances and to quarantine smallpox.

Physicians Arrive in St. Anthony and Minneapolis. The first physician who located in St. Anthony of whom there is definite record was Dr. Ira Kingsley a herbalist, who apparently arrived in the spring of 1849.

The first regular physician was John H. Murphy who became established in St. Anthony in 1850.[6] In 1851, he formed a partnership with Dr. A. E. Ames who had graduated in the first class from Rush Medical School. Immediately after arrival in St. Anthony, Dr. Ames

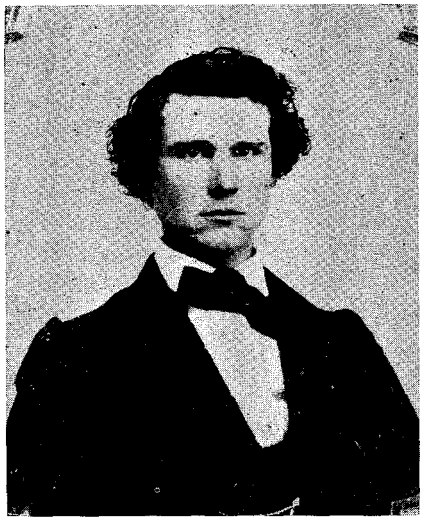


A. E. Ames

filed a claim on the west side of the river and moved there in 1852. Thus, he was the first physician to practice in Minneapolis.[2]

Dr. Mayo Arrives in St. Paul. Dr. W. W. Mayo was born near Manchester, England, and came to the United States at the age of 26 years in 1845.[7] He was a professional chemist. He graduated from the Medical School of the University of Missouri in 1854 and began to practice in St. Paul in 1855 before setting up practice in Le Suer, Minnesota. In the spring of 1863, he established practice in Rochester, Minnesota, where he and his sons, William J. and Charles H., later established the Mayo Clinic.

Red Wing Gets Its First Doctor From Hobart. At Geneva, New York, Hobart College was founded in 1822. Later there were persons in the student body destined to play a large role directly and indirectly in the health of the citizenry of our state and in the University of Minnesota. William S. McLaren, a Presbyterian minister, is said to have been in Red Wing. Robert Neil McLaren is recorded as having lived in Red Wing. They were from Geneva, New York (the home of Hobart College). One or both of the McLarens (a family document refers to William) invited an old friend of Geneva, New York, days to *come to Minnesota to establish a medical practice.* This friend, Augustine B. Hawley,[8] was born in Caroline, New York in 1833. He received the



Augustine B. Hawley

degree of Doctor of Medicine from Hobart College in 1855. Dr. Hawley debarked at Red Wing from a Mississippi River steamboat on July 15, 1857 at the age of 23 years. The population was approximately 1,000. Hamline University had been established in Red Wing in 1854. After a five-day survey of the surroundings, he decided to establish a practice and opened an office on July 21. He also proceeded to establish an Episcopal Church and strongly recommended Reverend E. R. Welles, his former roommate at Hobart College, as the first rector.

University of Minnesota Established. In January 1851, Governor Ramsey, in his second message to the territorial legislators, called attention to the importance of establishing a University and recommended the legislators to memorialize Congress for a grant of one hundred thousand acres of land for the endowment of said University.

The legislative act follows:

AN ACT to Establish the University of Minnesota.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. That there shall be established in this Territory an institution under the name and style of the University of Minnesota.

SECTION 2. The proceeds of all funds that may hereafter be granted by the United States to the Territory for the support of a University, shall be and remain a perpetual fund to be called the

"University Fund," the interest of which shall be appropriated to the support of a University, and no sectarian instruction shall be allowed in such University.

SECTION 3. The object of the University should be to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts.

SECTION 4. The government of the University shall be vested in a board of twelve regents, who shall be elected by the legislature as hereinafter provided.

SECTION 5. The members of the board of regents shall be elected at the present session of the legislature and shall be divided into classes numbered one, two and three; class numbered one shall hold their office for two years; class numbered two, for four years; and class numbered three, for six years from the first Monday of February, one thousand eight hundred and fifty-one; biennially thereafter there shall be elected in joint convention of both branches of the legislature, four members to supply the vacancies made by the provisions of this section and shall hold their offices for six years respectively.

SECTION 6. Whenever there shall be a vacancy in the office of regent of the University, from any cause whatever, it shall be the duty of the Governor to fill such office by appointment, and the person or persons so appointed shall continue in office until the close of the session of the legislature, then next thereafter, and until others are elected in their stead.

SECTION 7. The regents of the University and their successors in office shall constitute a body corporate with the name and style of the "Regents of the University of Minnesota," with the rights of such, of suing and being sued, of contracting and being contracted with, of making and using a common seal and altering the same at pleasure.

SECTION 8. The regents shall appoint a secretary, a treasurer, and a librarian who shall hold their respective offices during the pleasure of the board. It shall be the duty of the secretary to record all the proceedings of the board and carefully preserve all its books and papers, the treasurer shall keep a true and faithful account of all moneys received and paid out by him, and shall give such bonds for the faithful performance of the duties of his office as the regents may require.

SECTION 9. The regents shall have power, and it shall be their duty to enact laws for the government of the University; to elect a Chancellor who shall be ex-officio president of the board of regents or when absent or previous to the election of such Chancellor the board may appoint one of their own number president pro tem. They may also

appoint the requisite number of professors and tutors, and such other officers as they may deem expedient, also determine the amount of their respective salaries, provided that the salaries thus determined shall be submitted to the legislature for their approval or dissent.

SECTION 10. The University shall consist of five departments: The department of science, literature and the arts; the department of law; the department of medicine; the department of the theory and practice of elementary instruction; the department of agriculture. The immediate government of the several departments shall be entrusted to their respective faculties, but the regents shall have power to regulate the course of instruction and prescribe, under the advice of the professorships, books and authorities to be used in the several departments and also to confer such degrees and grant such diplomas as are usually conferred and granted by other universities.

SECTION 11. The regents shall have power to remove any officer connected with the institution when in their judgment the interest of the University requires it.

SECTION 12. The admission fee to the University and the charges for tuition in the several departments thereof shall be regulated and prescribed by the board of regents; and as soon as in their opinion the income of the University fund will permit, tuition in all of the departments shall be without charge to all students in the same who are residents of the Territory.

SECTION 13. The University of Minnesota shall be located at or near the falls of St. Anthony, and the regents, as soon as they may deem expedient, shall procure a suitable site for the erection of the same as soon as funds may be provided for that purpose, after such plan or plans may be approved by a majority of said board.

SECTION 14. The regents shall have the power and it shall be their duty as soon as the requisite funds shall have been secured for that purpose to establish a preparatory department of said University, and employ teachers for the same, who shall be qualified to give instruction in all the branches of learning usually taught in academies; which preparatory department may be discontinued whenever the regents may think proper, after the other departments of said University shall have been established.

SECTION 15. The regents are authorized to expend such portion of the fund which by the provisions of this chapter may come under their control, as they may deem expedient for the erection of suitable buildings and the purchase of apparatus, a library, and a cabinet of natural history; and the selection, management and control of all lands,

which may hereafter be granted by Congress for the endowment of said University is hereby vested in the board of regents.

SECTION 16. The regents shall make a report annually to the legislature at its regular session, exhibiting the state and progress of the University in its several departments, the course of study, the number of professors and students, the amount of expenditures and such other information as they may deem proper or may from time to time be required of them.

SECTION 17. Meetings of the board may be called by any seven members thereof, at such time and place as they may deem expedient and a majority of the said board shall constitute a quorum for the transaction of business, but a smaller number may adjourn from time to time.

SECTION 18. The regents, if they shall deem it expedient may receive into connection with the University any college within the Territory upon application of the board of trustees; and such college so received shall become a branch of the University and be subject to the visitation of the regents.

SECTION 19. No religious tenets or opinions shall be required to entitle any person to be admitted as a student in said University, and no such tenets or opinions shall be required as a qualification for any professor, tutor, or officer of said University.

SECTION 20. The legislative assembly may at any time alter, amend, modify or repeal this chapter.

Approved February 13, 1851.

Two townships (46,080 acres) were granted but Minnesota passed through its territorial days without the benefit of a state university.

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Chapter III

The Infant State Awakens, Stretches, and Grows

When Minnesota was admitted to Statehood on May 11, 1858, the population was rapidly increasing. It reached 172,000 in 1860; 439,706 in 1870 and 780,773 in 1880—about 300,000 in each ten-year period. The influx from Scandinavia increased from 12 in 1850 to 59,000 in 1870. In 1890, Minnesota claimed 99,913 Swedes, 101,169 Norwegians and 14,133 Danes. The number of Germans increased from 147 in 1850 to 41,000 in 1870. A melting pot indeed!

Life Lines Reach Out. Today, when we listen to an astronaut talking in outer space, it is difficult to realize the satisfaction of those living in Minnesota in 1862 in being able to communicate by telegraph to cities on the navigable parts of the Mississippi River. In 1867, the railroad known as the Iowa and Minnesota Division of the Chicago, Milwaukee and St. Paul operated trains between St. Anthony Falls and Prairie du Chien. Also a rail connection stretched eastward and thus Minnesotans could travel to and from the East by rail. In 1872, the River Division of the Chicago, Milwaukee and St. Paul Railroad extended to Winona which reduced by several hours the travel time from the Twin Cities to Chicago. Contrast this to the present one-hour jet flight to the Windy City.

Duluth Gets Its First Resident Physician. Prior to 1869, when physicians were necessary in Duluth, they came from neighboring Superior, Wisconsin. The first physician to locate permanently in Duluth was Dr. Edward Erastus Collins, who arrived in May 1869.[1] He remained five years in Duluth then practiced in Minneapolis and in Stoughton, Wisconsin until 1881 when he returned to Duluth to remain until his death in 1912.

Our Debt to Hobart College Increased. Two more Easterners who came West to help write Minnesota's history were Dr. Charles N. Hewitt and William Watts Folwell. Dr. Hawley continued to practice medicine in Red Wing. However, after about 10 years, he desired to

dispose of his practice and enter the drug business. He had long been fond of Dr. Charles N. Hewitt and they kept in touch with one another after school days at Hobart College. Therefore, he wrote Dr. Hewitt about the glorious opportunities open to professional men in the North Star State and invited him to come to Minnesota and take over his practice.

Dr. Hewitt was born in Vergennes, Vermont in June 1836. After graduating from Hobart College in 1856 with a degree of Bachelor of Arts, he entered Albany Medical College where in December 1857 he received the degree of Doctor of Medicine. In April 1861, he volunteered for Army service in the Civil War and became a Brevet Lieutenant Colonel.[2]

When Hewitt started for the "visit" to Red Wing in 1866, his close friend of Hobart College and Army days, William Watts Folwell learned of the plan and hurried a letter off to Dr. Hewitt inviting him to stop at his home in Venice, Ohio. After this visit, Dr. Hewitt continued his journey and arrived in Red Wing which, then in the spring of 1867, had a population of 3,000. Fascinated with the place and the possibilities of the new State of Minnesota he accepted Dr. Hawley's invitation to take over the practice.

Red Wing Becomes Public Health Center for Minnesota. When Dr. Hewitt took on Dr. Hawley's flourishing practice in 1867, a large volume of his work consisted of examining and treating persons with communicable diseases, including smallpox, diphtheria, tuberculosis, cholera, typhoid fever and venereal diseases. He was deeply interested in preventive measures and through him Red Wing became the Public Health Center of Minnesota with offices in the Keystone Building[3] for 22 years.

William Watts Folwell Destined for Greatness in Minnesota. In 1833, William Watts Folwell was born on a farm in Seneca County, New York. While a student at Hobart College, he came to know Charles N. Hewitt and George Leonard Chase. After graduation, Folwell taught at Hobart College. He spent four years in military service, advancing to the rank of colonel. Following discharge, he lived in Venice, Ohio where he was a clerk for four years in his father-in-law's milling business.[4] The president of Kenyon College, Gambier Knox County, Ohio then called him to the professorship of mathematics and civil engineering beginning with the new term 1868-69.

Reverend George Leonard Chase, also a Hobart graduate, had married Mrs. Folwell's sister. Because of her "consumption" they moved to Minnesota for climatic benefit. He became assistant in the Gethsemane Episcopal parish in Minneapolis. Reverend Chase heard of developments and presented Mr. Folwell's qualifications before the Board of Regents of the new University. The Board members were so impressed they invited Professor Folwell to come out "to see and be seen." He accepted, but after an interview, he rejected an appointment as professor of mathematics at Minnesota, considering his professorship at Kenyon College good enough!

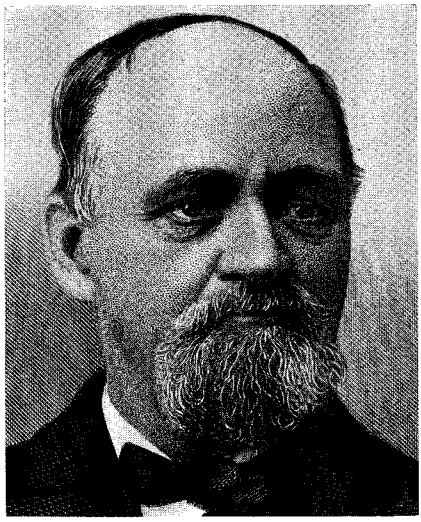
Consideration of many aspirants and nominees delayed the election of a president of the University of Minnesota. Reverend Chase firmly believed that Professor Folwell had fine qualifications for the presidency and continued his efforts in his behalf. He gathered and laid before the Board of Regents a body of testimonials. Folwell's Hobart College and Army friends, Reverend Welles, Doctors Hewitt and Hawley, sent a long letter to the Board of Regents strongly recommending him for the presidency.

On August 23, 1869 the Board of Regents elected Mr. Folwell as president of the University for one year at a salary of $2,000 "plus the use of rooms for his family," in the old, less than half-built main building. He accepted and resigned the Kenyon professorship immediately.

When Mr. Folwell was elected President, the Board of Regents adopted the following resolutions: "Resolved, that the President-Elect be requested to deliver an Inaugural Address in the Hall of the University on the third Monday in October and that he be there and formally presented with the keys of the Institution." Later, the ceremony was postponed to December 22, the close of the first term of the academic year.[5]

On December 1, 1869, a formal invitation to the inauguration was prepared by the Executive Committee consisting of J. S. Pillsbury, O. C. Merriman and John Nicols of the Board of Regents and was published in the newspapers. A number of copies were also circulated through the mail.

The ceremony began at 2:00 o'clock p.m. and President Folwell held a "reception in the same hall from seven to half past nine in the evening."



John S. Pillsbury

The induction address by Hon. John Sargent Pillsbury contained the following:

"Professor Folwell: — In my official capacity as President of the Board of Regents, I have the honor and the pleasure of tendering to you the greetings of the officers and citizens of the State of Minnesota.

"On this auspicious day as we are about to lay upon the first President of our University the mantle of authority and of trust, it is eminently fitting that we should publicly express to him our confidence in his ability and worth, our appreciation of the value of the interests committed to his charge and our united desire to sustain him in every proper exertion for their maintenance and safety.

"You may not be familiar, Sir, with the history of this institution. That history includes the record of many a dark day and many a struggle for light and life. What with financial revulsions and threatened bankruptcy, we have often been ready even to surrender hope. Twelve years ago, the people of the territory of Minnesota, with a clear conception of the permanent value of the highest mental and moral culture erected the present structure. Ten long years it stood empty to laugh at our youthful trials. But at length the night of misfortune began to pass and the dawn of prosperity to brighten. Just as our land had hushed the thunder of war these doors began to open and these halls to echo with the voices of our youth. We feel deeply moved in view of the smiles of Heaven, which today beam upon us,

to render to the Great Ruler of the Universe our gratitude and humble adoration. And yet, in the fair promise of this hour, we but catch a glimmer of the long and brighter day which stretches out before us, when these halls shall be filled with other and more numerous youth; when the alumni of this institution shall, as we trust, honor the high places of our country and shall return, perhaps, with hoary locks, to visit her classic halls, or amid her groves to seek their youthful haunts." *

The first paragraph of President Folwell's response follows:

"I return with profound thankfulness your greeting, and theirs, and that of the people of this great State. Chiefly, I feel grateful for those expressions of esteem and confidence you have used, not towards myself alone, but also towards my honorable colleagues of the University Faculty. It will be our endeavor to justify that confidence, because we know well that without your sympathy, your active, unfailing support, our usefulness will be confined to very narrow limits."

In the body of his splendid long address President Folwell said:

"Then let boys learn those things which they will practice when they become men, and girls the things which they will practice when they grow up to womanhood. And what things will the American boy practice when he grows up to be a man? He will be a farmer or artisan, physician or lawyer, preacher, teacher, or engineer? Yes, some of these, and let him be no 'striker,' bungler, nor empiric. But is this all? The American boy growing up to manhood is to be something more than a workman, whether with hands or brains. He will be friend and neighbor, a member of society, of a family, of the church, and will practice the duties of these relations. What is more he will be a citizen of his State and of the great Republic.

"The American boy will not be merely a voter. He should be fit to be voted for, and to take up, at the bidding of his fellow citizens, the duties and responsibilities of public service. It will not do, then, in America, to scrimp and narrow higher education down to the beggarly limits of mere individual demand; nor will it do here in Minnesota, where farmers, lumber-dealers, and hardware merchants are framing the statutes of a great University."

This address contained many other gems such as:

"Today we celebrate the foundation of the University, its inaugura-

* William Watts Folwell miscellaneous papers 5, 6, 7.

tion, long ago an assured fact with those whose labors, sacrifices, and foresight have made it sure. It is hope, not memory, which inspires our hearts and dictates our utterances.

"*The University* in organizing colleges of medicine and law *owes it to the people not merely to instruct the few how to heal diseases* and manage suits at law, but to teach the *many how to keep well* and out of litigation. The time is not distant when a Department of Public Health will be established in all universities . . .

"The University will accumulate and maintain a great library . . .

"Next, the University will collect and arrange a museum of history, natural history, and art . . .

"Another function of the University is to prosecute those scientific researches and make those costly experiments for which private investigators lack the means" . . .

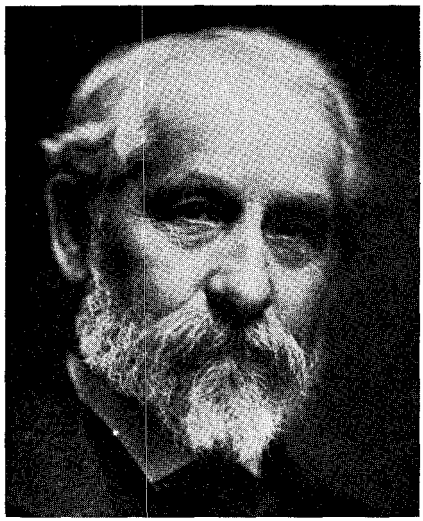
He said:

"The University, then, is not merely *from* the people, but *for* the people. True, it will put bread in no man's mouth directly, nor money in his palm. Neither the rain nor the sunshine do that, but they warm and nourish the spring grass and ripen the harvest. So higher education, generous culture, scholarship, and literature inform, inspire and elevate communities."

He concluded:

"Surrounded then and reinformed by these skillful and experienced educators, armed with your authority, assured of your confidence and friendship, commended by you to the people whose servants we are, and finally invoking with you that Divine help and furtherance without which all human efforts are vain, I will proceed with trembling, but not without hope, to the work you have set me to."

Students. For the school year 1870-71, the faculty consisted of 10 members. There were only 18 students of university grade but slightly more than 200 in the preparatory department. The students ranged in age from 13 to 30 years. During Folwell's administration, this preparatory department was gradually eliminated. The University's first graduating class in 1873 consisted of two men. Two years later there was one woman graduate, there were 27 in the class graduating in 1881. That was the last year that each senior was required to deliver a graduating address at commencement services. Tuition for all students in all departments was free. Some students were accommodated with



William W. Folwell

rooms in the University building, Old Main, furnished with bedstead and mattress, wash-stand, table and stove for $3.00 per term (approximately four months). It is said that Folwell walked from door to door with students to see that they found proper housing. He said, "It's the duty of the University to make it possible for a young person to live decently on $3 a week." His students affectionately referred to him as "Uncle Billy."

He made many valuable contributions such as the founding of the high school system in Minnesota, the State High School Board, beginning of state aid in education, establishment of practical courses in agriculture. He envisioned junior colleges and he *established the first faculty of medicine at the University.*

When he resigned the presidency in 1884, the Board of Regents appointed him professor of political science and put the Library in his charge.[5] He remained in these capacities until 1907, when he attained retirement age. Folwell Hall was then dedicated as his memorial on the campus. It was then he began writing the famous four-volume history of the State of Minnesota, the authenticity of which has not been questioned.

Those of us who were fortunate enough to meet and frequently see Professor Folwell thoroughly agree with E. B. Pierce, so long Secretary of the Alumni Association, who referred to President Folwell as a

"gentleman of the old school." He was "fine, courteous, studious, friendly, brisk in action and speech, walking very erect—he was always neat as a pin. Long after his retirement he invariably appeared in formal dress at every dinner function he attended. The market basket in which he carried books and papers, the cape and cane were characteristic." [6]

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Chapter IV

Health Problems Increase in Severity with Population Growth

THE GREAT INFLUX of consumptives caused much concern among early Minnesota physicians. For this reason Dr. Hewitt strongly insisted on promotion of public health activities. In the 1850's, 60's and 70's, the climate brought consumptives and their families from many walks of life and many parts of the world. Interestingly, it was consumption that initiated the train of events which brought such outstanding physicians and educators as Hawley, Hewitt, Folwell and Chase to Minnesota. In 1861, the famous Concord naturalist, Henry David Thoreau,[1] sought relief for consumption in the air of Minnesota. He will always be remembered for his beautiful description of the Minnesota River. Among the tuberculous physicians who came was Edward Livingston Trudeau[2] (1873). Those whose disease healed spontaneously, or underwent long periods of remission, and some having diagnostic errors became staunch advocates of Minnesota climate. The response to the earlier publicity pertaining to Minnesota's climate with its curative power was tremendous. Each boat that docked on the wharf and each train that puffed into the depot brought a crowd of new settlers, not only the usual number from New England, but many Scandinavians, Germans, Czechs, Irish, and a sprinkling of other nationalities. Some moved out to farms and homesteads in various parts of the state, but many stayed on in the towns or villages, where they found countrymen from home. Thus, Minneapolis and St. Paul promptly emerged from one-street lumber towns to sprawling cities with urban problems of overcrowding and epidemic disease.

Tuberculosis prevailed everywhere, not only among the invalid population, but among the native-born and the newly-arrived immigrants. Many of the boys who went to war in 1860 returned with consumption contracted in barracks and prison camps. Cholera and "intermittent fever" are mentioned with dread in nearly every pioneer

diary, and epidemics of smallpox, typhoid and diphtheria ran through communities like wildfire, at times wiping out half the population. There was no controlling agent prior to 1872.

Severe Storm Caused Abatement of Migrating Consumptives. "Shortly after noon on the 7th of January, 1873, a blizzard came up in Minnesota which so filled the air with fine particles of snow as to cause absolute darkness. All this was accompanied by a furious wind. Many settlers had no previous experience with such terrific weather and when the storm was cleared on the third day it was found that 70 persons had perished and others were disabled from freezing. Numbers of farmers died while attempting to grope the short distance from house to barn through the blinding snow. This gave our climate such a setback that the Committee on Epidemics of the State Medical Association could only announce briefly: '(1) Minnesota air lost its vaunted prophylactic properties last winter and spring due to a very severe winter. (2) North and east winds from the Great Lakes were bad for consumptives.' "

Minnesota is Not a Health Resort. By 1880, Minnesota's day as a health resort was just about over. The thousands of invalids who flocked to our borders all through the 50's, 60's, and 70's became an almost imperceptible trickle. With the opening of the Union Pacific Railroad, the tide of health-seekers turned farther to the South and West, and Minnesota was almost forgotten in the rush to Arizona, Colorado, California and New Mexico.

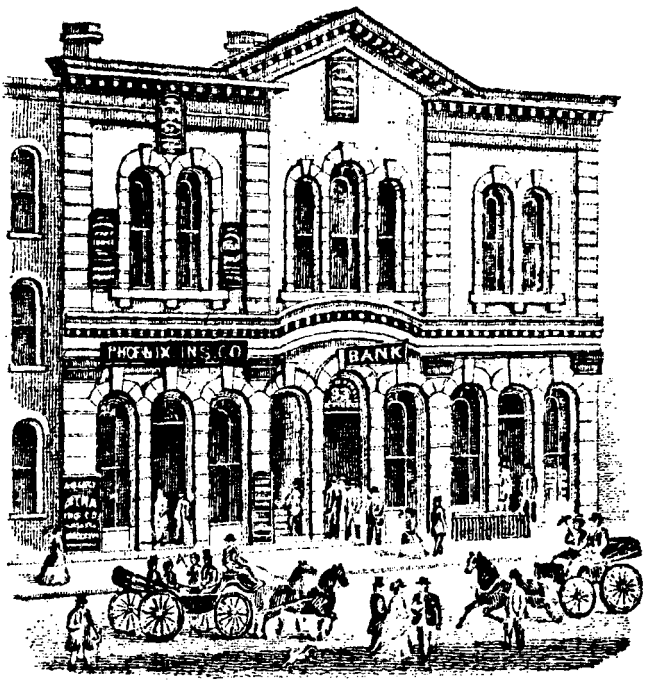
Among the large number of health seekers who migrated to Minnesota many died here or soon after returning to their homes. Many who remained here died from tuberculosis during the succeeding decades. In 1883, there were 11,678 deaths reported in Minnesota. Diphtheria ranked first with 1,374 and tuberculosis second with 1,079 deaths. In 1894, Dr. W. J. Mayo said that tuberculosis in combination with other kinds of infections caused nearly one-third of the annual death rate.

State Board of Health Established. Dr. Hewitt's interest in public health increased as he continued private practice in Red Wing. Early in his professional career there, he stated that one-fifth of the deaths and one-fourth of the sickness in Minnesota were preventable. He often quoted Benjamin Franklin: "Public Health is public wealth." He read every medical and health journal he could obtain and developed an extensive library, which Thomas D. Keys,[3] historian of the Mayo

Clinic described meritoriously. He learned of the law enacted in Massachusetts in 1869, permitting the creation of a State Board of Health and a similar action two years later in California. He promptly began promoting the establishment of a State Board of Health in Minnesota.

When the Minnesota State Medical Association came into being on February 1, 1869 at a meeting of this Society of February 6, 1872, Dr. Hewitt introduced a resolution requesting that a committee of five members be appointed to take into consideration all matters upon which the society asked legislation. Such matters were to be systemized and presented to the Society with drafts of bills on which the committee advised the Society to seek legislation. The following physicians were appointed: A. B. Stuart, Chairman, Charles Hewitt, E. Hill, S. D. Flagg, and E. A. Ames.

Dr. Stuart presented the bill to the Minnesota State Legislature on February 7, 1872. The Legislature took favorable action on March 4, 1872. Thus, Minnesota became the fourth state to have a State



Keystone Building, Red Wing

Board of Health: Virginia, the third state, had enacted such legislation on February 13, 1872.

The first meeting of the Board was held March 4, 1872. A. B. Stuart was elected president and Dr. Hewitt secretary. The salary of the secretary was fixed at $250 a year payable quarterly, and traveling expenses. The total annual expense of the Board was not to exceed $500. Dr. Hewitt continued private practice in Red Wing and established a State Board of Health office in the Keystone Building of that city.

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Chapter V

Early Medical Instruction in Minnesota

Eighteen Years of Gradual Development in Medical Schooling. For several decades, medicine was taught in Minnesota by the preceptor system, wherein the practitioner of medicine chose a pupil who became his assistant. By working in the physician's office, reading his books and making house calls with him, the student learned. Eventually, the student became a full-fledged doctor.

In 1869, 212 persons practiced medicine in the state, of whom 119 were regular and 93 were irregular. The word "regular" applied to those who could produce satisfactory evidence of being legal practitioners of medicine. Quacks continued, as they had in various parts of the world for centuries, to prey upon sick individuals and their families.

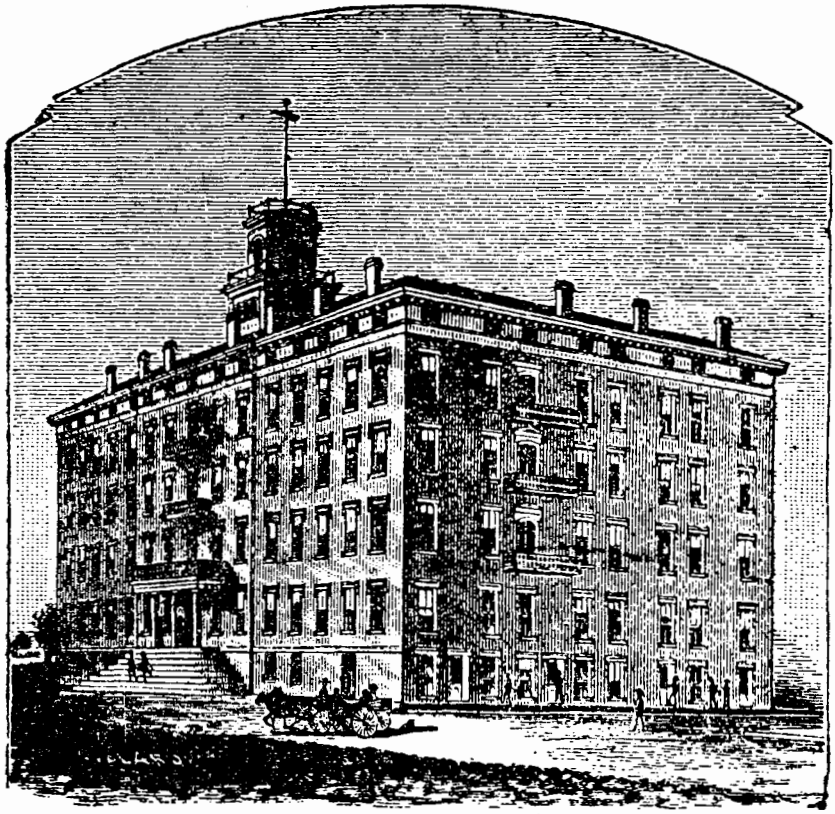
Organization of Medical Schools. With the rapidly increasing population, formal training for the medical profession became imperative in Minnesota. Richard Olding Beard [1] described the beginning as follows: "To the left of St. Joseph Hospital in the city of St. Paul, stood in 1868 and for several years thereafter 'the little stone deadhouse' in the second story of which was a table, some chairs and a human skeleton.

"In that upper room, a group of students, the members of which were 'reading medicine' in the offices of doctors of the hospital staff, gathered from day to day, bringing in amputated arms or legs now and then for dissecting, making a few tests of specimens conjointly and listening every day to talks by staff members among whom were Dr. D.W. Hand and the elder Dr. Stewart who did most of the teaching. They were inspired teachers. The pupils stood in fear of their quizzing powers." This situation persisted until 1870 when, according to Chatterton[2]: "The Saint Paul School of Medical Instruction was formed by a number of St. Paul physicians who believed greater facilities should be afforded students desiring to obtain a preparatory medical education than could be obtained from any single instructor. The object of their

school was not to take the place of a regular college, but to prepare students for a better understanding of lectures they might hear in a college course." The course was four months in length with hours of instruction from 3:00 to 10:00 p.m. Since this was only a preparatory school, an effort was made to correlate the courses with those of the winter terms of the Chicago colleges where most students went to complete the medical course.

Dr. Franklin Staples and five faculty members organized the Winona Medical School Preparatory in 1872. The students from this school also usually went to Chicago to complete work for the degree of doctor of medicine. However, this school closed in 1879.[3]

In 1879, the St. Paul School expanded and became the first Medical College of the State under the name *St. Paul Medical College*. The



Old Winslow House, partially occupied by the Minnesota College Hospital 1882

course included six hours of study from 3:00 to 10:00 p.m. The class in dissection was conducted in the evening from 9:00 p.m. to "an unstated and probably unearthly hour," Beard said.

In 1880, the St. Paul Medical College became the *Medical Department of Hamline University.* However, in 1881 this department closed. The faculty, with a group of Minneapolis physicians, formed the *Minnesota College Hospital.* Dr. Chatterton said:[2] "This college occupied *a part* of a magnificant building known as the old Winslow House, situated in East Minneapolis." This school was formally opened on October 31, 1881. The following list of faculty members and succeeding quotations are from page 126 of August 15, 1882, issue of *Northwestern Lancet* announcing the session beginning October 2, 1882:

BOARD OF DIRECTORS

Thos. Lowry, L.L.D., President
F. A. Dunsmoor, M.D., Vice President
Geo. F. French, M.D., Secretary
Amos W. Abbott, M.D., Treasurer
Hon. Chas. R. Vanderburg

FACULTY OF THE COLLEGE

F. A. Dunsmoor, M.D., *Dean*
Prof. of Surgery

Geo. F. French, M.D.
Prof. of Obstetrics

Jay Owens, M.D., St. Paul
Prof. of Theory and Practice of Medicine

Amos W. Abbott, M.D.
Prof. of Anatomy

T. F. Quinby, M.D.
Prof. of Materia Medica and Therapeutics

Jerome H. Salisbury
Prof. of Chemistry

T. Jones, M.D., St. Paul
Prof. of Physiology

Alfred Bray, M.D.
Prof. of Toxicology

C. E. Riggs, M.D., St. Paul
Prof. of Nervous Diseases

Hon. Eugene H. Wilson
Prof. of Medical Jurisprudence

Alex J. Stone, M.D., St. Paul
Prof. of Diseases of Women

Francis Atwood, M.D., St. Paul
Prof. of Diseases of Eye and Ear

C. L. Wells, A.M., M.D.
Prof. of Diseases of Children and Dermatology

C. A. Wheaton, M.D., St. Paul
Prof. of Clinical Surgery

A. B. Cates, A.M., M.D.
Adjunct Prof. of Obstetrics

James Quinn, M.D., St. Paul
Prof. of Genito-Urinary Diseases

A. R. Brackett, M.D.
Demonstrator of Anatomy

H. J. Burwash, M.D.
Prof. of Hygiene

C. H. Hunter, A.M., M.D.
Prof. of Pathology

Chas. W. Drew, Ph.D., M.D.
Asst. to Chair of Chemistry

C. M. Skinner, M.D.
Prof. Orthopoedia

"This *Medical College* is inaugurated under the auspices of a union with the *St. Paul Medical College,* thereby securing the co-operation of this experienced corps of instructors, and the hospital advantages of Minneapolis and St. Paul combined.

"*The College Hospital Building* containing the medical college and the hospital is a grand edifice, contains 200 rooms, admirably located for hospital purposes, and provided with the best modern appliances and appointments.

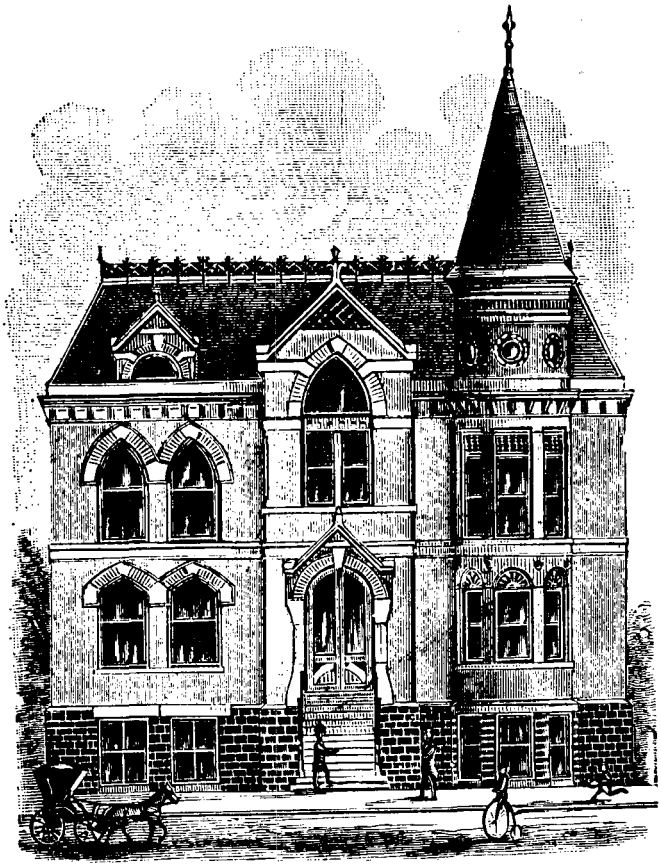
"*A Thorough and Systematic Course of Instruction* will be given by means of recitations, didactic and clinical lectures. A three years course is required, but students may be admitted to advanced standing by passing a satisfactory examination in Anatomy, Physiology and Chemistry.

"There will also be a preliminary examination for admission, unless the Applicant has had the benefit of a high school education, or its equivalent. Students can board in the college building with best accommodations."

"Fees or all tickets and necessary dissection and chemical material, $50.00."

In 1883, the *Minneapolis College of Physicians and Surgeons* was organized. Its 12 faculty members began teaching in the upper rooms of a business block at Washington Avenue and Fifth Avenue South. Dr. J. T. Moore was its dean during the 12 years of existence.

In 1885, the groups constituting the Minnesota College Hospital separated. Those from St. Paul reconstituted the St. Paul Medical College located at Ninth and State Streets, St. Paul. Dr. Chatterton says,[2] "The Saint Paul Medical College claimed success because of the unusual amount of its available clinical material, and a building centrally located on the principal business street, near streetcars . . . The faculty was composed of: Alexander Stone, M.D., Dean and Professor of Obstetrics, Gynecology and Medical Jurisprudence; Charles A. Wheaton, Professor of Anatomy and Clinical Surgery; Dr. F. Dedolph, Professor of Pathology and Dermatology; Dr. Talbot Jones, Registrar, Professor of Psychology and Diseases of Children; Dr. F. A. Dunsmoor, Professor of Surgery; Dr. Francis Atwood, Professor of Ophthalmology and Ototomy; Dr. James Davenport, Professor of Materia Medica and Therapeutics; Dr. Jay Owens, Professor of Theory of Practice of Medicine and Diseases of the Throat; Dr. Ernest F. Horst,



St. Paul Medical College

Professor of Nervous Diseases and Orthopedic Surgery; and George F. Weitbrecht, Professor of Chemistry."

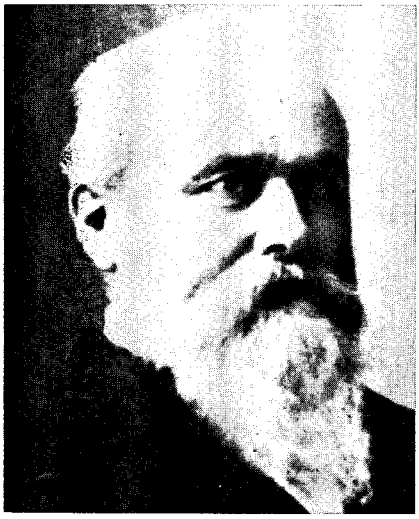
When the group constituting the Minnesota College Hospital separated, those in Minneapolis continued but changed the name of the institution from Minnesota College Hospital to Minnesota Hospital College with Dr. F. A. Dunsmoor as dean. This group then erected a building at Sixth Street and Ninth Avenue South, Minneapolis where the institution operated until 1888.

In 1886, the *Minnesota Homeopathic Medical College* was established.

In 1895, the *Minneapolis College of Physicians and Surgeons* was reorganized and became the *Department of Medicine at Hamline Uni-*

versity. Of the private medical schools in this area, this Department of Medicine lived the longest.[3]

First Course in Public Health. On July 13, 1873, President Folwell wrote Dr. Hewitt: "I have the honor to inform you that at the last meeting of the Board of Regents there was erected a 'department of instruction, of Public Health with the subjects Anatomy and Physiology, to be in charge of a nonresident professor. It was further resolved that the said department be put in charge of the Secretary of the State Board of Health. Permit me to express the wish that you will not decline to assume this task although it will add to your burden. I do not need to remind you of the importance of the department." Apparently, *this was the first appointment of its kind in the United States.* Dr. Hewitt accepted the professorship and beginning in 1873, he gave a



Charles N. Hewitt

course of lectures to the entering class or the entire student body each year for the next 20 years. Concerning this, President Folwell later wrote of him: "In his whole laborious campaign of education, there was nothing into which he threw himself with greater ardor, than into his instruction as non-resident professor of Public Health in the University of Minnesota." Dr. Hewitt received no financial remuneration for this work.

Department of Medicine Established at University. When the

territorial legislature passed an act in 1851 to create a University, provisions included the establishment of a school or department of medicine.[4] The opening of the University was postponed until after the Civil War. A small preparatory school preceded it in 1867 but a year later—1868—the University of Minnesota officially opened.

The organic law of the state establishing the University, enacted by the legislature February 18, 1868, as amended by the act of 1872, authorized the opening of a college or department of medicine. The subject was frequently discussed by members of the medical profession and particularly with Dr. Charles N. Hewitt whose election to the presidency of the State Medical Society in 1882 reemphasized his prestige among physicians. The Society requested that Dr. Hewitt draw up a communication to be laid before the Board of Regents asking their consideration of a plan which the Society believed would be practicable and useful. This communication was forwarded to the president and was submitted to the Board of Regents on June 29, 1882. Dr. Hewitt, invited to attend the meeting, supplemented the communication with remarks in open board forum. The following resolution was unanimously adopted: "Resolved that Dr. Hewitt of Red Wing and Dr. Leonard of Minneapolis, and the president of the University be requested to present to this Board a plan of organization so proposed together with a syllabus of examination for medical students." [5]

An Examining Faculty Only. At the meeting of the Board of Regents held January 5, 1883, the committee submitted its report prepared by Dr. Hewitt. The report proposed that a thoroughly competent and independent faculty be provided whose duty would be to examine all candidates for licenses and degrees in medicine of the University; who would be in no way connected with the preparation of such candidates for such examination and whose sole aim would be to maintain a standard of qualifications fully equal to the highest and fully in accord with the needs and demands of the people and the time.[5]

Nonteaching University Medical Department Faculty Appointed. During a meeting of the Board of Regents in 1883, Regent Nelson offered the following: Resolved, "That there be and hereby is commenced at and in the University of Minnesota, a College or Department of Medicine substantially in uniformity with the plan embraced in the report made and submitted by Drs. W. H. Leonard and Charles N.

Hewitt and Wm. W. Folwell and this day ordered spread upon the records of the Board." This resolution was unanimously adopted. At the same meeting Regent Nelson also offered the following: Resolved, "That Regents Hubbard, Pillsbury and Clark be and hereby are appointed a committee to select and nominate to this Board names of persons to constitute the Medical Faculty." This was also unanimously adopted.

On March 8, 1883 the committee nominated and recommended the following faculty members and their subjects: Charles N. Hewitt, Red Wing, Preventive Medicine; Franklin Staples, Winona, Practice of Medicine; Daniel Hand, St. Paul, Surgery including Surgical Pathology; William H. Leonard, Minneapolis, Obstetrics and Diseases of Women and Children, and Perry H. Millard, Stillwater, Anatomy and Physiology.

On April 22, 1884, the following additions were made to the faculty: James A. Dodge, Medical Chemistry; Charles H. Smith, Materia Medica and Therapeutics; Charles Simpson, Pathology and Pathological Anatomy; George Wood, Diseases of the Nervous System and Medical Jurisprudence. Dr. Hewitt was president and Dr. Perry Millard served as Secretary and Executive Officer of the medical faculty.

The objects of the examinations were to test: 1. The candidate's familiarity with the literature of the subject; 2. His clinical and laboratory experience for this purpose, properly authenticated specimens of his work in any department were examined and he could submit certificates and the other evidence thereof; 3. His skill in the actual use of physical, chemical and other tests in diagnosis and the use of remedies and instruments.

All candidates who passed the entrance, scientific and professional examinations including the appropriate clinical and experimental tests incidental thereto, and gave satisfactory evidence of having pursued professional studies required by the by-laws, being twenty-one years of age or upwards, and of good moral character, were recommended by the faculty to the Board of Regents to receive the degree of bachelor of medicine (M.B.), which degree duly conferred was the warrant of the University of Minnesota for the practice of medicine and surgery.

All candidates for the degree of doctor of medicine (M.D.) must furnish satisfactory evidence that they had severally pursued the study of medicine for four years in the office of, and under the personal

direction of a physician in active practice, who was a graduate of some college or school of medicine recognized by the Board of Regents, upon the recommendation of the faculty of this college. The examination consisted in each case essentially of a thesis and its defense, but the faculty demanded in all cases clinical and practical tests and operations, to enable the examiners to decide not merely upon the scholastic proficiency of the candidates but upon actual professional skill. All these were to be upon subjects approved by the faculty, be founded on original work and certified as the unaided productions of the candidates. Twenty-five printed copies of each thesis were furnished to the faculty before reading and defense.

Nine Medical Degrees Awarded First Three Years. From 1884 to 1887, nine medical degrees were awarded. There was none in 1888.

Faculty to Serve as Examining Board. On March 5, 1883, the legislature enacted a law to regulate the practice of medicine in the State.[6] This specified that the medical faculty of the University of Minnesota should organize as a board of examiners and receive through their secretary applications for certificates and examinations. They were empowered to issue certificates to all who furnished satisfactory proof of having received diplomas or licenses from legally chartered medical institutions in good standing. Two forms of certificates were to be prepared. One was for those persons in possession of diplomas or licenses and the other for candidates to be examined by the faculty. The law provided that a graduate in medicine should present his diploma to the examining board for verification as to its genuineness. If the diploma was found genuine, and the person named therein the person claiming and presenting the same the board should issue a certificate which would be conclusive as to the right of the lawful holder of the same to practice medicine in this state.

If not a graduate, the person practicing medicine should present himself before the board and submit to such examinations as the board required. If the examination was satisfactory to examiners, the board issued a certificate in accordance with the fact that the lawful holder of such a certificate was entitled to all the rights and privileges hereafter mentioned. The board of examiners retained the right to refuse certificates to individuals guilty of unprofessional or dishonorable conduct and revoke certificates for like cause. Forms of affidavit and certificate were prepared and the faculty became a state board of medical

examiners on April 19, 1883. The law provided exemption of all persons who had practiced medicine in the state for five years previous to March 5, 1883.

President Folwell Resigns. At the meeting of the Board of Regents on March 8, 1884 President Folwell submitted his resignation for consideration. ". . . it was on motion voted that the resignation be accepted, to take effect at the end of the present scholastic year, or soon thereafter as his successor shall be appointed, and upon motion it was further voted to proceed to ballot for a candidate to fill the chair of Political Science in the University and a ballot being had there were six votes cast all being for Col. Wm. W. Folwell, and he was thereupon declared duly elected to the Professorship of Political Science in the University, to enter upon his duties at the end of his term as President of the University, it being also understood that he is to retain the oversight of the Library."

Regent Davis thereupon offered the following unanimously adopted resolution, vis: Resolved that: "In accepting the resignation of President Folwell, the Regents desire to express to him their full sense of the zeal and great ability with which he administered his office, and they feel that in the new position which he has assumed his labors will be productive of lasting benefits to this State."

Folwell remained as professor of Political Science and retired in 1906. He was granted the first honorary degree conferred by the University. This was the degree of doctor of laws awarded in 1925. Folwell Hall, built in 1907, is his memorial on the campus. His name is first in the notable and highly selective list of *"Builders of the Name"* of this University inscribed in stone in the foyer of Northrop Memorial Auditorium in 1929. President Emeritus Folwell died that year at the age of 96.

Opposition to Nonteaching Faculty Plan. After a few years, opposition developed to the nonteaching faculty plan. Dr. Perry H. Millard, also a member of the original nonteaching faculty opposed Dr. Hewitt's point of view, as he was of the opinion that the University should develop a department of the traditional kind. Therefore, Dr. Millard resigned from the original faculty. He then supported a new medical practice bill, which passed the legislature in 1887. This created a Board of Examiners which was the first of its kind in the United States.

In the University faculty report for 1886-87, the following appears:

"The duties heretofore discharged by medical faculty as an examining body have been transferred by a recent act of the legislature to a new State Board. As the present faculty had completed its work most of the members signed their intention to resign as they do not desire to teach."

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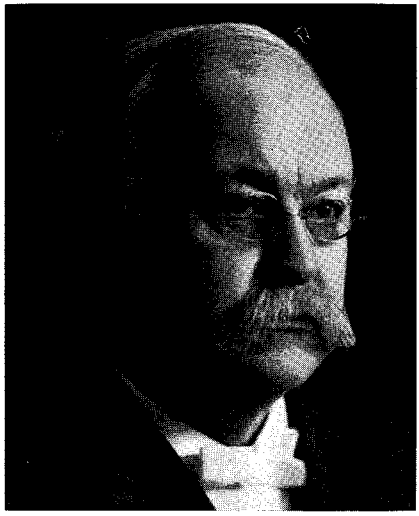
Chapter VI

Our Presidents Since the Organization of the School of Medicine

CYRUS NORTHROP

When President Folwell resigned in 1884, Cyrus Northrop became the second president of the University. He was born in Ridgefield, Connecticut, on September 30, 1834, the son of a farmer and carpenter. Cyrus attended a rural school and graduated from Yale University in July 1857. He was a teacher, lawyer, politician and journalist, when "Early in the spring of 1884 four gentlemen came to my house one afternoon and introduced themselves as Regents of the University of Minnesota. They were Ex-Governor John S. Pillsbury, Hon. John B. Gilfillen, Governor L. W. Hubbard and Superintendent Daniel L. Kickle." They offered Northrop the presidency of the University of Minnesota which he declined. They then invited him to visit the



Cyrus Northrop

University at the expense of the Board of Regents, which he did on March 12, 1884. Former Governor Pillsbury met him in a sleigh and drove him to the Pillsbury home. Governor Pillsbury escorted him about the cities and the campus and arranged meetings with various people on Monday and Tuesday. At noon Wednesday Professor Northrop learned that the Pillsburys had arranged a reception for him at their home that evening. Mr. Pillsbury had invited every Yale graduate in the entire vicinity in addition to other influential individuals. "And when at the close of the evening the long procession of guests passed me and everybody said 'we hope you'll come.'" The next morning the Board of Regents held a special meeting and offered Northrop $2,500 more than he was receiving at Yale. He returned to Yale and later accepted the offer. His salary of $6,000 per year was the highest salary Minnesota had paid any employee including the Governor.

When Mr. Northrop assumed the presidency in 1884, only 289 students were enrolled in the entire University. There were 30 faculty members, of whom only 23 received financial remuneration. In 1909, when he first tendered his resignation, the total University enrollment was 4,800 students. They were taught by 212 professors and assistant professors, and 125 faculty members of lower rank. Full professors' salaries had increased from $2,400 per year in 1902 to $3,500 in 1909. (Professors and teachers of all grades in clinical subjects of the College of Medicine and Surgery were still teaching without salary.)

President Northrop's wit and humor were a constant delight. No one ever got the better of him in repartee. In 1901, Yale University, in celebrating its 200th anniversary, selected Cyrus Northrop to give the Jubilee Address. The toastmaster was that past master of after dinner speaking, Chauncey Depew, but his introduction of President Northrop as "that educational *cyclone* of the west," was a mistake. President Northrop, acknowledging the introduction, said that he must perforce accept that allegation "coming as it did from such an eminent authority on *wind*."

Never was a college president more loved and respected by a student body. Chapel exercises were a daily occurrence. The program consisted of the singing of a hymn, a scripture reading and a prayer. Frequently, President Northrop led the exercise. The following poem written by one of the women students illustrates their reverence for Northrop:

When Prexy prays
Our heads all bow.
A sense of peace
Smooths every brow.
Our hearts deep stirred
No whispers raise,
At chapel time
When Prexy prays.

When Prexy prays
All hearts unite
And closer draws
The Infinite;
No thoughtless wit
Himself displays
At chapel time
When Prexy prays.

When Prexy prays
Our better self
Is raised above
All thoughts of pelf;
To nobler lives
Incline our ways,
At chapel time
When Prexy prays.

The Board of Regents was unable to find a desirable successor when President Northrop tendered his resignation in 1909 so he kindly continued on to 1911, when the student body had reached 5,000. As some of the remarkable accomplishments of Deans Millard, Ritchie and Wesbrook (Chapters VIII, IX, X) are acclaimed, sight must not be lost of the fact that President Northrop played a major role in making them possible and final. Made president emeritus upon retirement, he continued a major interest in the University until his death on April 3, 1922.

Some time after Dr. Beard prepared a memorial for Dean Millard, President Northrop said to him, "There is something I want you to do for me, if I should go into the other world before you do and should there be an occasion to write a memorial for me, I want you to write it." Therefore, Dr. Beard prepared a beautiful memorial, the last paragraph of which reads: "His memory, the memory of the man he was and the work he did, will be cherished so long as the University of Minnesota, —the monument his brain, his hand had chiefly reared, to the honor of the State and the highest welfare of her citizens, endures."

The Northrop Memorial Auditorium, built in 1929, embodies the names of Folwell, Northrop, Maria Sanford, William S. Pattee, and Henry T. Eddy engraved in the stone panels of the foyer as the first "Builders of the Name."

GEORGE EDGAR VINCENT

George Edgar Vincent, who succeeded President Northrop, was born on March 21, 1864, in Rockford, Illinois. His father was the founder of the Assembly at Chautauqua, New York, with all of its widely ramified activities and influences. After graduating from Yale in 1885, he joined his father, both in the management of the Chautauqua program and the editing of its publications. President Harper persuaded him to come to the University of Chicago to accept a fellowship and work for a doctor's degree in sociology. There, he rose to be dean of the Faculty of Arts, Literature and Science. He became President of

George E. Vincent

the University of Minnesota in 1911 and served with great distinction until resigning on June 30, 1917.

The Administrative Board planned a complimentary dinner offered to President Vincent by the general faculty on May 8. At this farewell dinner, a representative from the Medical School read this resolution: "The Medical School of the University of Minnesota through its

Administrative Board desires to take this testimonial occasion to assure you of the regret with which it has received the tidings of your retirement from the Presidency of the University, of its lively sense of the large service you have rendered to the greatest institution of the State, of its appreciation of the unremitting interest you have taken in Medical Education and the earnest work you have done to make this school better and to enlarge the field of its usefulness to the people.

"It bears admiring witness to the integrity of 'the truth that you have taught,' to the lofty purpose 'of the good that you have wrought,' to the inspiration you have been to sound organization, to educational and scientific achievement, and to high ideals of personal and social service.

"The Medical School has suffered some things at your hands which it has frankly accepted as necessary and beneficient surgery for its own good; and if at times you have been obliged to put the brakes of administrative prudence upon its ambitions, you have nevertheless encouraged it to hitch the machinery of its development to the star of high attainment and permanent good.

"It gives you thanks for all that you have done and have meant to do, for all that your influence, impressed upon the School, will continue to do in the days to come.

"It realizes the large part you have had in unifying the forces of the University life, in welding together the dissociated interests of University groups, in awakening a University consciousness which has quickened a real University spirit among us.

"It counts of major consequences, among your many services to the people, the inclusion within, the sphere of University influence and activity, of a Campus as wide as the State—the extension of the University service to well-night every business, professional and technical calling and to all sorts and conditions of men.

"The faculty of the Medical School takes satisfaction in the promise of your own future. It congratulates you upon the bigness of the opportunity for work and service which awaits you. It is not given to every man to go so inerrantly to the place for which he is so preeminently fitted.

"The Medical School does not expect to lose you from the reach of its own future. It looks for your helping hand, for your friendly counsel in the fulfillment of its own destiny. Your colleagues of the school

hail you, coming or going, as one with them in ambition, in hope and in service."

Upon learning of his death at his home in Greenwich, Connecticut, on February 2, 1941, a resolution prepared by Guy Stanton Ford, then president of the University of Minnesota, and approved by standing vote of the Board of Regents at its February 14, 1941, meeting, read in part as follows: "President Vincent came to the University of Minnesota in 1911 to head a group of colleges ready to be focused upon the tasks of a new age. He left behind him in 1917 an integrated university suffused with a firm conviction that it was destined for greater things and united through a vision of his tasks and its services that embraced the whole life of the state, and, through scholarship, the world beyond state boundaries. His six years were in a sense a refounding of the University by the creation of an institution that met the definition of a University by doing University work." (See Chapter XI.)

MARION LEROY BURTON

Marion LeRoy Burton, who became the fourth president of the University of Minnesota succeeding George Vincent in 1917, was born in Brooklyn, Iowa, August 30, 1874, the son of a farmer. When he was only eight years old, his father died and the family moved to Minneapolis. He attended public school, but for financial reasons

Marion L. Burton

he had to go to work at the end of his first year in high school. He became a clerk when only 15 years old in a drug store in Minneapolis and used all spare time possible in reading chemistry, pharmacy, medical material, etc. In 1900, he received the bachelor of arts degree from Carleton College with high honors.

He not only worked his way through school, but also became one of the most popular students in the College. He played baseball, was prominent in intercollegiate debate and oratory, in literary science and other student organizations, and graduated at the head of his class.

Following graduation, he became principal of the Windom Institute at Montevideo, Minnesota. After three years there, in 1903, he entered the Divinity School at Yale University and received the bachelor of divinity degree in 1906, and later the degree of doctor of philosophy in Theology.

At the meeting of the Board of Regents on January 15, 1920, the president of the Board read the following letter of resignation of M. L. Burton as president of the University of Minnesota. "In accordance with my message to you on December 29th, 1919, I am writing to say that I have decided to accept the call to the presidency of the University of Michigan. I reached this conclusion only after the most careful consideration of all the principles and interests involved.

"I desire, therefore, at this time, officially to present my resignation as President of the University of Minnesota, to take effect at the close of the current fiscal year on June 30, 1920.

"It is with great reluctance that I anticipate the severing of my official relationship here. The Board of Regents has done everything in its power to make my work delightful and stimulating. I have never been conscious of any strain (other than is inevitably involved in the duties of the president of a large University) in my dealings with the students, the Faculty, the Deans, and other administrative officers, the alumni, the Regents or the Legislature . . ."

The Regents voted to adopt the following resolution: "That the resignation of President Burton be accepted to take effect June 30, 1920; that the Board sincerely regrets the loss of President Burton; that the relations existing between him and the Board have always been characterized by mutual confidence, trust, and uninterrupted harmony of action . . ." (See Chapter XI.)

LOTUS DELTA COFFMAN

When President Burton submitted his resignation, a committee of the Board of Regents made an extensive search for a qualified person to replace him. On April 14, 1920, Fred Snyder, chairman of the committee and president of the Board of Regents, made a report which recommended the appointment of Lotus D. Coffman, then Dean of the School of Education, to be President of the University.

Lotus Coffman was born on a farm near Salem, Indiana on January 7, 1875, and attended a country school. After finishing high school in Salem, he became a teacher in country schools. In 1906, he received the bachelor of arts and in 1910 the master of arts degree from the

Lotus D. Coffman

Indiana State University. At Columbia University, in 1911, he received the degree of doctor of philosophy. In 1915, he became dean and professor of education at the University of Minnesota. He continued in that post until being chosen as president of the University in 1920.

The University of Minnesota sustained a great loss when President Coffman died on September 22, 1938, at the age of 63 years—the first president to die while in office. He was a world authority in education.

President Coffman really wrote his credo when he said in the preface to the 1932 biennial report: "Let those who wish to be political and

industrial leaders receive the support they deserve. As for me, I should prefer to be known in the years to come as one who stood in these days for strengthening rather than weakening education; as one who helped to modify and adjust it to meet the demands of new problems and to prepare for a new day; as one who has not discarded the great tradition of America that universal education is essential to public welfare and that a highly educated leadership is basic to human progress."

The final resolution of the Board of Regents contains the following: "His record of almost two decades as president of the University of Minnesota, is, and will remain, an open book where those who would comprehend the place of higher learning and of scholarship in a democracy can follow the steps by which he led a state, through its University, to ever broadening conceptions of its obligations to its youth and to the future that will be their present. We, the Board of Regents, who he boldly led, turn from any catalog of the steps by which the University of 1920 has become the University of 1938."

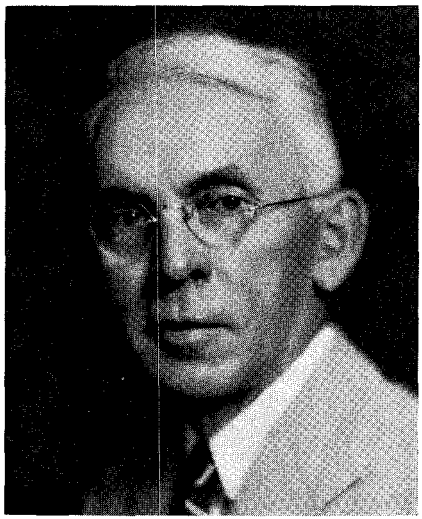
In 1960, President emeritus Ford briefly presented his evaluation of former University of Minnesota presidents. He said that when Coffman became president in 1920 the *Minneapolis Journal* carried a little editorial about the appointment. It mentioned that Burton's first name was Marion and the new president was named Lotus Delta. It asked when was the University going to get a president with a man's name. He said, "I don't know how Coffman got that name. I asked his mother once why she chose it, but she bristled and wouldn't tell me." During Coffman's time, the University mushroomed in size and became the largest in the country on one campus.

"One of the most serious threats to academic freedom that the University ever faced was made during Coffman's regime when a bill was introduced in the State Legislature that would have prohibited teaching biological evolution. It was modeled on the Tennessee anti-evolution law that led to the Scopes trial." Ford said, "There was a hearing in the House Chamber on the Minnesota Bill. The University was thoroughly prepared, but honor should go to the representatives of the privately endowed institutions, Catholic and Protestant alike, who appeared against the bill. Some of them did not believe in evolution as they understood it, but they knew that if college curriculums were to be determined by legislation forced through the clamor of organized propaganda and pressure groups, their institutions as well as the Uni-

versity would not be centers of learning but purveyors of a hodgepodge of legalized obscurantism." President Emeritus Ford also said: "The statement with which President Coffman closed the hearing left no phase of the issue of the freedom of teaching untouched." (See Chapters XI and XV.)

GUY STANTON FORD

When President Coffman died in 1938, members of the Board of Regents were again fortunate in having on the campus a man qualified to assume the presidency. Guy Stanton Ford was born on May 9, 1873 on a farm at Liberty Corners, New Salem, Wisconsin. His father was a country doctor. Ford entered the University of Wisconsin and received the degree of bachelor of letters in 1895. In 1900, he registered for graduate work at Columbia University where



Guy S. Ford

he earned the degree of doctor of philosophy in 1903. From 1901 to 1906, he taught history at Yale. In 1913, President George Vincent, during his reorganization of the faculty, invited Dr. Ford to become professor of history and dean of the Graduate School at the University of Minnesota.

As dean of the Graduate School, Dr. Ford did much to promote graduate work in the School of Medicine. He was extremely helpful

to President Vincent in accomplishing the affiliation with the Mayo Clinic. This affiliation was originally intended to be with the Medical School but Dean Ford's influence brought about a better arrangement with the Graduate School. Throughout his deanship, he was a strong supporter of the School of Medicine. When he accepted the deanship, only 159 students were enrolled in the Graduate School. Twenty-five years later there were 3,229 graduate students, many of whom were in Medical Sciences.

When he became president of the University in 1938, Dr. Ford continued to support the Medical Sciences in every possible way. The constitution of 1851 gave the name "chancellor" to the head of the University; however, for many years after the University was established the word "president" had been used. Dr. Ford had a great dislike for the title "chancellor" which became generally known hence the following:

There is a man, Guy Stanton Ford
Who's been called most every name.
Whether Doctor, Mister, Prof or Dean
He'd answer just the same.
Well, now the picture changes
Though he's the same old guy,
But if you call him chancellor
Just kiss yourself good-bye.

When he retired by reason of age in 1941, President Ford said, "The candlelight in the school room of the University at the Falls of St. Anthony has grown brighter and brighter and now throws its light like a beacon far beyond the boundaries of the State. Given the power and support it needs now, that light may help us and our children to see the way to a solution of our present problems consistent with the highest aspirations and noblest traditions of our past."

The following appears in the resolution of the Board of Regents at the time of President Ford's retirement: "The Board of Regents, mindful of the years of devoted service he has given, and doubly conscious of the obligations they imposed upon him, during the final years of his active association with the University of Minnesota, now with rising vote, express their deep gratitude for all that Guy Stanton Ford has been, and all that he has done. As he leaves this campus to enter upon new fields of activity, they wish for him and Mrs. Ford happy years, and further rich accomplishment. They cherish the thought that a memory of friendship and comradeship, enriched by

more than a quarter-century of joint endeavor in a common educational task, will grow in depth and satisfaction with each passing year.

"And the Regents do further direct that this resolution shall be spread upon their minutes, there to remain in perpetuity as evidence of an association that is broken with regret and heartfelt sadness.

'Godspeed, Guy Stanton Ford.' "

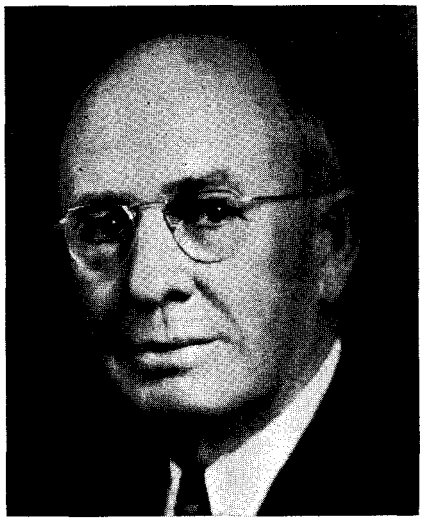
In 1951, a building on the campus of the University of Minnesota was named Ford Hall in his honor. In addition to numerous other items, this building houses his private library of 1,200 volumes which he donated to the University. He took lead in establishing the University of Minnesota Press.

Dr. Ford died on December 29, 1963, at the age of 89 years, whereupon President Emeritus J L. Morrill said, "None more truly than Guy Stanton Ford was a builder of the Minnesota name. Happily he lived to realize the scholarly strength whose foundations he helped to lay and the standard of excellence he inspired. In our loyalty to the University is loyalty to his heritage of destination." (See Chapters XI and XV.)

WALTER CASTELLO COFFEY

When President Ford retired, another dean, Walter Castello Coffey, on the University of Minnesota faculty, was considered highly qualified for the presidency. He was born on a farm, near Hartsville, Indiana on February 1, 1876. When he was eight years old, he became greatly interested in sheep, chiefly because of the change from Leicester to Shropshire breed on his father's farm. He associated with his father in the production and exhibition of some outstanding Shropshires. When he was 17 years old, he became a teacher and taught for six years in the public schools of Indiana. In 1903, Professor N. W. Mumford, head of Animal Husbandry, College of Agriculture, University of Illinois, who had been inspired by young Coffey's enthusiasm and success, asked him to become a herdsman and shepherd of the flocks at the Illinois College of Agriculture. Very soon after he began teaching a course in sheep husbandry. At the age of 30 years in 1906, he was awarded the bachelor of science degree.

In 1921, President Coffman invited him to the deanship of the Department of Agriculture and director of the Agricultural Experiment Station, University of Minnesota.



Walter C. Coffey

In July 1941, the Board of Regents asked Dr. Coffey to become acting president of the University of Minnesota. In the fall of that year, he became president. He was soon in an extremely difficult position because of Pearl Harbor in December which necessitated devotion of much of the University's activities to World War II. Nevertheless, he did all that was possible to promote the welfare and progress of the University. He served as president from 1941 to 1945 with "fair-minded, conscientious, judicious, and with constructive imagination."

After attaining retirement age on June 30, 1945, Dr. Coffey chose to give the remainder of his life's work as a free will offering to public service. He was said to be the most industrious retired college president in America. He became known as the elder statesman of agriculture. He was also endearingly referred to as the "grand old man of Minnesota Agriculture."

His leadership continued outstandingly. During World War II, he personally raised almost $300,000 to help pay for the Student Union at the St. Paul Campus so that the way for construction was clear a few weeks before his death.

Dr. Coffey was greatly interested in Hamline University, the oldest University in Minnesota, having been originally established at Red Wing in 1854. Indeed, at the age of 76 years he became acting president

of Hamline from June 1952 to January 1953 during selection of a permanent president.

In November 1949, the Administration Building on the University School of Agriculture on the St. Paul Campus was renamed Coffey Hall in his honor.

Among his large store of stories which always stood him in good stead was one concerning himself as follows: "He was professor of animal husbandry in Illinois when agriculture was something of an interloper in traditional academic circles. He noted that some of his colleagues had nicknames given them by their students. He told his wife that these nicknames appeared to be names of affection, not nicknames of derision, and said, "You know, I haven't a nickname." She said, "That's too bad, but there's nothing you can do about it." Time passed, and one day he came home and said with great satisfaction, "I have a nickname." She said, "Fine, what is it?" He said, "Sanka." She said, "What does it mean?" They looked it up and found that Sanka is a certain type of coffee from which the active principle of the bean has been removed."

Dr. Coffey died from coronary thrombosis on January 31, 1956, at Orlando, Florida, on the eve of his 80th birthday, whereupon President Morrill's tribute contains the following: "But happily he knew so well the high place he held in our affection and in the esteem of the people of Minnesota whom he served so long and with such devotion in his distinguished career as dean and as president of the University. Despite his age and illnesses that troubled his recent years, he continued to serve our own and Hamline University with unflagging zeal and energy.

"Sincerely, we are grateful for the example of his shining integrity and his abiding commitment to the education of youth, and the advancement of teaching, research and public service. (See Chapter XV.)

JAMES LEWIS MORRILL

When President Coffey attained retirement age, the Board of Regents made a nationwide search for his successor as president of the University. Of the large number of persons interviewed and considered, James L. Morrill was the unanimous choice. He was born at Marion, Ohio, on September 24, 1891. He received the degree of bachelor of arts at the Ohio State University in 1913.

James L. Morrill

Soon after graduation he became a reporter for the *Cleveland Press.* and four years later he was elected to the vice presidency of Ohio State University. In 1928, he became junior dean of the College of Education and four years later he was elected to the vice judiciary of Ohio State University. In 1942, he was elected to the presidency of the University of Wyoming and president of the University of Minnesota on July 1, 1945. When he was formally inaugurated in April 1946, Fred B. Snyder, chairman of the Board of Regents remarked, "He is exactly the right man in the right place at the right time."

When President Morrill retired on June 30, 1960, the University was vastly different than when he became president in 1946. In his first year of presidency, the full-time student enrollment doubled. In the fall quarter of 1945, there were 11,396 students enrolled in the University. In the fall quarter 1946, the number had increased to 27,103 many of them returning war veterans. However, he said, "I take no particular pride in the size of the University as such. If the quantitative takes precedence over the qualitative, it's a tragedy. The measure of greatness is in instruction of young people, research to widen the boundaries of knowledge, and service." He took pride in calling attention of the entire citizenry to the fact that the University ranked in the top ten of the nation's public and private schools despite the fact

that Minnesota has only 2 per cent of the nation's population and less than 2 per cent of its resources.

During the Morrill years, the medical sciences so increased that support from general University funds tripled from $562,824 to $1,729,917.

In addition to working closely with Dean Diehl and Dean Howard, President Morrill was involved in the advancement of the other schools and the University in general.

When he attained retirement age in 1960, an all-University dinner was given in his honor on May 24, when he received a certificate reading: "James Lewis Morrill, President of the University of Minnesota, 1945-60; as a friend, an example of what loyalty can be; as a man, the personification of integrity; as a president, the very symbol of academic freedom."

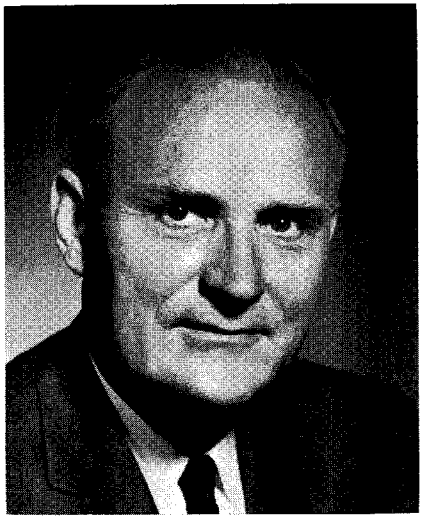
A memo by Edwin L. Haislet, University of Minnesota Alumni Executive Secretary, published in the *Alumni News,* June 1960, is a beautiful summary of President Morrill's preparation and his presidency of the University of Minnesota including, "a man of true integrity, of vision and courage, friendly yet reserved, warm but dignified, he looked, spoke, and acted like a college president should."

A statement by which President Morrill must always be remembered follows: "The future of America and indeed the world walks on the feet of the young people who tread our campus paths today." *(University of Minnesota Alumni News,* June 1960.)

Following retirement in June 30, 1960, Mr. Morrill became a Ford Foundation Consultant. He is presently associated with the Foundation's overseas development program in Latin America. (See Chapters XV and XVIII.)

OWEN MEREDITH WILSON

Owen Meredith Wilson, who succeeded J. L. Morrill on July 1, 1960, was born on September 21, 1909, at Colonia Juarez Chihuahua, Mexico, where his father headed a Mormon Academy. Wilson was reared in Utah and completed the work for the degree of bachelor of arts at Brigham Young University in 1934. One of his classmates, William P. Martin (now head of the Department of Soil Science, University of Minnesota) said, "His combination of academic attainment and student activity and faculty acceptability led to his award



O. Meredith Wilson

of the *Most Efficient Student Medal* at the (1934) graduating exercises —an award that was most appropriate."

In 1943, Wilson was awarded the degree of doctor of philosophy in history, University of California; in 1959, the degree of doctor of laws, Lewis and Clark College; the next year he received the same degree from Reed College.

In the early 1950's, the governing body of the University of Oregon made a nationwide search for a new president. Dean O. Meredith Wilson was the unanimous choice. At that time, 1954, the chairman of the Faculty Advisory Council referred to him as "the sort of man every faculty hopes to get when a new president is chosen—a scholar and teacher with solid liberal training, an educational statesman."

In January 1958, he watched the football game at the Rose Bowl when his University lost 10-7 to Ohio State University. He commented that "Universities ought to use the same scouting and recruiting tactics to attract top flight students as athletic directors use to get star athletes. He pointed out that when the Oregon coach is interested in any high school athletic star there are many persons willing to see to it that the boy gets an opportunity to see our campus and look into the advantages of playing for Oregon. Why shouldn't it be just as important to recruit 200 pounds of scholar as it is to lure 200 pounds of athletic talent?"

When it was known that President Wilson was to leave Oregon a

member of the Oregon Board of Education spoke of him as, "The most irreplaceable man in the entire Oregon education system."

As President Morrill's retirement age approached, the University began early to search for his successor. The announcement of O. Meredith Wilson's appointment was made by Mr. Quinlivan, on January 14, 1960.

On July 27, 1966, President Wilson wrote the University's Board of Regents the following letter: "Unless something completely unforeseen develops, I have decided to accept the Directorship of the Center for Advanced Study in the Behavioral Sciences, beginning July 1, 1967. I am writing this now because the decision if made, will be announced while I am away from the city.

"I find this letter not only very hard to write but even much harder than I imagined. No board has ever been kinder to an officer; no chairman of a board, more considerate than you have been. I have an increasing pride in the University and its faculty and a deep attachment to the Minnesota community which supports the entire enterprise. Whether I am correct or not, my decision has rested on what seems to me a rather hard analysis of the way in which my energies could be best invested during the next ten years. A great determinant in this instance was that, by an earlier decision, I had limited my career at Minnesota to an additional three years. In the new post, I am able to contemplate ten years at work which is very attractive to me and which, by men to whose opinions I have normally listened, is considered the most important thing I could do now for education. The opportunity to be helpful to the social sciences and humanities where universities have lagged in their support also draws strongly on me.

"I hope you will understand that this decision was made after the most painful soul-searching. I would like again to express my pride in the Board and the University and to thank you for the honor of allowing me to work with you for these seven years.

"This letter sounds like a letter of goodby; it is only a letter of decision. I will expect to work as hard as I can for the welfare of the University for the coming year."

During his seven years as head of the University, President Wilson gave unqualified support to the College of Medical Sciences. Concerning him, Dean Robert B. Howard wrote August 29, 1966: "He has been an active supporter of the College of Medical Sciences, vitally

interested in its problems and in its sound development. His first formal on-campus address was given under the auspices of the Medical School and the Minnesota Medical Foundation in September of 1960, when he talked to the opening day convocation of our medical student body.

"President Wilson played a vital role in the resolution of the private practice matter. He has given active support to our program in the humanities and arts for medical students, a program known in its earlier phase as the "Horizons Series." Not only has he supported this, but he gave the initial lecture in the series. He has actively participated in a number of fund raising activities on behalf of the College, working closely with such groups as the Masons, the Variety Club, and individual donors who have expressed interest in the medical area. He has given active and effective support to the program for major expansion of the health sciences within the University, a program that will be presented definitively to the 1967 Legislature.

"Perhaps his most effective support of the College of Medical Sciences, however, has been his untiring and unceasing effort to build a better and stronger University, for the strength of the Medical Center will certainly be no greater than that of its parent University. We have all been most grateful for his efforts, and his prospective departure saddens us all."

When President Wilson resigned, a search committee recommended Malcolm C. Moos as 10th president of the University. The Board of Regents approved the recommendation on July 1, 1967 to become effective on September 1. (See Chapter XVIII.)

Chapter VII

University College of Medicine and Surgery Established

During Cyrus Northrop's Presidency, the College of Medicine and Surgery Becomes a Reality. On April 7, 1887, a committee consisting of Doctors D. W. Hand, C. N. Hewitt, and P. H. Millard waited upon the Board of Regents and urged the propriety of establishing a teaching school of medicine with a high curriculum. A special committee of the Board took up the proposal.

At a meeting of the Board of Regents, February 28, 1888, a committee of the Board of Trustees of Minnesota Hospital College and St. Paul Medical School appeared and tendered the use of their properties to the State for the University Medical and Surgical College purpose.

In March, the Board of Trustees of the Minnesota Homeopathy Medical College made a formal proposal to the Board of Regents to waive its charter as a college and cease to teach, provided homeopathy would have a fair representation in the new medical department of the University.

On April 26, 1888, the minutes of a meeting of the Board of Regents contain the following: "The Committee on Medical Department of the University, through its chairman, President Northrop, made the following report, which was adopted in the following resolution:[1]

"Resolved by the Board of Regents of the University of Minnesota.

"1. That the Medical Department of the University of Minnesota, the faculty of which has heretofore been merely an examining and not a teaching body, be and the same is hereby abolished.

"2. That there is hereby established a College of Medicine, to be styled, 'The Medical Department of the University of Minnesota,' which college shall be opened as a school for teaching medicine in October 1888.

"3. The faculty shall consist of the president of the University and such professors to be elected by the Board of Regents as may be charged

with the duty of giving instruction in such departments, one of which professors shall be dean of the faculty, and shall perform such duties as usually pertain to that office.

"4. The course of instruction shall cover a period of three years of six months each.

"5. Any matriculated student of any college of medicine in the State of Minnesota may be admitted as a student in the Medical Department of the University without examination, if application for admission is made during the college year 1888-89. But all other applicants for admission after the year 1888-89 shall be required to prove their fitness to enter the department, 1st by writing legibly and correctly an English composition of not less than two hundred words. 2nd by translating easy Latin prose, or, in lieu thereof by passing an approved examination in any one of the following subjects: French, German, one of the Scandinavian languages, the elements of Algebra or Plane Geometry, Botany; and 3rd by showing such knowledge of Physics as may be obtained from the study of Balfour Stewart's *Elements of Physics*: Provided that no examination shall be required of matriculated students on graduation of any reputable college, high school, nor of persons holding a first grade teacher's certificate; and that the certificate of the State High School Board in any of the required subjects shall be accepted in lieu of an examination in that subject.

"6. Any person of good moral character may be admitted as a student in this department, upon passing the required examination.

"All students who enter the department shall register at the office of the Registrar of the University and all fees required shall be paid to the Registrar and thereafter be subject to the disposition of the Board of Regents.

"7. That tuition fees for the regular courses of lectures in the College of Medicine shall be forty dollars for residents of the state and sixty dollars for non-residents: that the fee for graduation be ten dollars for medical and dental students; that for laboratory work the charges be the actual cost of the chemicals used and breakage only; that the charges for dissection be confined to the actual cost of the bodies.

"8. That the propositions of the Hospital College of Minneapolis, and of the St. Paul Medical School to lease to the Board of Regents for five years at a nominal rent of one dollar the buildings now used by these medical schools for the purposes of medical instruction and to

surrender to the Board of Regents for the use of the Medical Department of the University all the apparatus and material now in use in said colleges be accepted, and that the leases of said buildings tendered to the Board by the authorized agents of said colleges be accepted and the conditions and terms therein named, it being understood and agreed that said colleges shall surrender their charters and cease to be teaching schools.

"9. That the Board of Regents will maintain in the Medical Department of the University a curriculum of high character, of which laboratory and clinical work shall be a leading feature. All laboratory work shall be done and all didactic lectures shall be delivered in Minneapolis. One day in each week shall be set apart for clinical work both in Minneapolis and in St. Paul. There shall be maintained in each city, without expense to the state, a dispensary to be known as the University dispensary.

"10. The degree of doctor of medicine and surgery shall be conferred upon students who are upwards of twenty-one years of age, who are of good moral character, who have attended at least three regular courses of lectures of not less than six months duration each, who have taken a laboratory course including Urinalysis, Toxicology and qualitative analysis and have studied medicine at least three years.

"The doctor of dental surgery shall be conferred upon students who are upwards of twenty-one years of age, who are of good moral character, who have attended at least three regular courses of lectures of not less than six months each, who have taken a laboratory course in prosthetic dentistry and who have done the same work as the candidates for the degree of doctor of medicine are required to do in Anatomy, Physiology and Chemistry."

Upon motion, the following was adopted:

"Resolved that the subject of the faculty and curriculum of the Medical Department be referred to a committee consisting of one regent, the dean of the Medical Department, the president of the State Medical Society, the president of the State Examining Board, and the president of the State Board of Health, which committee shall report to the Board of Regents the names of proper persons to fill the various chairs and lectureships in the Medical Department for the consideration and action of the Board."

President Northrop was appointed on this committee to represent the

Board of Regents. It was voted that the president and secretary of the Board be authorized to execute the leases of the Medical Colleges of St. Paul and Minneapolis on the part of the Board.

On motion, the following was adopted:

"Resolved, that this Board make provision for instruction in homeopathy and that a committee consisting of President Northrop and Regent Kiehle be instructed to report names of professors and lecturers for the same for consideration of the Board."

When Charles W. Elliot became president of Harvard University in 1869, he said that anyone who chose could come in off the street and enter Harvard School of Medicine. Apparently, he was not proud of this fact! As fast as possible, he began the struggle to make the School of Medicine a general University Department in the true sense. He accomplished his goal of developing a school of medicine second to none. The next school to succeed in this manner was Johns Hopkins during the last decade of the 19th Century. Observing the success in developing the Harvard School and the work in progress at Johns Hopkins, President Northrop and all concerned proceeded in a similar manner.

Teaching Faculty for College of Medicine and Surgery Appointed. A committee consisting of Dr. D. W. Hand, President of the State Board of Health; Dr. F. French, President of the State Board of Medical Examiners; Dr. Charles F. McComb, President of the State Medical Society; Perry H. Millard, Dean of the Medical Department; and Cyrus Northrop, President of the University, was thereupon ap-

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The photograph of the original faculty which appears in Johnson's *Forty Years of the University of Minnesota* was taken sometime after the first faculty was appointed. Therefore, it contains Doctors Greene, Jones and MacLaren who were appointed later. However, that group photograph does not contain pictures of Doctors A. B. Ancker, Burnside Foster, Arthur Ritchie, A. E. Senkler and E. C. Spencer who were members of the original faculty. Individual photographs of Doctors Ancker, Foster and Senkler taken at about that time have been found and inserted on Johnson's original group picture. Therefore, they appear in the above photograph. An individual photograph of Dr. Spencer was not found, however, he is shown in the photograph with Doctors Parks Ritchie and Justus Ohage in Chapter IX.

A photograph of Dr. Arthur Ritchie has not been found.

Top row: Dunn, Millard, Northrop, Riggs, E. J. Abbott. *Second row:* Foster, MacLaren, Fulton, Hendricks, C. J. Bell, Moore, Senkler. *Third row:* Bracken, Greene, Vander Horck, Parks Ritchie, Dunsmoor, A. W. Abbott, Stewart. *Fourth row:* Beard, Hunter, Jones, J. W. Bell, Cates. *Fifth row:* Stone, Allport, Wells. *Sixth row:* Wheaton, Laton. *Seventh row,* Ancker.

pointed by the Board with instructions to nominate a faculty for the College of Medicine and Surgery and the College of Dentistry.

A special committee consisting of President Northrop and Professor D. L. Kiehle was appointed to nominate a faculty for the College of Homeopathy. The persons nominated by the above committees were unanimously elected members of the faculties by the Board of Regents.

Three Colleges Established within the Department of Medicine. Thus, the Department of Medicine consisted of a College of Medicine and Surgery, a College of Dentistry, and the College of Pharmacy was added in 1892.

The names of those appointed to the original teaching faculty of medicine and surgery follow:[2]

Arthur F. Ritchie, Minneapolis, Professor of Anatomy; Richard O. Beard, Minneapolis, Professor of Physiology; J. C. Bell, Massachusetts, Professor of Medical Chemistry; H. M. Bracken, Pennsylvania, Professor of Materia Medica and Therapeutics; Albert E. Senkler, St. Cloud, Professor of Theory and Practice of Medicine; Charles H. Hunter, Maine, Professor of Clinical Medicine and Pathology; Alexander J. Stone, Maine, Professor of Diseases of Woman; John J. Fulton, Pennsylvania, Professor of Ophthalmology and Otology; Frank Allport, Minneapolis, Clinical Professor of Ophthalmology and Otology; C. Eugene Riggs, Ohio, Professor of Diseases of the Nervous System; Charles H. Boardman, Philadelphia, Professor of Medical Jurisprudence; Arthur B. Ancker, Baltimore, Professor of Hygiene; James H. Dunn, Indiana, Professor of Diseases of the Genito-Urinary Organs; Charles L. Wells, New York, Professor of Diseases of Children; James E. Moore, Pennsylvania, Professor of Orthopedic Surgery; M. P. Vanderhorck, St. Paul, Professor of Diseases of the Skin; W. L. Laton, Maine, Professor of Diseases of the Nose and Throat; Everton J. Abbott, Cleveland, Ohio, Professor of Clinical Medicine; Charles A. Wheaton, Syracuse, New York, Professor of Principles and Practice of Surgery; Frederick A. Dunsmoor, Litchfield, Minnesota, Professor of Clinical and Operative Surgery; Perry H. Millard, Stillwater, Dean and Professor of Clinical Surgery; A. Parks Ritchie, Indiana, Professor of Obstetrics; J. Clark Stewart, New Jersey, Professor of Histology and Bacteriology; J. W. Bell, Ohio, Professor of Physical Diagnosis and Diseases of the Chest; E. C. Spencer, St. Paul, Professor of Surgical Anatomy; A. B. Gates,

Maine, Adjunct Professor of Obstetrics; Burnside Foster, Massachusetts, Demonstrator of Anatomy.

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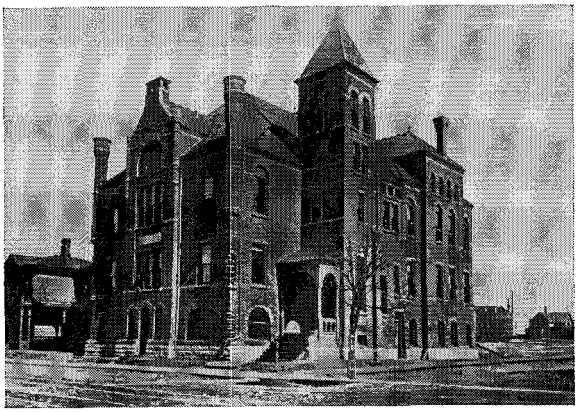
Chapter VIII

Perry Millard's Deanship Leads the Way — 1888-1897

At age 40, Dr. Perry H. Millard became dean of the first teaching faculty. He now had the kind of Medical College he had long advocated. The faculty held its first meeting on June 8, 1888, but there was no place on the campus to house the new College. However, the Board of Regents had accepted the building of the Minnesota Hospital College, where lectures were delivered and the laboratory work was conducted. This building was located a considerable distance from the campus on Sixth Street and Ninth Avenue South, Minneapolis (Fig. 1).

On May 8, 1888, President Northrop appointed a Committee on Curriculum for the Medical Department as follows: from the College of Medicine and Surgery, Dean Perry H. Millard, Frederic A. Dunsmoor and W. W. Abbott; for the College of Homeopathy, Henry W.

Perry H. Millard



First building occupied by University of Minnesota Medical Department from 1888 to 1893 at Sixth Street and Ninth Avenue South, Minneapolis.

Kiehle and George E. Ricker; for the College of Dentistry, L. J. Weeks, and J. H. Martinsdale.

The same day, President Northrop appointed a Committee on By-laws consisting of R. O. Beard, chairman, Perry Millard, W. E. Leonard and L. J. Weeks.

The curriculum fashioned by Dean Millard and his faculty covered a period of three years, each of which represented an annual course of lectures of six months' duration.

At a meeting of the faculty on May 14, 1888, with Dean Millard in the chair, the days and hours each day for lectures were scheduled. The lecture hours by subjects are here listed:

Medical Jurisprudence	8 hrs.	Dermatology	8 hrs.
Hygiene	8 hrs.	Genito-urinary	12 hrs.
Orthopedia	8 hrs.	Nervous System	24 hrs.
Physical Diagnosis	8 hrs.	Eye and Ear	24 hrs.
Diseases of Women	36 hrs.	Practice	48 hrs.
Surgery	72 hrs.	Pathology	24 hrs.
		Obstetrics	48 hrs.

All dissection was to be done evenings.

During a meeting on January 9, 1889, with President Northrop in the chair, the lectures in laboratory subjects were mentioned as eight hours in each of the following: anatomy, physiology, chemistry and botany. "Laboratory instructions will be given during the course."

The lectures began October 1, and continued to the end of May.

Various hospitals and dispensaries of Minneapolis and St. Paul provided a clinical teaching setting. Dr. Thomas G. Lee arrived from Yale in 1891 to give the course in histology, embryology, bacteriology and clinical microscopy. The annual fees were $40 per year for Minnesota residents, and $60 for others.[1] Dissecting material was extra and was scarce.

Students—Entrance was Easy—Graduation Not Difficult. When the University College of Medicine and Surgery opened in 1888, the course was presented in three academic years of six months each. In 1890-91, the school year was increased to eight months and in 1901-02, to nine months. In 1894, the course was lengthened to four years. The first students were admitted with a high school diploma or, lacking this, upon a simple entrance examination.

The student body gradually increased in number from 105 at the beginning to 124 in 1891-92, to 231 in 1894-95, and 221 in 1897, of whom 56 graduated that year.[1] The first class to graduate from the University College of Medicine and Surgery consisted of 23, of whom 2 were women. The number of graduates increased to 32 (2 women) in 1892, and 45 in 1893 (4 women).

The Library—the Backbone of the College Grows. After the appointment of the teaching faculty, and the College's housing in the former Minnesota Hospital College, accumulation of a library became the next concern. On April 4, 1892, the Executive Committee of the Board of Regents voted $2,000 for books for the Medical Department. The new Medical Hall completed on the campus in 1893 provided a special library room for the gradual collection of medical books.

T. G. Lee was especially interested in building the best possible medical library. Soon after becoming a member of the faculty in 1891, he was appointed chairman of a Committee on Equipment and Library. Over the years, faculty members and their friends contributed to the library.

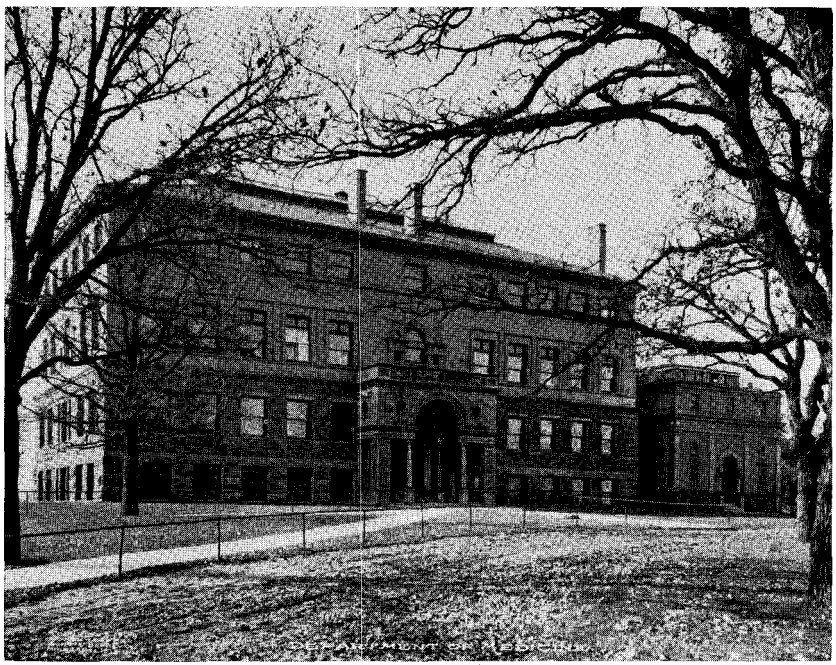
On March 21, 1897, President Northrop stated that the library of Dean P. H. Millard who had died on February 1, 1897, would probably be given to the Library of the College of Medicine and Surgery with certain restrictions until Millard's youngest heir should come of age. After the Medical Hall fire in 1909, the library was moved to the Institute of Public Health and Pathology. In 1902, Mrs.

Rollin E. Cutts, a member of the class of 1891, made a gift of several unbound medical journals. A contribution of editions also came from the late Professor Hendricks' (Anatomy) library.

Campus Buildings. In 1891, $80,000 was appropriated by the legislature for erection and equipment of buildings on the University campus. Dean Millard[2] personally advanced money ($65,000) for the first building which was dedicated in 1892 as Medical Hall (Fig. 2) which became Millard Hall in 1906, the Pharmacy Building in 1913 and, finally Wulling Hall in 1942. At the dedication ceremony held in 1892, Sir William Osler, Baltimore, gave the main address, "Teacher and Student." This is considered one of Osler's best published addresses.[3]

In 1892, the Legislature authorized removal of the College to the campus.[4] In this new building, gross anatomy, histology, pathology and bacteriology were taught.

Everybody Fears Doctors—It Seems. Concerning the move to the campus, Dr. R. O. Beard wrote:[1] "It was the occasion of great concern when the Medical College was removed. The academics were



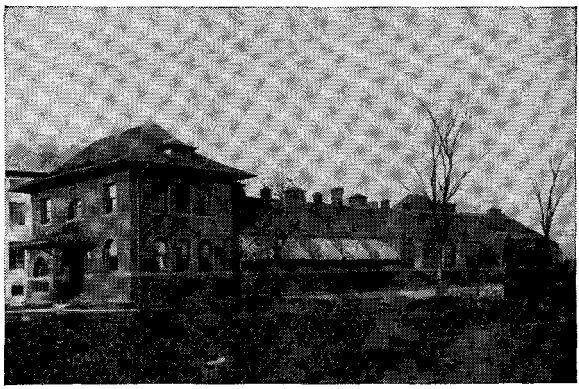
Medical Hall (Millard Hall)

practically the entire University of that day, and the invasion of the campus by the Medics was like the alarum of the barbarians at the gates of Rome. They were literally afraid of us and, perhaps, not altogether without occasion, for the Medics of the period—hard-working, ambitious, critical as ever—were a rough lot. To 'pass up' a student over the amphitheater benches was a common pastime, and if discovered by the entry of a professor, they were not in the least abashed; to conceal animals, large or small, dead or alive, in the reading-desk or under the seats; to mix the chemical solutions so that the reactions would not work, to introduce a 'stiff' into a faculty meeting—these were quite ordinary pranks. If a lecture was liked, it was always applauded. Silence greeted the unappreciated, and those who were in disfavor might meet empty benches or be treated to a small riot."

In 1893, another structure, known as the Medical Chemistry Building ("Bowling Alley") was completed (Fig. 3) (became the General Storehouse in 1912 and was razed in 1924). Its west end was used as a chemical laboratory, and the teaching of bacteriology, histology, pathology and pharmacology was transferred to the east end of the building.

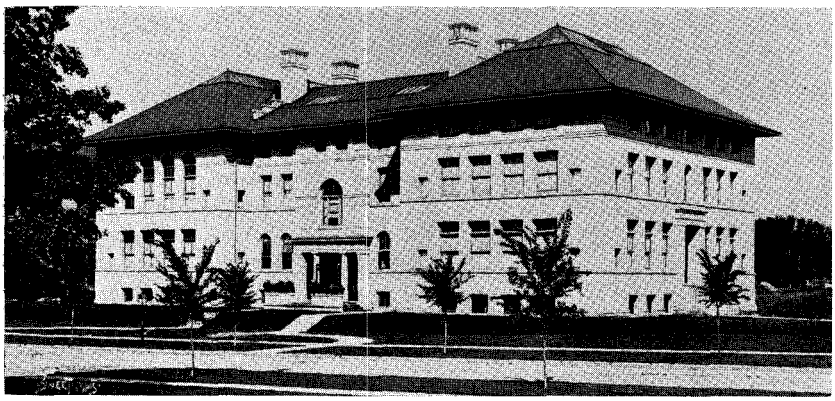
In 1895, the legislature appropriated $40,000 for a laboratory of medical sciences. When completed in 1896, it housed bacteriology, histology, pathology and physiology (Fig. 4). This building was renamed Wesbrook Hall in 1932 in honor of Dean Wesbrook.

When Dean Millard died in 1897, President Northrop requested



This structure was erected the same year as Medical Hall and was known as the Medical Chemistry Building. It housed chemistry, bacteriology, histology, pathology, and pharmacology.

Dr. R. O. Beard, secretary of the faculty many years, to prepare a memorial which contains the following: "His most signal service was rendered in the projection, organization, and development of the Department of Medicine of the University of Minnesota . . . It was largely through his unceasing labors and his persistent enthusiasm that it was placed upon the University Campus under the roof of Medical Hall. It was his first ambition, his daily duty, his well-justified pride to forward its interests throughout the years of his fatherhood of its faculty."



Laboratory of Medical Sciences

In an address delivered in 1908, President Cyrus Northrop said,[5] "The credit for organizing this College by combining the best men of various independent medical colleges in a new faculty for the University and of securing the retirement of the independent colleges from the work of teaching so as to give the Medical College of the University a practical clear field belongs to Perry H. Millard, the first dean of the College. The pertinacity, firmness, skill and tact displayed by Dr. Millard were wonderful and success crowned his efforts at last, though I had often thought he would fail."

A Memorial Erected for Dr. Millard 39 Years after His Death. Dr. E. S. Boleyn, class of 1894, who practiced so long in Stillwater and knew Dr. Millard very well, called the attention of the Minnesota Medical Alumni to his unmarked and sunken-in grave in the Fairview Cemetery in Stillwater. Dr. Millard's contributions to the early years of the Medical School were so great and enduring that although 39 years had passed since his death, a committee of the Minnesota

State Medical Association acting with the Medical School Alumni collected the necessary funds to procure and erect a tombstone on his grave.[6] The ceremony arranged for June 7, 1936, was attended by medical leaders of the State and the School of Medicine including President Lotus D. Coffman.

Following Dean Millard's death on February 1, 1897, Dr. H. M. Bracken, Secretary of the State Board of Health was appointed acting dean until the faculty and Board of Regents selected a permanent dean.

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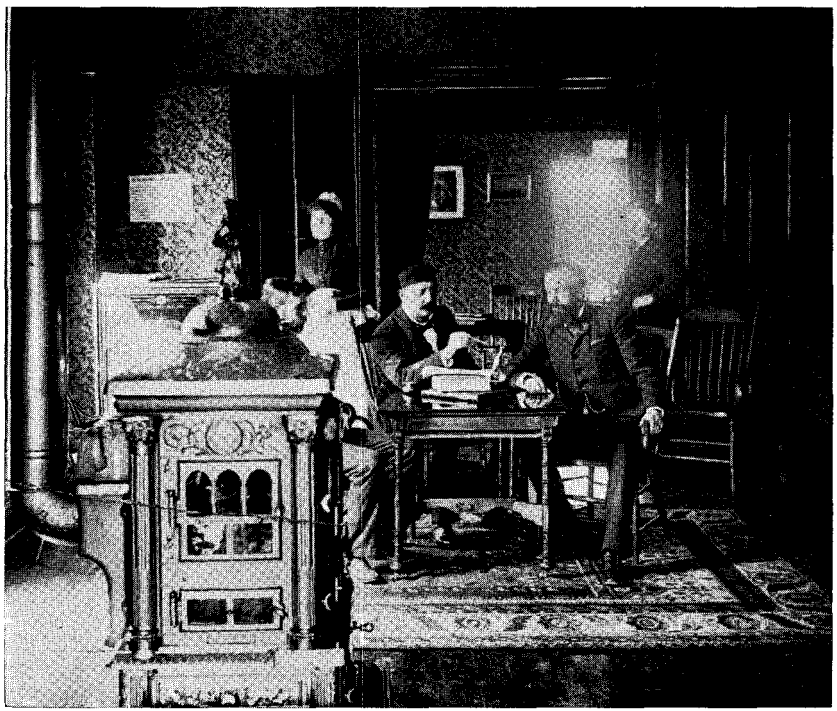
Chapter IX

Dean Ritchie's Regime — 1897-1906

As successor to Dean Millard, Dr. A. Parks Ritchie was the choice of the faculty, President Northrop, and the Board of Regents for advancement to the deanship. He was appointed on a part-time basis in May 1897 with an annual salary of $1800 and permitted to continue private practice in St. Paul. Ritchie was born in Indiana in 1845, and received the degree of doctor of medicine from the Ohio Medical College in Cincinnati in 1870. He established private practice in St. Paul in 1880, and was appointed to the chair of obstetrics when



A. Parks Ritchie and Justus Ohage

the College of Medicine and Surgery was established at the University of Minnesota in 1888. (See Chapter XXII.)

Requirements for Entrance Increased for Medical Students. In 1900, the medical student's entrance requirements were elevated to the same as all other departments of the University. In 1898, the first offer of a seven-year undergraduate course in medicine, leading to the bachelor of science and doctor of medicine degrees was announced. In the school year 1903-1904, a six-year course was optional.

After Dr. Rollin E. Cutts of the surgical staff died in 1902, Mrs. Cutts, also a physician, gave a $500 endowment from which the investment proceeds were to be used for an annual award of a gold medal for the student with the highest scholastic standing in surgery.

When Dr. Ritchie resigned in 1906, a total of 192 students were enrolled in the College of Medicine and Surgery and 49 graduated that year.

Buildings—New Buildings—The First Hospital. In 1900, a building costing $40,000 was constructed for Gross Anatomy taught by Dr. C. A. Erdman. (See Chapter VIII.) This building was destroyed by fire in 1910 and was later replaced by the Pharmacy Greenhouse.

Anatomy Building constructed 1900

Later, under Dr. Ritchie's deanship, funds were procured for the Public Health and Pathology Building which was completed in 1907.

Dr. A. F. and Mrs. Elliot left an estate valued at $225,000 to $250,000 in the hands of Attorney Walter J. Trask as trustee. Dr. A. B. Cates, Professor of Obstetrics knew Mr. Trask and pointed out the need for money to build a hospital on the campus. (See Chapter XXVII.) In 1905, $113,000 was allocated for a campus hospital. Although the first unit of University Hospitals was not constructed until 1911 this enabling fund was acquired under Dr. Ritchie's deanship.

Postgraduate Course Recommended—Recognition of a Need. On November 29, 1904, Dr. George Douglas Head, then secretary of the medical faculty, addressed a letter to the Executive Committee of the medical faculty presenting a plan for the organization of a postgraduate course in the Medical Department. He recommended that a special committee be appointed to formulate a plan for a postgraduate course to be presented at the next meeting of the general faculty.

The general faculty was then to develop through its committee a plan that would be satisfactory to all the faculty. The whole matter could then be referred to the Board of Regents for its sanction and the department should then proceed with the organization of the postgraduate course.

According to the proposed plan, the course would begin on May 1 and continue to June 1 each year. It would be controlled and governed by the Executive Committee of the Medical School. The schedule was to consist of a course in each of the following subjects: general bacteriology, technique in pathological histology, etc., surgery and applied anatomy, embryology, clinical microscopy, public health, medicine, all bedside courses and surgery.

On motion of Dr. Lee, the matter was referred to a special committee to be appointed by the dean with instructions to consider and formulate a plan for a postgraduate course to be presented to the next general faculty meeting. Dean Ritchie appointed Doctors Head, Greene and Lee.

On December 9, 1904, this committee reported approval of the plan essentially as Dr. Head originally proposed it. It was favored by Doctors Todd, Jones, Hunter, Lee and Stewart. Dr. Greene, speaking not only for himself but for the majority of the St. Paul members of

the faculty, spoke against organization of a postgraduate course. Dr. Hunter moved that the Executive Committee prepare a working plan to present at a special meeting of faculty—motion carried.

At a regular meeting of the College of Medicine and Surgery, January 1, 1905, Doctors Lee and Beard stated they would be unable to give postgraduate work until their present crowded condition was relieved. However, Dr. Todd's motion that the Executive Committee make plans for the organization of postgraduate work carried. This was the beginning of the Continuation Medical Education program of today.

Reorganization of Faculty Proposed. On November 15, 1905, Dr. R. O. Beard presented an elaborate plan for reorganization and departmentalization of the faculty. Both the postgraduate course and the faculty reorganization plans appealed to Dean Ritchie. Therefore, he called a special faculty meeting on December 1, 1905 to discuss both proposals. Plans to reorganize the faculty were postponed but a motion to continue planning for postgraduate work passed. This was the year the University Postgraduate School was established.

Dr. Ritchie Resigns Deanship. Dr. Ritchie resigned the deanship in 1906 in order to have more time for his private practice in St. Paul. During the nine years he served as dean, some exceedingly important projects which we have mentioned had their beginning—such as procuring funds and constructing a new Anatomy Building, procuring funds for the new Public Health and Pathology Building, and the first gift for the University Hospital. Postgraduate teaching and faculty reorganization were considered during his administration.

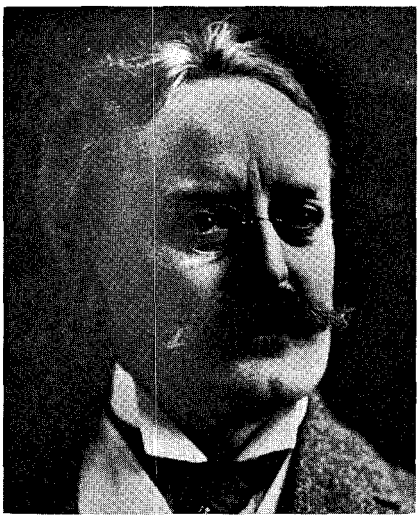
After resigning the deanship Dr. Ritchie remained on the faculty as professor of obstetrics. (See Chapter XXII.) In 1910, the Departments of Gynecology and Obstetrics combined and Dr. Ritchie's title was changed to chief of the Department of Obstetrics and Gynecology. He continued as a faithful attender of faculty meetings and worked valiantly not only to promote the new projects, but all other worthwhile activities in the rapidly developing College of Medicine and Surgery. He died on February 2, 1913.

Chapter X

Wesbrook Appointed Dean 1906 — Resigns in 1913

PROFESSOR FRANK F. WESBROOK succeeded Dr. Ritchie to the deanship in 1906. He was born in Ontario, Canada, in 1868, and received the medical degree from Manitoba College in Winnipeg in 1890, after which he did extensive and prolonged study in pathology in England and Germany. In 1895, he came to the University of Minnesota as professor of pathology and bacteriology. A year later, he was also appointed bacteriologist to the State Board of Health. In these two positions, he was on a full-time basis. He was the first full-time dean of the Medical School.

When Dr. Wesbrook was appointed, the College of Homeopathy still functioned and Hamline University had a medical department with buildings across the street from the Minneapolis General Hospital, where both the University and Hamline staffs taught students. There was



Frank F. Wesbrook

considerable rivalry between the two staffs. This interfered with the development of teaching and research services at the General Hospital.

Problem of College of Homeopathy Solved and Dissolved! There was still the problem of the Homeopathy College of Medicine and Surgery, an integral part of the University's Department of Medicine. The Board of Regents had created two chairs, one of homeopathic materia medica (the study of drugs under different names), and the other of homeopathic therapeutics (the study of drugs under different doses). By 1909, the number of students in the College of Homeopathy had decreased from its highest enrollment of 16 to only one senior and two juniors with none in the sophomore and freshman classes. Dean Wesbrook persuaded the staff of this College that union with the regular College of Medicine and Surgery staff with homeopathic subjects as electives would be advantageous. After a brief period, no student chose subjects in this field and thus, the problem of homeopathy was solved.

Hamline University Department of Medicine Joins University College of Medicine and Surgery. Dean Wesbrook skillfully persuaded the Hamline medical faculty to merge with the University College of Medicine and Surgery with full agreement of Hamline University officials on February 20, 1908. The students then registered at Hamline were re-registered in appropriate classes in the University.[1]

Since 1908, the University Has Only Medical School in Minnesota. On September 29, 1908, Dr. T.G. Lee, Secretary of the Faculty, reported registration of students for the year 1908-1909. There were 75 fourth-year students including 21 from Hamline, 50 third-year students including 16 from Hamline, 61 second-year students including 5 from Hamline and 46 first-year students. Hamline Alumni were adopted as University Alumni. Since this historic merger in 1908, there has been only one school of medicine in Minnesota.

"The Doctors Mayo" Enter Our Medical School Picture. Dean Wesbrook developed a close friendship with William and Charles Mayo and sought their advice regarding medical education, hospitals, etc. Thus, he secured their support for the development of the College of Medicine and Surgery. He and Dr. Thomas S. Roberts (of Ornithology fame), head of pediatrics in the College of Medicine and Surgery, won Dr. William Mayo's special interest in the school and promoted his appointment to the University's Board of Regents in 1907. Thereafter,

Dr. Mayo remained on the Board of Regents and worked fervently for the promotion of the school until his death in 1939.

Organization of Faculty—College Departmentalized. For the first 20 years of the College of Medicine and Surgery, each faculty member was responsible directly to the dean. At the meeting of the Executive Committee on November 15, 1905, Dr. R.O. Beard had proposed a plan for reorganization of the College. A motion was passed that the proposal be sent to all teaching members of the faculty above the rank of assistant and that the plan be recommended to the faculty for action.

At a meeting on November 25, 1906, Dr. Beard moved that the dean appoint a committee of three to take up the plan for reorganization of the faculty, revise the same and present it to the Executive Committee. Dean Wesbrook appointed Dr. Beard, Dr. Greene, and Dr. Moore to serve on this Committee. At a meeting of the faculty on December 7, 1906, Dr. Beard presented the report which again contained the plan for organization. The plan was discussed by seven members of whom two were opposed. Dr. Beard then moved that, "it is the sense of this meeting that such a plan of reorganization as proposed shall be adopted and that this be made the basis of consideration by the Executive Committee for further consultation for the faculty and to report at the next meeting of the faculty." This motion was carried.

Significant Reorganization of Medical Faculty. On November 23, 1908, the following draft of the reorganization plan was presented to the faculty: "The organization of the College of Medicine and Surgery of the Department of Medicine of the University of Minnesota shall consist of:

"(1) The Executive Faculty, (2) The General Faculty.

"The Executive Faculty shall consist of the Chiefs (or their alternates) of the following departments of instruction: to wit—1. Anatomy, 2. Histology and Embryology, 3. Physiology, 4. Chemistry, 5. Materia Medica, Pharmacology and Therapeutics, 6. Pathology, Bacteriology and Hygiene, 7. Surgery, 8. Medicine, 9. Obstetrics, 10. Gynecology, 11. Ophthalmology, 12. Dermatology, and 13. Nervous and Mental Diseases.

"Under each Department of Instruction shall be included the elective courses allied to it.

"Under the Department of Surgery shall be included:—Principles of surgery, practice of surgery, operative surgery, orthopaedics.

"Under the Department of Medicine shall be included:—Principles and practice of medicine, physical diagnosis, diseases of children, medical jurisprudence, history of medicine and clinical microscopy.

"Under the Department of Nervous and Mental Diseases shall be included electro-therapy and mechano-therapy.

"The *Executive Faculty* shall conduct all the executive business of the College, devise rules for the governance of the student body, shall supervise and coordinate courses of instruction and pass upon the recommendation of students for graduation.

"Each Department of Instruction must be represented in the meetings of the Executive Faculty by its Chief, or by an alternate who shall be designated in each department by vote of the Executive Faculty, every two years.

"The *General Faculty* shall consist of the Chiefs, professors, clinical professors, associate and assistant professors, demonstrators, clinical instructors and laboratory instructors in all departments of instruction.

"The annual meeting of the General Faculty shall be held in September, at the beginning of the first semester and a semi-annual meeting in February at the beginning of the second semester. Special meetings may be called at any time by the President of the University or the Dean of the College. Programs for the meetings shall be prepared by the Dean. It shall be the business of the General Faculty to consider questions relating to the educational work and policy of the College. Decisions upon such questions, reached by the General Faculty, shall be reported to the Executive Faculty and by it to the Board of Regents if necessary.

"The present Executive Committee shall be abolished and its duties shall be assumed by the Executive Faculty.

"The Secretary, who shall be elected by the Executive Faculty for a term of two years, shall serve as the recording officer of both the Executive and General Faculties.

"The Dean, or in his absence from the city, the Secretary, shall represent the College before the Board of Regents.

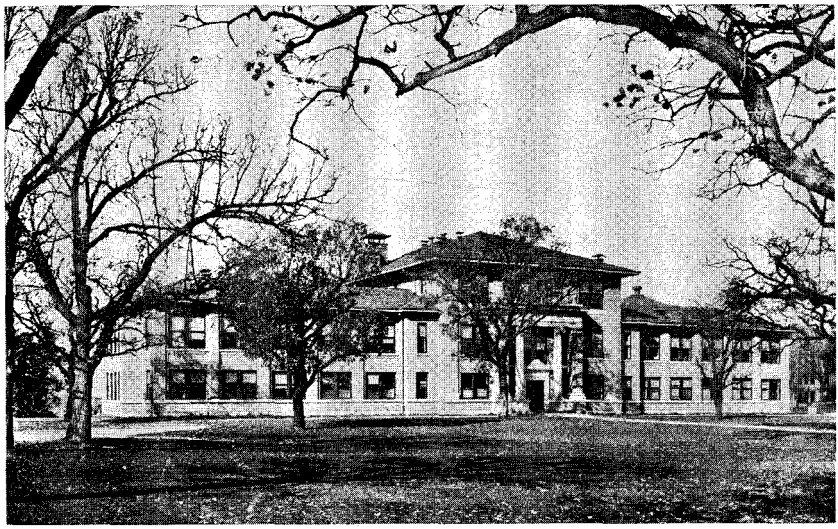
"This organization plan was adopted on November 23, 1908 and the following chiefs of departments and alternates were elected:"

Department	*Chief*	*Alternate*
Anatomy	Charles A. Erdman	None Available
Histology and Embryology	Thomas G. Lee	J. B. Johnston
Physiology	Richard O. Beard	Frederick Scott
Chemistry	George B. Frankforter	Ira Harris Derby
Pharmacology	open	M. R. Wilcox
Pathology, Bacteriology and Hygiene	F. F. Wesbrook	S. Marx White
Surgery	James E. Moore	J. Clark Stewart
Medicine	Charles Lyman Greene	George D. Head
Obstetrics	Parks Ritchie	A. B. Cates
Gynecology	Alexander J. Stone	J. L. Rothrock
Eye, Ear, Nose and Throat	Frank C. Todd	William R. Murray
Nervous and Mental Diseases	C. Eugene Riggs	W. A. Jones

Dispensary Established at Seven Corners! At a meeting on September 22, 1892 of the faculty committee on dispensary, it was announced that the Board of Regents had decided to establish a dispensary for patients unable to pay for medical services. The committee set up the dispensary hours and appointed a staff with representation from the appropriate departments, and schedules were arranged. However, the dispensary quarters never seemed satisfactory, therefore, Governor J. S. Pillsbury persuaded the legislature to appropriate $15,000 to purchase land for a College of Medicine and Surgery Dispensary. This was established in 1908 at 1908 Washington Avenue (Seven Corners).

Should Clinical Teachers be Paid for Their Work? This consideration evoked prolonged discussion and demanded an early resolution. Very little secretarial assistance was provided even the full-time laboratory professors. For example, Dr. Beard, head of administration and teaching of physiology, in addition to devoting much time to the secretaryship of the faculty, had no secretarial assistance until March 1910, when Miss Stella Hubbard became his stenographer with a salary of $50 per month. Miss Hubbard remained a loyal and efficient worker throughout the remainder of Dr. Beard's career.

New Building. Early in his career on this campus, Dr. Wesbrook laid plans for a new building to be called the Institute of Public Health to house both the expanded Department of Pathology and Bacteriology and the laboratory of the State Board of Health. Therefore, he worked



Institute of Public Health and Pathology

with Dean Ritchie for the procurement of such a structure. When this building, known as Public Health and Pathology, was completed in 1907, the Medical Science Building, later named Wesbrook Hall (1932), was left to the Department of Physiology under the direction of Dr. R.O. Beard and to the Department of Histology and Embryology, under Dr. Thomas G. Lee.

As fast as possible, Dean Wesbrook moved toward a campus hospital building. Obviously, a larger sum than the $113,000 Elliot gift would be necessary. The faculty on February 20, 1908, recommended that the Board of Regents ask the next legislature for $200,000 for additional hospital building, $100,000 for a new Anatomy Building (gross and microscopic anatomy—histology, embryology and neurology), $25,000 for remodeling of Millard Hall for uses of needs of Physiology and Pharmacology.

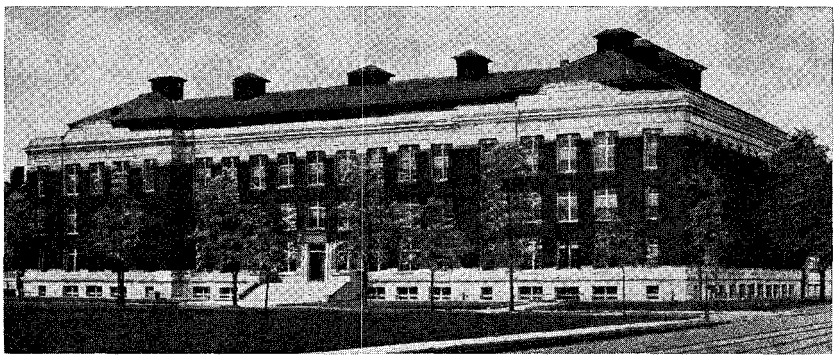
Minnesota's Citizenry Rallies to the Medical School's Cause. A campaign to obtain sufficient funds resulted in an enthusiastic response of the Minnesota citizenry. This encouraged the University Alumni Association to use its influence in the interests of a greater medical campus. Soon the legislature made an appropriation of $450,000 for campus expansion and then followed this by an additional appropriation of $350,000 two years later. It was decided that the College of Medicine

should move southward from the existing medical buildings. Therefore, land was purchased between them and Washington Avenue and later between Washington Avenue and the Mississippi River. On a part of this land there were many fine residences, five of which were converted to hospital purposes and the Training School for Nurses. These included two large dwellings on Washington Avenue at State Street which were remodeled, one for medical services in charge of Dr. Charles Lyman Greene, the other for surgery in charge of Dr. James E. Moore. The total bed capacity was 84. Despite the inconveniences of these facilities, much fine work was accomplished. The buildings were used only two years while the new hospital was constructed. (See Chapter XXVII.)

In 1908 and 1909, the legislature appropriated funds for two new buildings. A faculty committee, appointed to consider locations and names for these buildings, decided that they should be placed on the south side of Washington Avenue in the block between Union and Church Streets. One was to be named Institute of Anatomy and the other New Millard Hall.

Damaging Fires Plague Medical School. On October 6, 1908, a destructive fire occurred in the Anatomy Building. Never used for teaching again, the site gave way to the School of Pharmacy which later constructed a greenhouse on its foundation. After the fire in 1908, Dean Wesbrook announced that Dr. Erdman had been provided with room for dissection and other work in gross anatomy in a private house on Pleasant Street.

On December 24, 1919, a fire destroyed an upper story of Millard Hall. The New Millard Hall and the Institute of Anatomy (Jackson



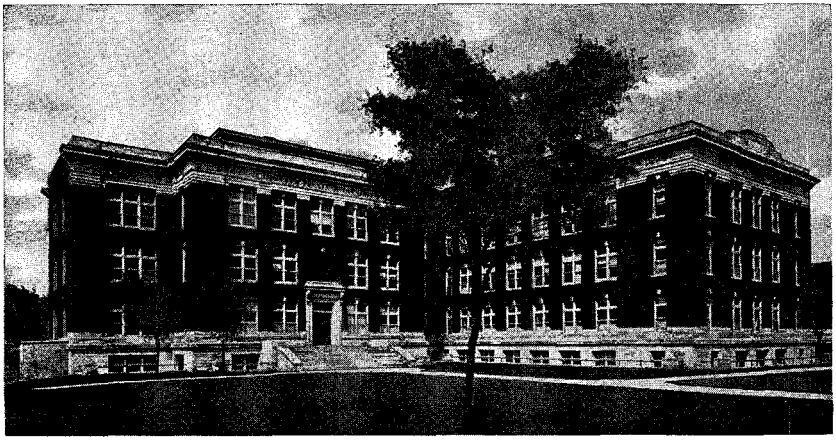
New Millard Hall

Hall 1955) were completed in 1912 at a total cost of $636,000. The Medical Chemistry Building then became a general storehouse.

The Departments of Physiology and Pharmacology moved to Millard Hall, as well as the office of the dean and offices of four heads of clinical departments. This building had a full basement and quarters on a partially furnished roof for experimental work on animals by appropriate departments. The three floors of the Institute of Anatomy were occupied by the Department of Anatomy, the Medical Photographic Department, the Medical Illustration Department and later the Department of Pathology.

New Buildings and Equipment Make Medical School One of the Country's Best. Thus, in 1912 the Medical College buildings consisted of the Laboratory of Medical Sciences, constructed in 1896; the Public Health and Pathology Building, occupied in 1907 north of Washington Avenue; and Elliot Memorial Hospital, completed in 1911; Institute of Anatomy and New Millard Hall, both completed in 1912 south of Washington Avenue. These five buildings provided what was often referred to as one of the most modern and best equipped medical schools in this country.

Numerous Other Accomplishments Achieved During Dr. Wesbrook's Deanship. I. *Medical Art* work began when a part-time artist was employed to prepare charts for teaching purposes, and occasional illustrations for publications for the Department of Anatomy then located in a brown frame house on Washington Avenue near the site



Institute of Anatomy

of today's Murphy Hall. In 1908, the illustrations work moved into the Dentistry Building, then in 1912 to the Institute of Anatomy. (See Chapter XXXIII.)

II. The need for first class *Medical Photography* in the operation of the College of Medicine and Surgery was early recognized. A photographic studio was set up in the new Institute of Pathology and Public Health Building and later moved to the Institute of Anatomy in 1912. (See Chapter XXXIII.)

III. *School of Embalming Established.* In February 1908, the advisability of establishing a School of Embalming was discussed. The State Board of Embalmers and Funeral Directors urgently requested such a school. This project was referred to Dean Wesbrook to make some arrangement but with no expense to the University. The School of Embalming, established in May 1908, was to be conducted during the summer months by the faculty of the College of Medicine and Surgery and such other instructors as might be selected by the faculty and approved by the Board of Regents. It was to be self-supporting. (See Chapter XV.)

IV. *Teaching History of Medicine.* In March 1908, Dr. Burnside Foster instituted a compulsory course of 12-18 lectures on medical history to senior students which served as a substitute for current elective courses. This was apparently one of the first compulsory courses in medical history in this country. (See Chapter XVIII.)

V. *School of Nursing Organized—The First University Training School for Nurses in the World.* On March 20, 1908, Dr. R. O. Beard presented the following resolution for a School of Nursing: "Be it resolved: That with the consent and approval of the Board of Regents an organization to be effected to be known as the Training School for Nurses of the University of Minnesota, to be maintained in relation to the Elliot Memorial Hospital and to be under the immediate charge of the faculty of the College of Medicine and Surgery. That a superintendent be chosen who shall have the direction of the Training School for Nurses and the management of the general care and nursing of the patients of the Elliott Memorial Hospital. That nominations for this position be made to the Executive Committee. That a nominee be recommended to the Faculty and by the Faculty recommended to the Board of Regents for appointment to this position at a salary of $1,500 a year."

On motion, the dean named a committee of three to consider carefully the outline plan of such a school of nurses, and to report back to the committee. Doctors Beard, Jones and Greene were appointed on such a committee.

The School was authorized by the Board of Regents on October 1, 1908. It opened March 1, 1909. (See Chapter XXVIII.)

Soon after the school was established, an executive committee consisting of a small group of interested teachers and administrators was formed, of which Dr. Beard was elected secretary. He continued in that capacity even after attaining retirement age.

VI. *Scholarship Encouraged through Awards and Fellowships.* In February 1910, Dr. J. W. Bell offered an annual prize of $100 to be known as the *J. W. Bell Prize in Physical Diagnosis* to the student with the best standing in the class. The Board of Regents accepted Dr. Bell's offer. In March 1910, Dr. S. Marx White announced that the Minnesota Academy of Medicine offered an annual research fellowship of $300 to graduates in medicine to devote time to some particular line of research. These were among the earliest gifts for the encouragement and support of scholarship on the College of Medicine and Surgery Campus.

VII. *Summer School.* For the first time in its history, the College of Medicine and Surgery voted to offer summer instruction for the session of 1913. This was the beginning of what was hoped would prove to be an increasingly important session which would not only enable regular students to make up lost ground or to anticipate courses, but would also provide medical practitioners an opportunity for graduate study and research.

VIII. *Resolution to Provide Sanitary Conditions on Campus Eight Years Preceding Student Health Services.* On May 12, 1910, Dr. R. O. Beard presented the following resolution: "Whereas: The recent occurrence of epidemic disease at the University of Minnesota indicates the need of some system of sanitary control and whereas the sanitary conditions of the University should be the subject of continual supervision.

"Resolved: That a recommendation be made to the Board of Regents that a committee of Deans representing the College of Medicine and Surgery, the College of Agriculture, the College of Engineering, and the School of Chemistry be appointed to present to the Board

regulations and methods for the control and supervision of the same."

This resolution was adopted and a committee was appointed consisting of J. H. Armstrong, John Grosvenor Cross, and H. E. Robertson. The committee was to consider the following: (1) The prevention of infectious diseases in Minnesota. (2) The provision of a system of University inspections in regard to sanitary matters like that provided for the public schools. (3) Such other matters of general university interest concerning which recommendation might be reasonably expected from this College.

On July 20, 1910, the committee made an elaborate report before a meeting of the general faculty of the College of Physicians and Surgeons. This report was unanimously adopted, its presentation to the Sanitary Committee directed, and the committee continued for further aid in prosecuting the adoption of its report by the Board of Regents. This was a forerunner to the Student Health Service which was established eight years later.

High Rating Among Medical Schools. Carnegie Foundation Reports Minnesota "First State in Union to Solve Perplexing Medical Problems." On February 23, 1910, Dean Wesbrook presented a report received from the Carnegie Foundation. Dr. Abraham Flexner[2] of that institution investigated all medical schools of the United States of which there were 165. The report on Minnesota contained information such as the state population which then was 2,162,726 with 477,640 living in Minneapolis and St. Paul. Two thousand, two hundred four physicians practiced in the state—a ratio of 1:981. The one medical school in the state, at the University, boasted an attendance of 174 students of whom 83 per cent were Minnesota residents. Forty-nine professors and 71 faculty members of other grades composed its faculty. The budget was $71,336. Flexner reported that: "Minnesota is perhaps the first state in the Union that may fairly be considered to have solved the most perplexing problems connected with medical education and practice. It has indeed still to realize its plans for an adequate clinical establishment of modern character; but there is little doubt that this is only a question of time, — and of a short time, at that. Meanwhile, medical education has been concentrated in the hands of the University, fortunately situated in the heart of the largest community of the state; the state has got rid of rival schools, regular and sectarian, the latter by a perfectly fair provision for separate instruction in sectarian

dogmas for any student who is willing to accept a diploma qualified so as to mark that fact." The fact that Flexnor found 100 of the existing medical schools to be little better than diploma mills made his report of our school even more significant. His elaborate evaluation of each school resulted in such great improvement in laws on medical licensure that only 65 legitimate first class schools remained in the United States. About this time, J. N. McCormack, traveling organizer for the American Medical Association, reported that *Minnesota possessed the best general level medical practice in the nation in 1910.*

Students. The six-year course, made optional during Dr. Ritchie's Deanship leading to joint degrees of bachelor of arts or science and doctor of medicine, and the choice of most students, became compulsory in 1908. Thus, "In 1912, the degree of bachelor of science or bachelor of arts became the statutory evidence of two or more years of required academic work." Since the class of 1909, each student has been required to write a thesis before graduation.

On July 20, 1910, Dr. Beard introduced the following resolution, adopted by vote of the faculty: "Resolved: That the Faculty of the College of Medicine and Surgery recommends to the Board of Regents at its coming meeting, that all matriculants for the first year's course in the College of September, 1911; and thereafter, shall be required to spend five years in the study of medicine before receiving their degree from this University, the last of these years is to be spent in internships in hospitals of the state, whose clinical opportunities shall be standardized for this purpose, or in hospitals of other states of equivalent standard in the judgment of the Faculty."

The Intern Year Originated at Minnesota. The intern year became a requirement for the degree of doctor of medicine, according to this resolution—the first medical school in the United States to require an intern year!

During the year 1911-12, when Mr. George E. Vincent became president of the University, 186 students[3] attended the College of Medicine and Surgery of whom 37 received the degree of doctor of medicine.

Medical Library Reaps a Rich Harvest of Gifts. The library continued to receive donations from individuals and organizations. On November 26, 1906, Dr. Lee reported a gift to the medical library

from Mr. E. E. Hemmingway of more than 1,000 numbers of medical journals representing some 19 different journals.

Other gifts to the library in 1907-08 included 110 bound volumes of medical journals and other books besides 1,161 numbers of 30 different medical journals all bound; Alfred Owre gave 73 volumes of medical journals and books.

Alfred, F., Charles C. and John S. Pillsbury gave to the Department of Histology and Embryology the Handapparat of the late Professor William His, of Leipzig, Germany, consisting of over 8,400 monographs and reprints representing over 2,500 authors. *This collection made the library of the Department of Histology and Embryology the richest anatomical library in the Northwest.*

After the Millard Hall fire in 1909, the library found a home in the Institute of Public Health and Pathology. Miss Evelyn C. Lyon of Fergus Falls was hired November 1, 1910 as assistant in charge of the medical library at $65 per month.

Dr. Lee, who had headed the Faculty Library Committee so long, served as faculty librarian from 1909 to 1913. Concerning Dr. Lee's work with the library, Clarence M. Jackson,[4] Chief of the Department of Anatomy, said in 1933: "As librarian he devoted much time to the foundation and development of the medical library."

The medical library moved to the first floor of the north wing of the new Millard Hall soon after its completion in 1912. It incorporated the departmental collections of books of pathology, medicine, anatomy, physiology, pharmacology, the hospital and dispensary in the one medical library. The other biological fields, including biology and botany had their own libraries. Miss Lyon remained in charge of the medical library. A kindly person with unsurpassed patience, she found no task too difficult in providing the best possible service to members of the faculty and students.

President Northrop Retires. Until 1911, Dean Wesbrook worked under the presidency of Cyrus Northrop as did his two predecessors, Perry Millard and A. Parks Ritchie. That year, Dr. George Vincent succeeded President Northrop (see Chapter VI).

Under Vincent's administration at Minnesota, Dean Wesbrook continued with the same progressive medical program that he had carried out so well since 1906. Dr. S. Marx White said: [5] "The project foremost

in Dr. Wesbrook's thoughts and plans was a medical school in which public health should be integral with clinical medicine in the training of physicians. Dr. Wesbrook appreciated profoundly the crucial part the physician plays in public as well as in private health matters. He wished to indoctrinate more insistently than ever before while the neophyte was studying the fundamentals. His writing during the period 1906 to 1913 reflects this urge."

Although he insisted upon adding public health to the curriculum of the College of Medicine and Surgery, like Hewitt, he was living in advance of his time.

Dr. White, who joined the faculty as a pathologist in 1898, also wrote:[5] "Dean Wesbrook realized that the time had come when the clinical departments required men who could give their whole time to teaching and research. He planned to accomplish this as rapidly as proper hospital facilities could be provided. Many of the local men had devoted much time and effort to the school without compensation. As rapidly as possible without failing to recognize their services, they were to be replaced by full-time men. George Edgar Vincent shared Wesbrook's feelings, but he had no background of knowledge of the character or extent of these services and desired that progress be as rapid as possible. Dr. Wesbrook had many sessions with the president, and at one time, had come to a definite agreement that reorganization would be fostered as rapidly as could be done but no specific announcement would be made. Within a few days after this 'definite agreement' had been made, the president spoke at a meeting in St. Paul. His enthusiasm mounted with his well-known rapid-fire diction. Evidently, his memory slipped momentarily, for he announced that he was 'about to reorganize the medical school.' "

Reorganization of Faculty. On January 7, 1913, President Vincent explained his plan for reducing the number of the clinical staff members and increasing the teaching efficiency of the College. He said, "this should proceed upon the principles of concentrating in the smallest number of hands the work of doing efficient teaching." Discussion centered on whether to secure resignations of all members of faculty, or of all members of clinical staffs, or by a reorganization through a committee without first asking for resignations.

On motion of Dr. Beard, the following letter was addressed to President Vincent on January 11, 1912: "In order to promote and

accelerate the reorganization of the work and the concentration of the faculty the undersigned respectfully submit their resignations to take effect at the pleasure of the president.

Signed:	F. F. Wesbrook	C. Eugene Riggs
	J. E. Moore	Frank C. Todd
	Charles L. Greene	Louis B. Baldwin
	Richard Olding Beard	A. B. Cates
	Thomas G. Lee	J. B. Johnston "

In short order, all members of the clinical medical faculty also resigned.

On January 15, 1913, at a General Faculty meeting, President Vincent again outlined a plan for reorganization of the Faculty. He laid down the following principles of selection of members of the faculty:

1. Personality and character including ability for team play, social service, etc.
2. Teaching power—The members of the faculty should be specialists in practice as well as teaching.
3. Capacity, training, prestige, indicated in part by contribution to science.
4. Past service to the College.

The reorganization provided the following titles: 1. Professor and Chief of Clinical Departments and Professor and Director of Laboratory Departments; 2. Professor in charge of a Division; 3. Associate Professor in charge of a Division; 4. Associate Professor; 5. Assistant Professor; 6. Instructor; and 7. Assistant.

Prior to the reorganization, the faculty consisted of 184 members. After the reorganization there were 11 professors, 18 associate professors, 16 assistant professors and 25 instructors.

In August 1913, President Vincent's report contained the following summary of the faculty reorganization: "For some years, the conviction has been growing that for historic and other causes the clinical staff of the College of Medicine and Surgery was larger than necessity demanded, and that moreover, it contained too many men of co-ordinate rank. At the request of the Regents and with hearty cooperation of the Executive Faculty of the College of Medicine and Surgery, a complete reorganization of the entire staff both clinical and laboratory was decided upon. All the members of the medical staff placed their resigna-

tions in the hands of the president. The Regents appointed as a committee of reorganization the President; the Dean of the College, Dr. F. F. Wesbrook; two members of the Executive Faculty, Dr. J. E. Moore and Dr. Charles L. Greene; and three alumni of the College, Dr. L. B. Wilson, Dr. E. L. Tuohy and Dr. Theodore Bratrud. This committee was requested to present to the Regents, first, a complete plan of reorganization for the medical faculty, and second, nominations of individuals to fill the positions provided in this plan. The report of the committee was received and adopted on February 17, 1913, to take effect August 1, 1913. The whole spirit in which this reorganization was carried out demonstrated the highmindedness and devotion of the medical profession in Minneapolis and St. Paul. The principles of the reorganization were essentially these: the reduction of members, the increase of time and responsibility for the chiefs of staff, and the assigning of positions under their leadership in such a way as to secure the greater efficiency of effort and continuity and unit of instruction." *In 1913, the name of the College of Medicine and Surgery was changed to School of Medicine or Medical School.*

In April 1913, the Executive Faculty agreed that every teacher having taught for six years of three quarters each or its equivalent should be entitled to a year of vacation. This led to the sabbatical year which continues today.

Dean Wesbrook Resigns to go to British Columbia. In the winter of 1912-13, Dean Wesbrook submitted his resignation to become effective on July 1. He accepted the presidency of the new University of British Columbia where he was given a free hand in the development of a medical school and a school of public health in close cooperation with the Provincial Department of Health.[6]

When Dean Wesbrook left the University of Minnesota, Dr. L. B. Baldwin, Superintendent of the University Hospitals, served as acting dean of the School of Medicine.

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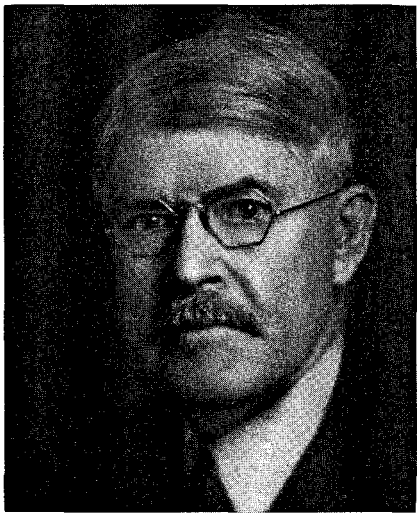
Chapter XI

Elias Potter Lyon Becomes the Fourth Dean of the Medical School

WHILE AT THE University of Chicago as dean of Science, Literature and Arts, President Vincent knew Elias Potter Lyon as acting head of the Department of Physiology. He kept in touch with him after Lyon became dean of the School of Medicine of St. Louis University. Therefore, President Vincent grasped the opportunity of inviting Lyon to become medical dean at the University of Minnesota in 1913.

The Solid Background of Dean Lyon. E. P. Lyon was born in Cambia, Michigan, October 20, 1867. His father was a saw mill boss and while Elias was still an infant, they moved to Hillsdale. After graduation at the Hillsdale High School, Elias went to Chicago where he worked one and a half years as a milkman. Feeling the need for more education, he returned to Hillsdale and enrolled in the commercial



Elias P. Lyon

department of Hillsdale College. In a vacant hour, he took a fill-in course in botany. This casual choice launched his interest in science and he went on to obtain the bachelor of science degree in 1891. Believing as did everyone that the bachelor of arts degree was superior, he continued his studies and took that degree in 1892. He then landed a job at the Harvard Preparatory School which was affiliated with the developing University of Chicago. He later taught at the Southside Academy in Chicago, then stopped teaching for full-time work at the University where he received the degree of doctor of philosophy in 1897.

That year, the Bradley Institute was founded in Peoria, Illinois, and Lyon was chosen to head the Department of Biology. Three years later in 1900, when Rush Medical College became affiliated with the University of Chicago, Lyon was summoned as first assistant in the Department of Physiology.

In 1902, he went to Naples, Italy, to do some work on artificial parthenogenesis. While there, the head of the Department of Physiology at the University of Chicago took a position at the University of California, and Dr. Lyon returned from Italy to become acting head. In 1904, he became professor and head of the Department of Physiology at St. Louis University School of Medicine and he was dean from 1907-13.

Ill Feelings Diagnosed at Minnesota. With the reorganized faculty at Minnesota reduced from 184 to approximately 70, including instructors, considerable ill feeling existed among those asked to resign and those not reappointed. Moreover, there was considerable demotion and loss of hope of future promotion among full-time laboratory teachers. For example, Dr. Thomas Lee, who for many years served as professor of anatomy and head of the Department was reduced in rank to professor of comparative anatomy, while the chiefship was awarded to Dr. C. M. Jackson, University of Missouri. Dr. C. A. Erdman, longtime professor of anatomy and heading the teaching of gross anatomy, was reduced to associate professor. Dr. E. D. Brown, professor of pharmacology heir-apparent the headship of that department, was reduced in rank to an associate professorship, while A. D. Hirschfelder of Johns Hopkins University became director and professor of pharmacology. Dr. R. O. Beard, named professor of physiology on the original faculty in 1888, was reduced to an associate professorship in physiology,

while Dr. E. P. Lyon was chosen professor and director of the Department of Physiology and dean of the School of Medicine.

However Extensive Research Program Begins. President Vincent's reorganization of the faculty applied mainly to important positions of staff members. The faculty had been well organized and departmentalized in 1909 and thus, no important change in these arrangements was posed by the president. Demotions of faculty members in the laboratory subjects as well as elimination of many teachers in clinical departments were severe. Nevertheless, it must be said that two of the persons brought from outside to replace former heads, C. M. Jackson in Anatomy and E. P. Lyon in Physiology, were the pioneers in introducing an extensive research program in the School. Much of the credit for this development belongs to Jackson. Offered the deanship of the Minnesota College of Medicine and Surgery at a salary of $6,000 per year, he preferred to confine his activities to teaching and research. Therefore, he accepted the headship of the Department of Anatomy at Minnesota with a salary of $5,000 per year. (In 1914, the salary for heads of departments was raised to $5,000, assistants and associate professors $1,500 to $5,000, and instructors to $1,200 per year.) Jackson promptly gathered around him additional young staff members desirous of doing research. For them, he set an ideal example by his personal research work. Other department heads followed Jackson's example and so research in addition to teaching was promoted in their departments and as a total medical school tradition.

Although Dr. R. O. Beard as secretary of the faculty had supported President Vincent's reorganization plan, almost a decade later (1921) he wrote: [1] "Its announced purpose was to diminish the size of the faculty. It involved the retirement of men who had given long and valuable service to the University and had served, in many instances, without salary. It included readjustments of position of undoubted merit in certain cases. That its primary stated purpose was a mistaken one is shown by the fact that within three years the original numbers of the faculty had been regained by new appointments, and that at the present time the faculty is larger than it was before the reorganization was effected.

"No constructive effort—and I have no doubt of the constructive intention which inspired that effort—ever worked for any school the dire destruction of fraternal feeling, of successful autonomy, of team-

playing cooperation which this event involved. Slowly and painfully the school has passed through the succeeding years of convalescence toward the hope of recovery, and it is still convalescent."

Dean Lyon Inherits a Tempest. When Dean Lyon arrived, and attended the first Administrative Board meeting on September 8, 1913, the original ill feeling continued. A number of physicians, many of whom were prominent practitioners of medicine and surgery in the Twin Cities, criticized the Medical School. Thus, Dean Lyon, from the day he arrived inherited the difficult problem of trying to bring a spirit of cooperation and peaceful coexistence out of a chaotic staff. On the other hand, he had unquestioned support from President Vincent and most members of the newly-appointed faculty.

The Mayo Clinic Introduces New Problems. When Dean Lyon first attended an Administrative Board meeting on September 8, 1913 and took the chair at the next meeting, September 15, his personality, disposition, six previous years of experience as dean, and calm judgment qualified him admirably for the problems he soon encountered. Further trouble loomed with the earliest mention of an affiliation of the Medical School with the Mayo Clinic (see Chapter XII). This proposal occurred during the meeting of the general faculty on March 11, 1913. President Vincent said, "The plan for cooperation with the Mayo Clinic and the publication of a scientific journal offers new opportunities for scientific work in the College. As the storm clouds drew nearer and nearer, Dean Lyon found himself in the midst of an even more difficult problem than the reorganization matter which he found on his doorstep on arrival. Those who had resigned, and those not reappointed, during the reorganization had not been completely reconciled. Moreover, for a number of years an unfortunate attitude toward the Mayo Clinic had been developing among some of the Twin Cities physicians in private practice.[2]

Electrocardiography Introduced. In 1914, Dr. S. Marx White, went to Europe and in England he worked for some time with Sir Thomas Lewis who was then one of the world's best known cardiologists. Dr. White ordered an electrocardiograph for the University of Minnesota at a cost of $5,000. This instrument was installed in Millard Hall in 1915. Dr. Olga Hansen, then an interne, spent considerable time with the electrocardiograms and became familiar with them. Her activity continued and she interpreted all electrocardiograms in the

outpatient department until she resigned from the faculty in 1927. She was assisted in making electrocardiograms by Dr. Ralph Morris from 1918 to 1920 and by Dr. Harold S. Diehl 1920-1921, both of whom were fellows in the Department of Medicine.

The Faculty as Practicing Physicians and Appointment Procedures. On October 22, the practice of dispensary and hospital staff members referring patients to private physicians was discussed extensively. This led to a ruling that such referrals should *not* be made. On March 12, 1920, the rule forbidding faculty members from treating dispensary or hospital patients in their private offices for one year after dismissal from University service was emphasized.

Full-time Faculty Members. Members of the examining faculty beginning in 1883 received no financial remuneration from the University. The teaching faculty organized in 1888 was composed of practicing physicians. Those who taught laboratory subjects as well as clinical teachers volunteered their time and talent without salary. Dr. Charles Bell, Professor of Chemistry and Toxicology was the first University medical faculty member on a full-time salary. In 1891, Thomas G. Lee came from Yale on full-time as instructor in histology, embryology, bacteriology and urinalysis. In 1895, Dr. F. F. Wesbrook was appointed full-time professor of pathology and bacteriology along with the State Board of Health. Dr. R. O. Beard, Head of the Department of Physiology, had an annual salary of $1,500 in 1904. The number of full-time salaried teachers increased in the laboratory subjects but a plan for *full-time clinical chiefs was not introduced until 1915.*

One of the members of the original medical school faculty of 1888 manifested a beautiful spirit of loyalty and helpfulness. He was Dr. James E. Moore, Chief of the Department of Surgery, who wrote a letter to Dean Lyon for presentation to the Administrative Board on February 8, 1915 which contains the following:

"After thirty-two years of professional life in Minneapolis I have concluded to retire from private practice on March first, 1915. I would not feel justified in retiring yet were it not for the salary paid me by the University. I have now been in the University for twenty-five years, the first sixteen without salary. Each year my interest in the University has increased, until now it is my first interest and the joy of my life. I always have, and am now leading such an active life that the spending of half of my time in idleness does not appeal to me.

Therefore, I wish to tender thru you, to the Administrative Board, the whole of my time after March first, so that the matter may come to the President and Board of Regents thru the regular channels.

"I am influenced somewhat in my decision by the fact that the trend in medical education seems to be toward a few full-time clinical teachers, and *this move will afford the University of Minnesota an opportunity to try out this principle without expense . . .*

"I have discussed this matter with President Vincent, Regent Mayo and yourself, to make sure that this move upon my part would not be prejudicial to the interests of other half-time men, and am assured that it will not, because my salary is established upon a half-time basis, and the additional time I offer will be considered my voluntary contribution to the cause we all love so well."

(In memory of Dr. Moore the *James E. Moore Society,* a scholarly organization of Minnesota students and faculty interested in surgical research was organized.) (See Chapter XXVI.)

With the resignation of Dr. Greene as chief of the Department of Internal Medicine the Administrative Board gave considerable consideration on September 13, 1915 to a full-time head of the department. The Administrative Board decided that a new chief of the Department of Medicine should be on practically a full-time basis, with only restricted consultation practice allowed, and no private office off the campus. It appointed a committee consisting of F. L. Adair, chairman; Dean Lyon, C. M. Jackson, and J. P. Sedgwick to seek a new chief of the Department on this basis. Dr. L. G. Rowntree of Johns Hopkins University was recommended on November 1, 1915 and he accepted the post and became the first full time clinical department chief.

Dr. Fred L. Adair did a magnificent job in the reorganization of the faculty, in promotion of plans for affiliation of the School of Medicine with the Mayo Clinic, and in establishing full-time heads of clinical departments. While conducting a general practice in 1905 in the Twin Cities, he began devoting time as an assistant in the Outpatient Department at Seven Corners. In 1909, he became a member of the staff of the Department of Obstetrics and Gynecology.

When President Vincent reorganized the Medical School faculty in 1913 after requesting all 184 staff members to submit their resignations, Dr. Adair was one of the 70 to be reappointed.

The Administrative Board of the Medical School was composed of

Fred L. Adair

the dean, assistant dean and heads of departments. The general faculty wanted Board representation by a person who did not hold a headship. Therefore, on May 1, 1913, a general meeting of the medical faculty was held mainly for the purpose of electing a faculty representative to the membership of the Administrative Board. They chose Dr. Fred Adair by a unanimous vote.

On the Administrative Board, Dr. Adair faithfully attended meetings and enjoyed there also the complete confidence of the other members. He was unanimously reelected at each regular election of the faculty including April 17, 1916. At that time, his other work had become so heavy that he found it impossible to accept.

Members of the Administrative Board held such extreme confidence in Dr. Adair that he was appointed to membership or chairmanship of some of the most important committees. At the University of Minnesota, Dr. Adair was promoted through the various positions of assistant, instructor, assistant professor, associate professor and finally professor of obstetrics and gynecology. But in 1929, he left the University to become chairman of the department and professor of obstetrics and gynecology, University of Chicago, and chief of the staff of obstetrics of the Chicago Lying-In-Hospital. Upon attaining retirement age in 1942, he became chief of the Division of Infant and Maternal Health

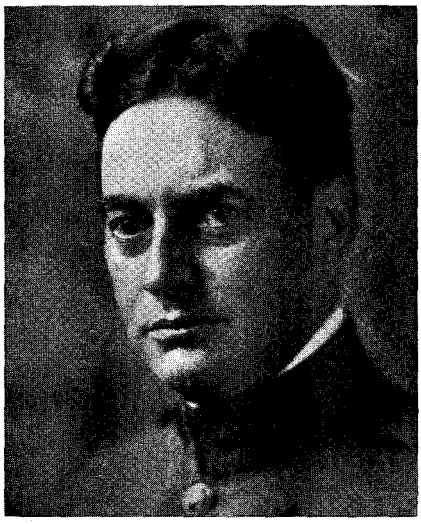
in the Illinois Department of Health. In 1950, he moved to Maitland, Florida, where he still resides.

Problems of Clinical Chiefs Comes to Climax. On February 18, 1918, Dr. J. P. Sedgwick, chief of the Department of Pediatrics, asked to be considered for full-time chiefship, such as had been arranged for Dr. Rowntree on practically a full-time basis in 1915. A committee consisting of Dr. A. D. Hirschfelder, chairman, J. C. Litzenberg, and W. R. Murray studied the problem.

On April 9, 1918, Dr. Hirschfelder's committee made a report which contains the following: "In view of the increased salaries of clinical chiefs, the opportunities for outside earnings should be limited. While various arrangements for bringing this about have been suggested, your committee recommends that the clinical chiefs contribute to a special fund for medical research, twenty-five per cent of all their net earnings from private work between five and ten thousand dollars per annum and fifty per cent of all net earnings of ten thousand dollars and over. The clinical chiefs and the dean shall constitute a committee to recommend to the Administrative Board the uses to which this fund shall be put." The Administrative Board approved and adopted the complete report.

The School of Medicine and Its Part in World War I. On April 6, 1917, the University of Minnesota promptly converted all necessary resources to military services. The Mayo Clinic, President Burton and Dean Lyon quickly offered every available item to the prosecution of the war. In fact, many preparations had already been made prior to formal declaration of war. Organization of a base hospital was begun at the University with Dr. A. A. Law in charge. On April 7, at a special meeting of the Administrative Board of the School of Medicine, Dr. Law presented a progress report. He stated that funds for the University of Minnesota Base Hospital had been secured and the government gratefully accepted the hospital. Eleven staff members from the Mayo Foundation and the remainder from the Medical School took charge.

At a general faculty meeting, November 21, 1917, a report showed 38 staff members were in actual military service. Nine others had been commissioned but not called to service. Four seeking commissions were disqualified physically. Ten applications for commissions were still pend-



Arthur A. Law

ing. Twelve faculty members were serving as examiners on War Boards and one member was in service on the Home Guard.

On December 10, 1917, mobilization of Base Hospital No. 26 began in Minneapolis and was completed December 15. On December 28 the hospital entrained in Minneapolis and arrived at Fort McPherson, Georgia on December 21. On May 21, 1918 the organization arrived at Camp Merritt, New Jersey and boarded ship on June 3.

The personnel of Base Hospital 26 contributed a splendid service from December 15, 1917 to May 3, 1919, a detailed account of which appears in a printed volume under the title *History of Base Hospital 26.*

University Health Service Established. As situations pertaining to health of students and personnel occurred, the need for an organization to provide for them became more and more obvious. On October 25, 1917, the Board of Regents voted to appropriate $5,000 and refer to the president the power to secure a University Health Officer.

On January 18, 1918, the Board of Regents voted that the Board look with favor upon the principle of the tentative proposals submitted by the Committee on Public Health and that the Regents constitute themselves a committee with President Burton, chairman, to ascertain whether necessary funds can be procured by subscription for the creation of a suitable student infirmary on the campus. The chairman of

the committee also might increase the personnel of the committee at his discretion.

On March 15, 1918, the Board of Regents voted to approve the immediate establishment of a University Health Department. Dr. John Sundwall was appointed as University Health Officer with the rank of professor. (See Chapter XXXI.) When Dr. Sundwall accepted a position at the University of Michigan in 1921, Dr. Harold S. Diehl was appointed to the directorship of the Student Health Service at the University of Minnesota. (See Chapter XV.)

Survey of the Medical School. When Dr. Coffman became president of the University in 1920 there was still considerable criticism of the School of Medicine by those whose wounds inflicted by the faculty reorganization and establishment of the Mayo Foundation remained tender. President Coffman desired to continue building the best possible school of medicine. He, Dean Lyon and the Administrative Committee recognized that the rapid development of medical sciences involved corresponding increase in the complexity and cost of medical education. The problem included the provision of necessary laboratories and staffs for the various fundamental medical sciences; the provision of adequate hospital facilities and clinical staffs including University Hospital and affiliated city hospitals and the development of graduate work in medicine. Throughout the years, the University endeavored to promote medical education along all of those lines. However, the pioneer work and the solution of some of the problems revealed differences of opinion as to the best method and occasional specific criticism by some of the medical alumni. Therefore, to make certain of continuing on solid ground it was thought that a comprehensive survey of the medical situation in Minnesota by distinguished and disinterested representatives of the medical profession might be of service both at Minnesota and elsewhere. On January 6, 1921, the Board of Regents authorized the appointment of a special survey committee. This committee consisted of Dr. Frank Billings, professor of medicine at Rush Medical College, Chicago; Dr. J. M. T. Finney, clinical professor of surgery in the Medical School of Johns Hopkins University; and Dr. V. C. Vaughan, dean of the Medical School of the University of Michigan.[3]

This committee made a comprehensive investigation and after several weeks of study and conference submitted a most favorable report. They

made suggestions and recommendations which they thought would strengthen the School, which are summarized as follows:

1. The Dean of the Medical School should be nominated by the medical faculty for appointment by the Board of Regents, heads of all departments in the Medical School having votes in this selection.

2. The salaries of the laboratory men should be increased.

3. There is no reason why the heads of clinical branches should at present be made full-time men. Certain associates and assistants in the clinical branches might very properly be made full-time workers.

4. An enlargement of the University Hospital to make approximately from four to five hundred beds should be secured.

5. The administrative officers and members of the faculty of the Medical School of the University of Minnesota should, in the opinion of your Committee, recognize the fact that the chief function of this School is to supply the State with general practitioners of medicine.

6. Every effort should be made by the administrative officers and the faculty to cooperate with and assist the practitioners of the State in furnishing them with opportunities for refreshing their knowledge in both laboratory and clinical branches and by helping them in the diagnosis and treatment of their cases.

After carefully studying this report, the Board of Regents adopted a resolution which contains the following: "Subject to the definitions of its powers and duties by the laws of this State the principles set forth for the development of the Medical School were adopted by the Board of Regents as the general policy it would follow hereafter in the conduct of the Medical School."

Department of Preventive Medicine and Public Health. At the meeting on January 4, 1922, the Administrative Board gave consideration to the establishment of a Department of Public Health. On April 5, 1922, the Public Health Education Committee proposed the creation of a Department of Preventive Medicine and Public Health the Committee recommended that public health be omitted from the existing name, Department of Pathology and Public Health.

At the meeting of the Administrative Board of the School of Medicine on May 11, 1922, President Coffman strongly recommended establishment of a new Department of Preventive Medicine and Public Health. During this meeting, Dr. Diehl, the new chief (see Chapter XXXVII), presented an outline of proposed courses for the new department.

Recognition of the importance of the staff of the State Board of Health again manifested itself in the following resolution adopted by the Administrative Board on July 21, 1923, for transmission to the president and the Board of Regents.

"Resolved: That the attention of the Board of Regents be called to the importance of keeping the State Board of Health Laboratories on the campus and that the Board of Regents be asked to give formal assurance to the State Board of Health that the present quarters of the State Board of Health may be retained and additional temporary space may be granted until such time as permanent and adequate quarters are provided on the University campus."

Endowments for Schools of Medicine and Nursing. On November 6, 1923, Dr. R. O. Beard submitted plans for endowments for these schools. On November 22, the Board discussed endowment plans and a committee consisting of Dr. Beard, chairman, Louise Powell, R.N., S. Marx White, R. E. Scammon and Dean Lyon considered several of the details discussed and the form in which these proposals should be submitted to the Administrative Board and the Board of Regents for approval. On December 6, the committee reported, some amendments were offered, and the entire adopted report went to President Coffman and the Board of Regents. On December 20, Dr. Beard recommended that the Administrative Board organize the endowment plan and that a joint committee be appointed to conduct a campaign for endowment funds. His motion, unanimously voted, established a committee of 10 members included the existing committee.

New Energy on the Medical Campus. In 1924, Dr. R. O. Beard[4] observed that for the last 12 years the development at the School of Medicine had been at a standstill but "at last there are signs that new energy has been released on the Medical Campus." On October 1, 1924, the School laid the cornerstone of the Todd Memorial Clinic.[5] Dr. Frank Chisholm Todd, after whom it was named, was born in Minneapolis in 1869, awarded the degrees of doctor of dental surgery and doctor of medicine by the University of Minnesota, became instructor in ophthalmology and otolaryngology in 1897, full professor in 1903 and director of his department in 1908. His numerous accomplishments are discussed in Chapter XX. Dean Wesbrook stated, "that without question Frank Todd was the greatest organizer and executive that the Minnesota medical faculty had developed." In World War I,

he became Lieutenant Colonel in command of the Base Hospital at Camp Dodge. During the severe epidemic of influenza, he succumbed to this disease at the age of 49.[6] After his death, Mrs. Todd found among his private papers notes fully outlining the idea of an elaborate clinic in ophthalmology and otolaryngology in the School of Medicine. Thus the Todd Memorial Clinic became a reality in the fall of 1925.

On October 1, 1924, the School laid another cornerstone for the Cancer Institute.[5] The Citizens Aid Society founded by Mr. George Chase Christian and sustained by his widow provided a gift of $250,000. This institute, a memorial to George Chase Christian, provided for the care and treatment of persons afflicted with cancer, for broadening of medicine and nursing education, and for the promotion of research in cancer. It was an integral unit of University Hospitals, as was the Todd Memorial Clinic. (see Chapter XXVII.)

In 1924, William Henry Eustis, himself a long time sufferer of crippling deformities, began a series of gifts in real estate, downtown office buildings and cash. Mr. Eustis, a property financier, once served as mayor of the City of Minneapolis. His gifts to the University ultimately totaled $2,243,830. The construction of the Minnesota Hospital and Home for Crippled Children on the Medical School Campus consumed $235,191 of the total gift.

School of Nursing Acquires a Residence. On June 6, 1923, a committee consisting of Dr. R. O. Beard, chairman, Louise Powell, Anna Jones, Doctors White, Strauchauer and Baldwin constituted part of the committee to conduct a campaign for funds for a building for the School of Nursing. However, not until January 1931 did the Board of Regents vote to authorize an architect to prepare tentative plans for a nurses' home for 275-280 nurses at a cost between $300,000 and $330,000 to be located at 510 Essex Street Southeast. This building was completed in 1933. In 1938, the nurses residence was named the Louise M. Powell Hall in her honor—the first of the University buildings to be named for a living person (Chapters XXVII and XXVIII).

Regulations Governing Full-time Faculty Members. On January 25, 1924, a special committee reported on the old problem of regulations to govern the outside work of full-time faculty members as follows:

"1. In general, the full-time members of the Medical School faculty will conform with the present regulations for outside work as outlined in the University Rules and Regulations.

"2. The full-time medical teacher shall not maintain an outside office; he shall not have affiliation with any partner, clinic or group; he shall not be on the active staff of any private hospital.

"3. The outside work of full-time clinical teachers shall be limited to consultation work with other members of the profession.

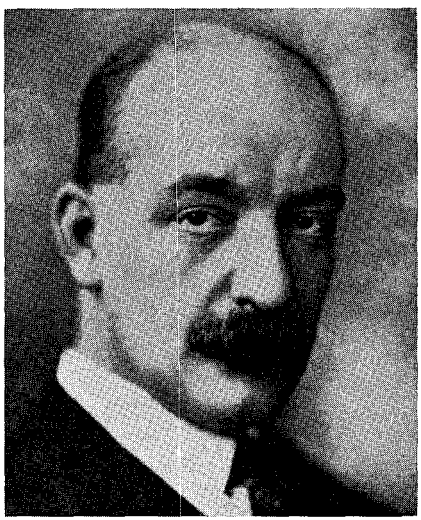
"4. The full-time medical teacher will keep a record of all outside work, which shall include:

a. Date and time of work, and
b. Physician calling consultation or person for whom work laboratory work is done.

"The dean of the Medical School shall be furnished monthly with a copy of this record.

"5. The dean of the Medical School, the president of the University and the University Comptroller shall constitute a board to pass upon the extent of outside work which any full-time member of the Medical School may carry and the decision of this Board shall be final."

College of Medical Sciences Established in 1931. In 1930, Dr. Richard E. Scammon, Professor of Anatomy, University of Minnesota, accepted the deanship of Biological Sciences, University of Chicago. He spent the school year 1930-31 at the University of Chicago post. However, during that year, opportunities were created at the University of Minnesota which resulted in Dr. Scammon's return. On May 12,



Richard E. Scammon

1931, our Board of Regents approved Richard E. Scammon as dean of Medical Sciences at $10,000 per year, beginning July 1, 1931. This is briefly described in the report of President Coffman as follows: "Attention is called especially to the fact that Dr. Scammon is appointed dean of the Medical Sciences. His deanship is not confined to an administrative jurisdiction; it is concerned primarily with educational programs and relationships rather than with administrative details." [7, 8]

The deanship of Medical Sciences created especially for Dr. Scammon included the Schools of Medicine, Nursing and the Hospital. E. P. Lyon remained dean of the School of Medicine.

Soon after becoming dean of the Medical Sciences in 1931, Dr. Scammon described the Medical School as follows: [9] "The School occupies a beautiful stretch of high placed ground, covering approximately seven acres, extending from Washington Avenue, the chief highway between Minneapolis and Saint Paul, to the cliffs overlooking the Mississippi River. Here its grounds become continuous with those of the Minneapolis Park Board so that there is a broad stretch of rolling woodland and meadow to the banks of the river. This fortunate location was secured through the efforts of the alumni and other public-minded citizens some twenty years ago. To the west, separated by a narrow street, are the buildings of the conjoint sciences of botany and zoology."

He said further: "The construction is highly uniform, a modified Georgian, with rather severe lines fitted well to the purpose of the school and to concept of simple and direct accomplishment that forms its ideal. All of these buildings are fireproof and are of ferro-concrete construction, faced with tapestry brick and trimmed with Bedford limestone.

"There are two deans—a dean of the Medical School, who is responsible for curriculum, student affairs and programs, admissions and examinations; and a dean of Medical Sciences, concerned with general policy, faculty, finance and the relations of the Medical School to conjoint branches in the University. Both are responsible to the president of the University and to the Board of Regents. The dean of the Medical School is assisted in his duties by a member of the faculty dealing with student admissions, a medical school examiner, and a student work committee. There is an executive faculty with a smaller advisory committee, and also a general faculty consisting of all the members of the teaching staff over the rank of assistant."

A Library Must Grow with the School. In 1913, research activities

of the Medical School faculty began to increase rapidly thus multiplying the need and use of the library. The library committee consisted of H. E. Robertson, George D. Head and F. L. Adair. Each member of the faculty was requested to send 2 copies of all his publications to the Medical School—one for the dean's office and one for the general medical library. The Administrative Board also recommended that 100 copies of reprints of published articles and monographs in each department be bound annually for library uses and cultivation of exchange with other institutions. With the completion of the new University library building in 1924, the entire Medical School library transferred to that building where it consolidated with libraries of the School of Dentistry, Departments of Botany and Animal Biology and a part of the Pharmacy collection, thus constituting a unified biological-medical library which then contained a total of 20,661 volumes.

The importance of the preservation of records was appreciated by the Board of Regents and the following action was taken on January 6, 1928: "The Director of Libraries has the responsibility and authority, as University Archivist, to develop and maintain the University Archives. In the interest of assuring the proper preservation of material pertaining to the history of the University, one copy of each publication issued by University departments or other units shall be sent by the issuing officer to the University Archives; and no University records, whether committee minutes and reports, departmental files, photographs, architectural drawings, or recordings, shall be destroyed or permanently discarded without the approval of the University Archivist or his designated representative. Inactive files may be sent to University Archives or the Archives librarian will assist departments in determining what kinds of materials should be preserved for their historical value. Mrs. Maxine B. Clapp, Archivist, and Miss Clodaugh M. Neiderheiser have developed and directed the Archives admirably."

After being moved to the central library the medical collection continued to grow rapidly. In 1932, Dean Scammon said: [9] "The University of Minnesota has been fortunate in its medical library. Due to the efforts of Dr. Henry Nachtrieb and Dr. Conway MacMillan, the printed material in the fundamental sciences was accumulated a number of years ago at prices that are but a fraction of the present value. Several years ago a policy was inaugurated of systematically adding various clinical journals. This program has been supported by the

central administration of the University. Engendered is the policy of the institution to build up first the sets of periodicals, second the monographs in the various branches of medical knowledge, and third to provide text books. As a result, the medical library is probably the best one between Chicago and the Pacific Coast. Four-hundred and seventy-five current medical periodicals are carried at the present time. The library is housed in special quarters along with the collections of books in biology and dentistry and is available to members of the profession as well as to the student body and faculty."

Students and Just How Should They Be Taught? In 1914, Dean Lyon proposed revamping the curriculum by reducing lecture hours, increasing clinical teaching, continuing elective hours and reducing the total number of curriculum hours. With the inclusion of the intern year it was decided to award the degree of bachelor of medicine at the end of the fourth year in the College of Medicine and Surgery; however, on March 6, 1919, a vote approved abolishing the bachelor of medicine degree at the end of that year with the understanding that a thesis would still be required in the senior year.

Student Interns—A Temporary Project. In the school year 1919-20, the student internship was introduced experimentally. This consisted of students spending the last six months of their four year course in a hospital. However, because of the scarcity of available hospital positions and the lack of full-time teachers in various hospitals, the junior internship necessarily became an elective course. On March 31, 1924, the Administrative Committee voted to abolish the junior internship.

The Clinical Clerkship Then Took the Place of the Junior Internship. This eliminated lectures from the senior year. The senior class members, separated into divisions and sections, spent the entire day in the hospitals. All of this was under close supervision of full-time faculty members, including teaching fellows.[10]

On July 11, 1926, the School began giving comprehensive examinations at the close of the junior year, covering all work in medicine for that year, and at the close of the senior year, covering all of the clinical work in the Department of Medicine. By 1930, there were no final *course* examinations, but a *comprehensive* examination was given at the end of each year in all subjects. Dr. A. T. Rasmussen organized and conducted these examinations admirably for more than 20 years. Alumni tend to regard them as nightmarish memories, however.

In 1918, the Medical School adopted the four-quarter system—summer becoming a full quarter of work. Thereafter, at the end of the sophomore year the students were divided into four groups. One-fourth of the class began its junior year the next summer and continued through two summer sessions, thus graduating in three and a half years. Another quarter of the class saved three months, graduated in March. The remaining two quarters of the class took two quarters off, but not necessarily during the summer, thus graduating at the usual time.

On October 11, 1915, the School decided to limit the third year class to 80 students. In the early 1930's, the School admitted 100 students annually but the limit of 50 students in each division of the junior class could not be increased. On February 4, 1931, an aptitude test for admission to the School of Medicine became a requirement.

Health of Students. The Student Health Service established in 1918 soon provided for an especially complete physical examination on admission of all University students.

In October of that year, Dr. Sundwall, Director of the Health Service, administered influenzal vaccine prepared by Dr. W. P. Larson, head, Department of Bacteriology and Immunology to all persons in the Student Army Training Corps.

On February 21, 1927, Dr. Diehl reported on physical examinations made on medical students a preliminary to complete annual examination of all University students.

A committee consisting of Dr. Harold Diehl, chairman, W. P. Larson and F. C. Rodda made the following recommendations with reference to health of students.

"1. All students entering Medical School be protected against small pox. No student to enter winter of freshman year without it.

"2. All students entering Medical School receive immunity tests for diphtheria; those non-immune to be protected by toxin-antitoxin inoculation—none to enter sophomore year without it.

"3. All students particularly at beginning of junior year be urged to secure protection against typhoid fever and paratyphoid.

"4. Require physical examination of all medical students before entering as freshmen, and at beginning of junior year."

In 1928, all entering students had tuberculin tests. Thereafter, this test became routine for entering students. In 1931, tuberculin reactor students had roentgenographic inspection of chests. Tuberculosis was a

serious scourge on the campus when the Student Health Service began. Among the medical students in the classes of 1919 through 1932, 92 developed clinical tuberculosis while in school or soon after graduation, of whom 11 died.

Dean Scammon Promoted to Distinguished Service Professor. Time proved that the old, old error had been repeated, namely, of transferring persons past middle life (Scammon was 47 years old when he became dean in 1930 at the University of Chicago) from a field in which he was highly qualified and in which he had won national acclaim to an area in which he lacked experience and for which he had almost no interest or native ability. He was unhappy in this situation and resigned the deanship in 1935. However, his prior years of service gave hope that he might contribute significantly to the University in other capacities. Another new position at the University of Minnesota was created for him, in fact, one that he had often expressed a desire to hold—namely, Distinguished Service Professorship in the Graduate School. He retired at the age of 65 years and died in 1952.

Harold S. Diehl becomes Dean of Medical Sciences. On June 29, 1935, Harold S. Diehl was appointed Dean of Medical Sciences. In the fall of 1914, Harold S. Diehl,[11] a freshman medical student, was assigned to the teaching section of the writer, then an instructor in the Department of Anatomy. During that school year, he did splendid work—dependable and trustworthy in every respect.

He was born in Nittany, Pennsylvania on August 4, 1891. After completing public school work, he entered Gettysburg College in 1908 and received the degree of bachelor of arts in 1912. Then, for two years he taught mathematics and was assistant principal of the high school at Fulton, New York. Harold aspired to more schooling which he financed himself. Through a former teacher at Gettysburg College, he accepted a part-time position teaching chemistry at Augsburg College in Minneapolis. This cleared the way for his enrollment in the School of Medicine at the University of Minnesota. After completing two years, he returned to his home in Maryland expecting to continue his medical education at Johns Hopkins or at Harvard University, both of which granted acceptances for transfer. However, these plans abruptly changed when he received a telegram from Dr. Robertson, head of the Department of Pathology, offering him an assistantship in pathology and bacteriology with a salary of $400 per year. Dr. Diehl declares

that this was one of the great thrills of his life and during his tenure as dean, he often cited this experience to others on the faculty urging them to take the initiative in inviting students who showed promise to accept fellowships or assistantships without waiting for the students to come to them or to file applications.

In 1918, Diehl received the degree of doctor of medicine and served as intern and physician in France for the United States Base Hospital 26 in World War I. From 1919 to 1920, he directed the Northern Division of the American Red Cross Commission to Poland. While serving in Poland, a communication from Dr. S. Marx White offered him a fellowship in the Department of Medicine at the University of Minnesota at $600 per year. Without Dr. White's invitation, Dr. Diehl probably would not have returned to Minnesota.

In January 1921, he became pathologist to the University of Minnesota Hospital with the title of instructor in pathology at a salary of $2,000 per year. In November of that year, he became assistant professor of public health and preventive medicine and in 1921, director of the Student Health Service. In 1922, he was made chief of the new Department of Preventive Medicine and Public Health. He developed and directed the Health Service and the Department of Preventive Medicine and Public Health admirably. In fact, his accomplishments were so outstanding that on June 1, 1935, President Coffman called at his office and asked him and Mrs. Diehl to prepare for a trip down the Mississippi River on Dr. W. J. Mayo's boat the next day. The president informed him that the occasion of the boat trip was a meeting of the Board of Regents of the University, and that he was to be elected to the deanship of the College of Medical Sciences. This came out of a clear sky, as there had been no previous mention of this appointment. Dr. Diehl that day became the second dean of the College of Medical Sciences. He was the first graduate of the institution to attain the post of dean.

Dean Lyon Retires. Dr. Lyon continued as dean of the Medical School under Harold Diehl until retirement at the age of 68 years in 1936. Lyon had served as a medical school dean longer than anyone in the United States (St. Louis University 1907-1913, and University of Minnesota 1913-1936).[11, 12]

The writer had the good fortune to be under his direction for 22 of the 23 years he served as dean of the University of Minnesota School

of Medicine. Throughout these years, he manifested kindliness and helpfulness in guiding me through the Medical School while an instructor in anatomy. He approved my promotion to assistant professor in 1923 and associate professor in 1926, and professor in 1932. The expressions of encouragement at every step of the way, his same watchfulness and guidance continued until his retirement in 1936.

Dean Lyon's loyalty to the School of Medicine was unsurpassed. For example, on December 18, 1930, he informed the Board of Regents that he was making the University beneficiary of his Group Life insurance. Unstintingly, he gave 23 of his best years to this institution.

In 1925, Dean Lyon pointed out that when he became dean of the School of Medicine in 1913, it almost seemed that there was a wall about the medical campus blocking it off from the rest of the University. During the next twelve years this changed. "We are now amalgamated into the greater whole. Our programs interdigitate with those of the other colleges. Hundreds of students from other colleges take subjects in the Medical School and representatives of our departments sit on the other faculties. We have come to realize the ideal that the Medical School is not an organization alone for the training of physicians, but rather is the custodian and reservoir of the medical sciences; the mechanism for supplying instruction either as the basis for a profession or as a part of a general education; and, finally, that the Medical School is the organization by which, through active research, these sciences may be forwarded and improved. I count this changed attitude of the Medical School as one of its finest achievements of the last ten years."

"But We Did It!" Numerous examples can be cited of Dean Lyon's keen judgment in choosing young faculty members, providing them with special training and supporting them to the nth degree. In 1936, he said, "State institutions aren't supposed to do things like that but private ones can." Then, he said, "But we did it." In the 1930's, Dean Lyon had the youngest faculty members of any medical school in the United States.

"But We Got It!" In 1936, he said he had lived through the most interesting time anyone could possibly have lived. He stated that harmony in the faculty is the most necessary thing in a medical school—and the most difficult to get. "But we got it." He said that when a new

professor was chosen, he did not do it as czar of the school; it was done by group action of all the department heads.

From 1913 to 1937, E. P. Lyon published more than 30 articles in medical, nursing and educational journals, four of which were published in 1936.

When Dean Lyon attained retirement age, a testimonial dinner was given in his honor on June 10, 1936.[13] At that time, Dean Harold S. Diehl presented a portrait of Dean Lyon to Dr. W. J. Mayo for the Board of Regents. A newly-established Elias Potter Lyon Lectureship added further honor. On that occasion, President Coffman said: "Dean Lyon was never actuated by mean or selfish motives. He was kindly and generous in dealing with others, professional and high-minded in discussing the problems of the Medical School and friendly to the students and staff. In his administrative capacity, he kept his face to the future rather than to the past. A scientist in his right, he knew how to evaluate the scientific efforts of others. He has been a university dean who administered the affairs of his College with no thought of gain to himself, and in a spirit of selflessness which others would do well to emulate, and his contribution to the University is as enduring as the benefits of medical science are to humanity!"

That night, Dr. W. J. Mayo said: "When Doctor Elias P. Lyon came to the University 23 years ago as Professor of Physiology and Dean of the Medical School, the teaching of medicine in Minnesota was of a clinical type, with only moderate scientific background. Today, the Medical School of the University of Minnesota clinically and scientifically is one of the first ten medical schools in America." In response, Dean Lyon said, "Mind you, I'm not ashamed of my job, but I think it has been only a small part of the much larger job we have done together. Minnesota's Medical School is a first class institution. It is no one man's monument. It stands for all who have worked here, from Millard, first dean, to the last teaching fellow."

After retiring on June 30, 1936, Dean and Mrs. Lyon spent the next winter in Florida. On their way back to Minnesota on May 4, 1937, while driving through the mountains he told Mrs. Lyon that he did not feel well and asked her to drive. He then became unconscious and died soon after reaching a hospital at Trafford, Pennsylvania.

In the early 1950's, the Institute of Anatomy and Millard Hall were

connected by a Laboratory Research Building which was appropriately named Lyon Laboratories. At the dedication ceremonies on February 11, 1954, Dean Harold S. Diehl said: "In medical education, Dean Lyon long occupied a position of national leadership. He had the vision of new horizons and the courage to depart from traditional methods, yet, he was always wisely conservative. He left enduring footprints in the sands of medical education, and his imprint indelibly upon this Medical School. This is in the records, but to the students, who were privileged to know him, Dean Lyon's outstanding qualities were those of kindliness and personal human interest. He always considered the welfare of the student of first importance, and helped many a one over the rough spots on a road to a medical career. And so a decade and a half after his death we can say of Dean Lyon that the shadow of his accomplishments and influences have lengthened rather than shortened with the passage of time."

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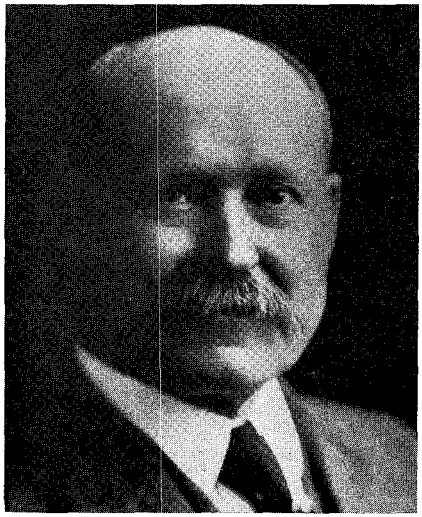
Chapter XII

The Graduate School of Medicine

PRIOR TO DECEMBER 1905, a Committee on Graduate Work had directed all graduate student activities on the campus of the University of Minnesota. However, on December 19, 1905, the Board of Regents formally established a Graduate School. Henry Turner Eddy who became the first dean was born in Stoughton, Massachusetts in June 1844. In 1870, he was awarded a degree in civil engineering and two years later the doctor of philosophy degree at Cornell University. Thereafter, he taught at Yale and later held professorships in several schools and became dean of the Arts College and later acting president and president-elect at the University of Cincinnati. He then served for three years as president of the Rose Polytechnical Institute at Terre Haute, Indiana.

President Cyrus Northrop had known Henry Eddy at Yale and in



Henry T. Eddy

1897 offered him a professorship of engineering and mechanics at the University of Minnesota. He served as dean of the Graduate School from his appointment in 1906 until retirement age in 1912 when he became professor and dean emeritus. His name is listed among the first five "Builders of the Name" (Chapter VI).

In the *University Bulletin* (1909-10) it is stated that: "the degree of master of arts or master of sciences is open to graduates of the College of Medicine and Surgery who are also bachelors of arts or sciences. Candidates must pursue approved courses in the College of Medicine and Surgery for at least one year after taking the degree of doctor of medicine."

When Dean Eddy retired, President Vincent recommended appointment of Guy Stanton Ford to the deanship of the Graduate School. During the next quarter-century (until he became University president), Dean Ford built the strongest and most productive Graduate School this nation had seen (Chapter VI).

Research and Graduate Degrees in Clinical Departments Promoted—Dr. Lee the First Faculty Research Worker. The original 1888 faculty members, on a part-time basis without salary from the University, devoted their time to teaching and administrative activities. Thomas G. Lee, who became full-time instructor in 1891, was the first faculty member to conduct scientific research. Between 1892 and 1918, he published 13 scientific articles. At a testimonial dinner commemorating his retirement in 1929, he was toasted as the *first faculty researcher.*

With the quickened research activities in the Department of Anatomy under Dr. C. M. Jackson beginning in 1913, a graduate fellowship program stimulated research in the clinical departments.

At the meeting on December 4, 1913, the Administrative Board appointed Doctors Arthur Hirschfelder, J. B. Johnston and J. F. Corbett as members of a Committee on Research. On January 9, 1914, this committee recommended classifications for research students.

1) Graduate students who are not doing research.

2) Physicians and others who are doing research but not candidates for degrees.

3) Candidates for advanced degrees granted by the Graduate School who are finishing their research in the College of Medicine.

A committee appointed on February 5, 1914, on Graduate Degrees in Surgery consisting of J. E. Moore, J. Clark Stewart and H. E. Robertson, reported to the Administrative Board on March 5, 1914 as follows: "We recommend that a standing committee of five be appointed by the Board to be known as 'The Committee on the Master Degree in Surgery.' We recommend that the University of Minnesota offer the degree of C.M. (master in surgery) to graduates in medicine." The report contained a list of eleven requirements to be fulfilled for the C.M. degree.

BEGINNINGS OF THE RESIDENCY PROGRAM

During the Administrative Board meeting on March 5, 1914, a letter from Dr. Frank C. Todd was read which contained the following: "I refer to the appointment of two physicians at the end of this school year to take a two years' course in diseases of the eye, ear, nose and throat at the University of Minnesota, at the expiration of which time a degree (probably master's degree) be granted, provided satisfactory work has been done.

"The plan would be to take on two such students for postgraduate work each spring; thus after the first year we should have four men pursuing the course. The object of this plan is as follows:

"Firstly: That of educating men to become experts in these specialties, and

"Secondly: To provide our department with assistants who will devote their full time in the work of the division.

"There is no specific provision for the education of men in these specialties and the character of the course that a man may outline lies entirely with himself, so that the country is today full of men who call themselves specialists in eye, ear, nose and throat diseases, who have taken a six weeks' course in a postgraduate medical school. It is needless to say that such men are very incompetent and there is a great need for a course in a reputable university such as it is proposed to establish. It seems to me that this is proper work for our University and true university post-graduate instruction. It would be the idea to attempt at first, at least, only the education of a few men in order that we may give them proper training. After our facilities increase, we may be able to take on more.

"As the American College of Surgeons is attempting to distinguish a real surgeon from a pretended surgeon, so such a course as this with the granting of a degree will help to distinguish a real ophthalmologist from a 'six weeks' ophthalmologist. As to the second consideration. It is perhaps not less important. During the past six months the attendance at the dispensary in eye, ear, nose and throat has been as follows: In eye and ear, including refraction, 1,334 new patients, or an average of 222 a month; while there has been an attendance of 4,504 or an average of 751 a month. In nose and throat, over one half this number. Thus, a total in eye, ear, nose and throat of 2,078 new patients, an average of 346 per month, and a total in eye, ear, nose and throat of 6,760 visits, an average of 1,128 per month. This means an average of 43 patients to be seen a day, 13½ of them being new patients.

"Many of these patients require considerable time; for example, all new patients and all cases that require refraction; some have minor operations and all of this, excepting refraction work, is supposed to be done in an hour and a half. It will thus be seen that a large number of men are required to man the division of eye, ear, nose and throat at the dispensary.

"Much work is thrown upon those who should devote more time to teaching and less to the caring for patients. We have a great deal of difficulty in securing enough assistance in the conduct of this clinic. It is not difficult to secure officers to carry on this work, but it is difficult to get enough privates.

"It would be expected that those taking the course in ophthalomology and otology would devote their entire time to it, and it would be to their advantage to do much of the work in which we require the most assistance. They would naturally spend a large part of the afternoon in work upon patients at the dispensary, and would prepare the work for the teachers.

"It is not my intention in this letter to go into detail but the advantages to our clinic will be evident to you, while the desirability of giving such a postgraduate course is beyond measure. Will you kindly take this up at the next meeting of the Administrative Board, and should you desire me to be present for further explanation kindly advise me."

The original Committee became known as the Committee on the Master Degree in Surgery and Doctors Charles Lyman Greene, J. C.

Litzenberg, and Frank C. Todd joined Dr. J. E. Moore, J. Clark Stewart, and H. E. Robertson in its task.

On July 30, 1914, the Committee made the following recommendations:

"1. That a Graduate School in Medicine be established.

"2. That a committee be appointed by the Administrative Board to be known as the Committee of the Graduate School and that this Committee confer with the Graduate School of the University of Minnesota as to its possible relation to the work and to report back to the Administrative Board.

"3. That requirements for admission to graduate work be as follows:

(a) High moral and ethical standing.

(b) The possession of the degree of doctor of medicine from a recognized medical college or university.

(c) One year's internship in an approved general hospital or an approved equivalent of service.

"4. That the graduate course cover a period of three years, leading up to the degree of doctor of science; such degree to be qualified by the special subject pursued (e.g.) doctor of science in surgery, doctor of science in ophthalmology, etc.

"5. That a candidate for the degree shall be required to do at least the last year's work in the University of Minnesota.

"6. That the schedule of graduate work shall be elastic and shall be fitted to the special needs of each candidate by the committee in charge.

"7. That a two year's graduate course may be given in certain specialties, which will not secure the degree, but for which candidates will receive a certificate of proficiency.

"8. That the number of students admitted be limited to those who can be accommodated in each department of study.

"9. That each department or division prepared to undertake graduate work, or having teaching fellowships provided, shall prepare and submit a curriculum for the three years' course.

"10. That the committee to be appointed by the Administrative Board be instructed to prepare a blank form of application for teaching fellowships or other graduate work.

"11. That the following rules govern the teaching fellows:

(a) Applicants for teaching fellowships will be expected to complete the three years' work, but may offer acceptable courses from other institutes for one or two years' credit.

(b) Teaching fellows will be required to devote their entire time to the course and will not be permitted to engage in private practice.

(c) Teaching fellows will be in residence for eleven months in the year.

(d) Fellows will be assigned to certain designated educational duties throughout the three years' course.

(e) The term of a teaching fellow may be terminated at any time for causes."

On August 10, 1914, Dr. Moore, authorized to consider candidates for teaching fellowships, began making nominations to the Administrative Board. On December 3, 1914, Dean Ford of the Graduate School announced his approval of arrangements for a master of science degree.

During the meeting of the Administrative Board on September 3, 1914, the secretary stated that the president had announced the creation by the Board of Regents of a group of five graduate teaching fellowships with exemption from tuition fees, estimated by the president at $150 a year, and with a requirement of teaching or other service. He proposed that graduate students in medicine, of three grades, be entered:

a. The teaching fellows in chosen special study, already provided for under stipends of $500, $750, and $1,000 for a first, second and third year, upon an entire time basis for eleven months in each year and giving a substantial share of teaching assistance.

b. Graduate scholars, in special study, for three years of nine months each, contributing a lesser share of teaching assistance and receiving the proposed abatement of tuition fees.

c. Graduate medical students, for three years of nine months each, under tuition fees of $150 a year, who shall not give any teaching or other service; the last class to be allowed a free range of graduate medical study.

The Board approved the proposal subject to a possibly better designation of these several classes of graduate students by the dean and the secretary. The Board also requested the Committee on Teaching Fellowships after consultation with Dean Ford, to supply the secretary with the material for a circular of information upon graduate work.

On October 8, 1914, the Administrative Board voted to assign one graduate teaching fellowship to each of the departments of medicine, surgery and obstetrics and to hold the remaining two in reserve for possible applications in other departments.

On November 5, 1914, the Committee approved the nomination of Dr. Rood Taylor as teaching fellow in pediatrics. At the same meeting of the Administrative Board, Dean Lyon announced that the budget for teaching fellows was $4500 for 1915-16 and $6700 for 1916-17.

During the same meeting Dr. Moore, chairman of the Graduate School Committee, proposed to confer the degree of master of science qualified by the subject in which a course of study is pursued upon the satisfactory completion of one or two years work in the Graduate School of Medicine.

On February 8, 1915, Dean Lyon announced that the Committee on Research and on Teaching Fellowships had merged into a Committee on Graduate Teaching.

The Mayo Foundation for Medical Education and Research. President Vincent's reorganization (see Chapter XI) in 1913 which reduced the number of faculty members from 184 to approximately 70 resulted in considerable bitterness among those who were not reappointed. For a number of years, there had been developing an unfortunate attitude toward the Mayo Clinic among some of the Twin Cities physicians in private practice. Dr. S. Marx White called attention to some of the occurrences which resulted in this attitude. He pointed out that in 1905, *McClure's* Magazine published an extensive article entitled "Modern Surgery" by Samuel Hopkins Adams, a popular writer. Mr. Adams, after visiting Rochester, wrote a vivid account of the work of the Mayo brothers in a small rural community. He stated that in this private enterprise these two brothers and their staffs handled more surgical cases than any other hospital in the United States—even more than the Johns Hopkins Hospital. This article about the Mayo brothers and contemporary surgery evidently touched off a series of other articles in publications all over the country. Although this publicity was not solicited by the Mayos, it created much indignation among medical men and surgeons, especially in the Twin Cities area, where it was looked upon as blatant advertising. It brought to the surface a resentment which festered. Moreover, Dr. Thomas S. Roberts, a graduate of the University of Pennsylvania, who was professor of diseases of

children in the Medical School and also had a practice particularly among the prominent and wealthy citizens here, took most of his surgical patients, as did a few other physicians, to Rochester instead of employing surgeons in this community. The resentment was growing and soon burst into flame.

From the time President Vincent first mentioned an affiliation of the School of Medicine and the Mayo Clinic, March 11, 1913, through appointment of a committee in March 1915, a colossal effort was waged by a few Twin City physicians against adoption of such an affiliation. By action of the Board of Regents, the affiliation was temporarily effected, but with the Graduate School instead of the Medical School. All of this had resulted in so much ill feeling that resignations were submitted even by some of the clinical faculty members.

As long as President Vincent remained with the University of Minnesota, no further outburst was made against the affiliation of the School with the Mayo Clinic. However, in March, after President Vincent announced his resignation on January 31, 1917, a widely circulated pamphlet entitled, "Why the Mayo Affiliation with the University should be Terminated," appeared. This contained twelve reasons why the affiliation should be abandoned and was signed by 78 physicians residing in the Twin Cities, Duluth and other parts of the State. This

William J. Mayo

Charles H. Mayo

pamphlet was circulated also to members of the legislature. In the pamphlet, earnest and active support was requested of a bill which had been introduced into the State Legislature asking for discontinuance of the Mayo Clinic affiliation.

When Dean Lyon was alerted, he promptly appointed Emil Geist, S. Marx White, and J. C. Litzenberg as a committee to formulate a reply. He then called a meeting of the general faculty on March 19, 1917, at which the committee presented its reply. In its final form, this reply was sent to all members of the legislature, to the medical profession throughout the state, to the alumni outside the state, to *The Journal Lancet,* and to *The Alumni Weekly.* The reply was published in *The Journal Lancet* April 1, 1917.

The *Doctors Mayo* had established advanced medical instruction in 1905 at the Mayo Clinic in Rochester (90 miles from the University of Minnesota). When the affiliation of the two institutions was proposed in 1914, they offered to endow it with a gift of $1,500,000. The affiliation was incorporated on February 8, 1915, as the Mayo Foundation for Medical Education and Research, a corporation independent of the Mayo Clinic. The Regents signed an agreement with the Mayo Foundation on June 9, 1915, which made its students members of the University Graduate School and subject to its regulations as candidates for degrees. The main feature of the agreement was that the Mayo Foundation was to provide an endowment of $1,500,000 of which the interest was to be allowed to accrue until the sum reached $2,000,000. Until then, the Mayo Clinic would pay the affiliation's yearly operating cost of about $100,000. The suggested trial period of the agreement was six years and could be brought to an end at any time upon a year's notice.

In March 1917, Dean Ford of the Graduate School and Dean E. P. Lyon of the Medical School made a public report in defense of the affiliation. The report stated that "the object of medical graduate work is the training of competent specialists and medical investigators." It pointed out that the Graduate School arranged and controlled all matters of admission, enrollment, curriculum and degrees and that the Regents appointed all doctor-fellows, or residents, and approved all staff appointments. The report also explained that all graduate medical work was under a Medical Graduate Committee composed of nine members:

the president of the University, the deans of the Graduate and Medical Schools, three medical graduate instructors in Minneapolis and three in Rochester.

When the bill to prevent affiliation was before the legislature in the spring of 1917, Dr. William J. Mayo himself addressed a public hearing in the House. In a simple but stirring address, he expressed his and his brother's belief that what they had accrued had come from the people and should be returned to the people, a belief they hoped to realize through the endowment of the University-Mayo affiliation.

The anti-affiliation bill died in the legislature. Therefore, a temporary arrangement was completed in 1915 and the Mayo Foundation for Medical Education and Research was established on a permanent basis in 1917. (See Chapter XIII.)

When Guy Stanton Ford became dean of the Graduate School in 1912, only two persons had previously been granted the degree of doctor of philosophy in the field of medicine. It was the original plan to have medical graduate work directed by the Medical School. However, Dean Ford encouraged and welcomed the plan of having this work conducted in the Graduate School as was done by other departments and schools of the University. He worked unceasingly with members of the faculty, particularly C. M. Jackson and Dean E. P. Lyon to place and maintain graduate work in medicine on a high plane. He accomplished this end and 970 physicians and medical scientists were awarded advanced degrees prior to 1940. (See Chapter VI.)

On July 1, 1939, *Royal N. Chapman* who was born in Morristown, Minnesota in 1889 became dean of the Graduate School. He was awarded the degrees of bachelor of arts and master of arts, University of Minnesota, in 1914 and 1915 respectively. In 1917, he received the degree of doctor of philosophy from Cornell University.

He worked from title of scholar in animal biology in 1912 to chief and professor of entomology and economic zoology in 1925. In 1930, he left the University of Minnesota to become director of the Experiment Station of the Association of Hawaiian Pineapple Canners, University of Hawaii, Honolulu. He also served as dean of the Graduate Department of Tropical Agriculture at the University of Hawaii.

As early as 1932, Dr. Chapman was honored by election as one of America's most distinguished scientists. His publications consisted of almost 40 papers.

Royal N. Chapman

Theodore C. Blegen

On July 1, 1939, he resumed work at Minnesota as professor of ecology and dean of the Graduate School. During the next few months, he worked diligently but on November 20 of the same year, he developed thrombophlebitis of the right popliteal vein. Twelve days later (December 2), a pulmonary embolus occurred from which he died in 12 hours.

Dr. *Theodore C. Blegen* succeeded Dr. Chapman as dean of the Graduate School. The son of Norwegian immigrant parents, he was born in Minneapolis in July 1891. He received the degree of bachelor of arts from Augsburg College in 1910 and from the University of Minnesota in 1912. After graduation, he accepted a teaching position in the Fergus Falls High School. From there, he returned to the University of Minnesota for a year of graduate work and then went to Milwaukee, where he taught history in the Riverside High School.

In 1920, he went to Hamline University as assistant professor of history where he remained until 1927. After beginning work at Hamline, he continued graduate study at the University of Minnesota and while carrying a full-time teaching position he won the degree of doctor of philosophy in 1925.

On January 27, 1955, Professor A. C. Krey introduced Dean Blegen who was scheduled to speak under the title "This Minnesota," at a meeting of the Minnesota Historical Society. When he referred to Dean Blegen's final examination for the degree of doctor of philosophy, Pro-

fessor Krey said, "In his final examination, he gave a performance unequaled by any other candidate in my experience. As I remember it now, he was given only one question—he took that, expounded it so clearly, so fully and so interestingly that the committee sat there enthralled by his performance. He was still going strong when the examination closed. He knew so much more about his subject than any of his examiners and probably anticipated other questions they might have asked that none of them interrupted him. In my memory, that examination stands out as the one in which the fewest number of questions were asked."

While still teaching at Hamline, he accepted a part-time position with Dr. S. J. Buck, superintendent of the Minnesota Historical Society. He helped Dr. Buck edit Folwell's four-volume *History of Minnesota.* When Dr. Buck resigned in 1931, Dr. Blegen became superintendent of the Historical Society. Under his editorship, the periodical of the Minnesota Historical Society was referred to by the Editor of the *American Historical Review* as the best publication of any local historical society. In 1927, he resigned at Hamline and was appointed professorial lecturer at the University of Minnesota. In 1930, he was promoted to an associate professorship and in 1937 to full professorship.

In 1925, Dr. Blegen was one of the founders of the Norwegian-American Historical Association and immediately became managing editor of its publications. He was awarded a Guggenheim Fellowship in 1928-29 on which he spent the year in Norway gathering valuable material concerning the Norwegian immigration to America. In 1939, he resigned the superintendency of the Historical Society to accept a fellowship of the Norwegian American Historical Society to complete the studies begun in 1928 and 1929 as a Guggenheim Fellow. He served this organization and its publications for 35 years during which he edited 41 volumes of its official publications.

Dr. Blegen's work and accomplishments early became favorably and widely known. In 1935 St. Olaf College conferred upon him the degree of doctor of humane letters. Three years later, the University of Oslo, Norway, awarded him an honorary doctorate, and in 1942, Hamline University conferred upon him the degree of doctor of literature. He also holds honorary degrees from Carleton, Macalester and Augustana Colleges. In October 1959, Augsburg College presented him with its Outstanding Alumnus Award.

The University of Minnesota was most fortunate in being able to convince him to accept the deanship of the Graduate School in 1940. For the next 20 years, he conducted this School in an admirable manner with complete satisfaction of the University administration, all members of the University faculty concerned, and with admiration and respect of the graduate students. Indeed, 2,296 doctors hold Graduate School diplomas bearing the official signature of Theodore C. Blegen, their beloved dean. Along with the strenuous work of the deanship, Dean Blegen continued to write and published on the average at least one book or its equivalent in articles and reviews each year.

His books entitled *Building Minnesota* published in 1928; *The American Transition,* in 1940; *Grass Roots History,* in 1947; *The Land Lies Open* (1949); *The Land of Their Choice* (1955), are among the more than 20 books he has published. *Norwegian Migration to America* in two volumes totalling more than 1,000 pages is often said to be his greatest work.

His accomplishments in golf, golf-pool and music along with his publications in addition to his superior administration of the Graduate School, etc., etc. caused him to be listed in the Minnesota Territorial Centennial as one of "The 100 Greatest Living Minnesotans."

On January 29, and 30, 1960, a Conference on Immigration and American History was presented by the University of Minnesota and its Department of History in honor of Dean Blegen. This conference was attended by scholars in this field from all parts of the United States and from Norway. Many excellent papers were presented which were published by the University of Minnesota Press. On January 30, following the conference, a dinner was given honoring Dean and Mrs. Blegen. This was attended by almost 500 persons who signed a citation. In his "Thank You" speech he said, "Each year some of us retire and make place for others—and I trust that we do it with a certain grace and with gratitude for all this University and State have meant to us, maybe, also, with a conviction that others will meet the challenges of a new time with new ideas and will do a better job than we have done."

He said many people had asked him what he proposed to do when he retired the following June. He said, "I may play a little golf, but I shall certainly go on with my writing. Here I take comfort from Biblical lore especially from the examples set by King David and King Solomon. I am sure you all remember the verse that tells what they did.

King David and King Solomon led merry, merry lives,
With many, many lady friends, and many, many wives,
But when old age crept over them—with many, many qualms,
King Solomon wrote the Proverbs
And King David wrote the Psalms.

"Putting aside all references to many lady friends and wives, I am not vain enough even after the speeches of the evening to suppose that I could write Proverbs and Psalms, but I do think that I could write a book or two or maybe more and I have thought of some titles." He then proceeded to state that he could write a book on "How to Be a Great University President" which would be devoted to President J. L. Morrill.

On April 23, 1960, following the 12th triennial meeting of the Norwegian American Historical Association, a banquet was held when Professor Carlton C. Qualey gave the address in honor of Dean Blegen who was retiring as editor. In his response, Dean Blegen called attention to the unparalleled team work which had prevailed down through the years. He pointed to "the enthusiasm of the membership and to the faithfulness of the 60 persons who have remained members since 1925 and 1926."

When Dean Blegen reached retirement age, he turned over the managing editorship of the Norwegian American Historical Asociation to another editor and ceased to be dean of the Graduate School of the University of Minnesota on June 30, 1960. His unbounded loyalty to Minnesota, its institutions and its citizenry and his great love for his native state caused him to refuse offers of numerous positions including college and university presidencies.

Although Folwell's four volume *History of Minnesota* remained available, it was not written for general readers. For many years, Dean Blegen had recognized the need for, and had a strong desire to write "the Minnesota story for the general public." No sooner were his retirement ceremonies over than the Minnesota Historical Society sponsored a research fellowship (with a grant from the Elmer L. and Eleanor J. Andersen Foundation), and his writing continued. The result is a volume entitled *Minnesota—A History of the State* composed of 27 chapters and a final section of 24 pages entitled "For Further Reading." A most helpful index of 61 pages completes the total of the 688 page

book. It also contains 48 appropriate illustrations. By January 1, 1966, almost 8,000 copies had been distributed. Many copies went to other states and other nations.

Promptly after his history of Minnesota was completed, the Hill Foundation provided Dr. Blegen with a three-year grant. His work was of such excellent quality that this grant was extended three more years in 1966. Over this period, to date he has published a few booklets and some articles. A new piece is an *Album of French-Canadian Voyageurs,* for which he wrote an introductory essay on the voyageurs which was published by the Minnesota Historical Society. He continues to work on several other items of which one is fairly large and will be announced in due time. Dean Blegen is one of the most remarkable persons who has ever served on the University of Minnesota faculty. He belongs to that group of true and fine Americans who have appreciation of their predecessors who created the environment under which they themselves have had the privilege of working. Since retirement in 1960, he has wasted no time and he will continue throughout the remainder of his life to make contributions of lasting benefit of present and future generations. What a life to emulate! On May 8, 1967, the Board of Regents appropriately honored him by naming the new class room building on the West Campus the Theodore C. Blegen Building.

When Dean Blegen retired, the Graduate School was again fortunate to have a highly-qualified and able faculty member, *Bryce Crawford, Jr.,* to assume the responsibilities of the Graduate Dean. Dr. Crawford, who joined the University of Minnesota faculty in 1940, had been an assistant professor of physical chemistry from 1940-43 and an associate professor from 1943-46. He has been a professor of the Department since 1946 and chairman from 1955-60, when he became dean of the Graduate School.

Dr. Crawford, who was born in 1914 in New Orleans, Louisiana and reared in Texas and California, attended Stanford University where he was awarded the degrees master of arts in 1935, and doctor of philosophy in 1937. He served as a National Research Fellow at Harvard University from 1937-39 and as a chemistry instructor at Yale University in 1939-40.

During World War II, Dr. Crawford was director of research on rocket propellants from 1943-45 under the National Defense Research

Bryce L. Crawford, Jr.

Francis M. Boddy

Commission. He was a Guggenheim Fellow at the California Institute of Technology and a Fulbright Fellow at Oxford University in 1950-51. He was also a Fulbright Scholar in Japan in 1966.

Dr. Crawford is a member of the American Chemical Society, American Physics Society, National Academy of Sciences, Optical Society of America, American Association for Advancement of Sciences, Coblentz Society and American Association of University Professors. He is chairman of the chemistry section of the National Academy of Sciences and a past chairman of the Council of Graduate Schools in the United States.

Since Dr. Crawford has been graduate dean, 790 students have received advanced degrees in medical fields. A total of 1,483 students were enrolled in medical fields in 1965-66 (Table I).

When Dean Blegen retired, *Francis M. Boddy* was appointed associate dean of the Graduate School. He was born in Owen Sound, Ontario, Canada in September 1906. He received the degree of master of arts in 1936, and doctor of philosophy in 1939. All of his student work was in the School of Business, University of Minnesota.

In 1930, he became a member of the faculty in the capacity of assistant. From then until 1946 he advanced through the ranks of instructor, lecturer, assistant professor and associate professor. In 1946,

he became professor of economics and continued in this capacity until he was appointed associate dean of the Graduate School, July 1961.

Since 1939, he has held numerous important appointments including consultant to the National Resources Planning Board, Washington 1939-42; Office of Price Administration 1942-43; United States Treasury Department 1950-53; member, Governor's Tax Study Commission 1955-57, and United States Navy Reserve 1943-46.

He holds fellowship or membership in many organizations including American Association for Advancement of Science; American (Royal) Scottish Economics Association; American Statistical Association; American Accounting Association; Econometric Society; Regional Science Association; Reserve Officers Association; Mount Pelerin Society; American Veterans Committee and American Association of University Professors.

Dean Boddy is author and co-author of many publications among which are *Principles of Economics,* 1947; *Applied Economic Analysis,* 1948; *Soviet Union Paradox and Change,* 1962; Editor, *Savings in Modern Economy.*

In 1915, a Medical Graduate Committee was appointed with Dr. C. M. Jackson chairman. One of the functions of this Committee was to consider problems and requests for research funds by students and faculty members. In due time, the legislature appropriated $25,000 for research work in the Medical School. Those seeking financial assistance made formal requests for desired amounts. The Committee carefully studied the subjects to be investigated and allocated funds to those persons thought to make noteworthy accomplishments.

Dr. Jackson remained chairman of the Committee until 1941 and on occasions was requested by Dean Ford to serve as acting dean of the Graduate School. Chairmen of the Graduate Medical Committee who succeeded Dr. Jackson included Dr. E. T. Bell, Dr. Maurice Visscher, and Dr. W. W. Spink. The functions of the chairman and the members of this Committee were numerous and important. Dr. Maurice Visscher who served as chairman so long and so well kindly responded to a request to write the following concerning the work of this Committee: "The Medical Graduate Group Committee has served as the major advisory group to the dean of the Graduate School with regard to all problems of graduate education in the Medical Sciences. Since

such work began in 1915, its routine functions have been to control the quality of all programs leading toward master of science and doctor of philosophy degrees. There have been two sections of the committee, one on the Rochester or Mayo Foundation campus of the University and the other on the Minneapolis campus. The Mayo committee has jurisdiction concerning graduate programs in Rochester and the Minneapolis committee concerning programs in the Twin Cities. They have operated jointly in setting up general guide lines and controlling major innovations.

"The two committees have been responsible for recommendations concerning appointments and promotions within the graduate faculty in the medical field throughout the University and have therefore played a major role in determining the quality of staff in the graduate school dealing with graduate education in the medical sciences.

"The Minneapolis committee had had in addition a major function in recommending to the dean of the Graduate School the allocation of funds for research in medicine, derived initially, from a special legal appropriation for distribution by the Graduate School, and more recently from funds derived from other sources as well, especially a part of the General Research Support Grant from the National Institute of Health.

"The importance of the work of the Medical Graduate Group Committee to the development and operation of advanced education in the Medical School at the University of Minnesota can be appreciated when it is pointed out that there are approximately as many students enrolled for graduate work in the Medical School on the Minneapolis campus as there are undergraduate students of medicine and that an equal or larger number of such graduate students work in Rochester. The total educational program in medicine has depended very heavy upon the work in the Graduate School. Credit must be given to the Graduate School for the high quality of medical practice in the various specialties of medicine in the State of Minnesota, as well as for the eminence of Minnesota as a center for advancement in the medical sciences through research. It would be a great mistake to think that the only function of the Graduate School as to medicine consisted in its contribution to research because unquestionably the graduate program has contributed in a most important way to the preparation of high caliber practicing

physicians in this state. The Hennepin County (formerly Minneapolis) General Hospital and the St. Paul Ramsey (Ancker) Hospital as well as the University and some other hospitals including the Mayo Clinic group have produced a large fraction of the practitioners of the State from among their internship and residency group of students. These hospitals all provide training controlled by members of the graduate faculty of the University. The State of Minnesota has gained greatly in the quality of its medical care."

ACCOMPLISHMENTS IN MEDICAL GRADUATE TRAINING

Although C. L. Herrick was awarded the degree of doctor of philosophy in neurology in 1898, and A. E. Julien the degree of master of science in neurology in 1908, the remainder of graduate degrees in Medical Sciences did not get under way at the University until about the middle of the second decade. The first were in anatomy when the master of science degree was awarded to E. R. Hoskins, in 1913; to W. E. Camp and C. A. Stewart in 1915; and to E. H. Norris and L. H. Rutledge in 1916. W. T. Allen and E. Baumgartner each received the degree of doctor of philosophy in 1915 and C. A. Stewart in 1917.

Golder Lewis McWhorter, Department of Surgery, and Rood Taylor, Department of Pediatrics, were the first to receive the degree of doctor of philosophy in clinical subjects—1917. At the Mayo Foundation, the first graduate degrees granted were master of science in 1916 and a degree of doctor of philosophy in 1930.

In 1918, Dr. L. B. Wilson published a fine description of the graduate work in medicine. Later, Dr. C. M. Jackson, who was responsible for extensive promotion of medical graduate work beginning in 1913, published an article in which he reviewed the accomplishments and brought to date the status of this activity. He said that in 1932 the medical graduate faculty at Minnesota included 234 members of whom 88 were at the University and 146 were at the Mayo Foundation. Of the 234, 50 were full professors, 50 associate professors, 67 assistant professors and 67 instructors. They represented all the principal divisions of medicine in both clinical and laboratory sciences. From 1914 to 1930, this faculty had quadrupled in number, increasing from 58 (31 at Minneapolis and 27 at Rochester). Dr. Wilson pointed out that the medical graduate faculty, organized under the Graduate School, facilitates cooperation between the Medical School and the various other colleges

of the University in higher medical education and research. The medical graduate committee consisting of (ex-officio) the president of the University, the dean of the Graduate School, the dean of the Medical School and the director of the Mayo Foundation plus four additional members appointed from Minneapolis and four from the Mayo Foundation supervised the work. The doctor of medicine degree from a Class A medical college plus an acceptable internship represented merely minimal requirements for admission, and also more than average scholastic ability.

Dr. Jackson wrote that in the University graduate work there were few lectures, or classes of the ordinary kind and no fixed curricula. Each student with the assistance of his adviser and the approval of the dean of the Medical Group Committee mapped out a program best fitted to his individual needs, but largely practical in character both laboratory and clinical. Clinical specialism required a more thorough foundation than could possibly be obtained in the undergraduate medical curricula. "The graduate student works largely under the direct personal supervision of his adviser, thus conserving the advantages of the ancient preceptor or apprentice system. The constructive aspects of the work culminate in the thesis in connection with which the student is trained for scientific research in his special field. The extent of the thesis research varies according to the degree sought. For the master's degree, a shorter dissertation is required demonstrating familiarity with the literature of the subject and capacity for research based on original observation. For the doctor of philosophy degree, a much more extensive study is necessary establishing original results which form a substantial contribution to knowledge."

From the years 1914-15 through the year 1930-31, a total of 429 graduate degrees in the medical group including both medical and laboratory subjects were conferred. Of this number, 177 were at the University, including 123 masters and 54 doctor of philosophy degrees, while at the Mayo Foundation there were 252, including 238 masters and 14 doctor of philosophy. Minnesota granted 42 of these degrees during the year 1930-31, 12 of which were masters and five doctor of philosophy at Minneapolis, and 24 masters at the Mayo Foundation. The students registered at the University in 1930-31 worked chiefly in the medical laboratory sciences, while those at Rochester were mainly concerned with the various clinical branches of study. Some students found it profitable to divide their time between Minneapolis and

Rochester. About half of the students at Minneapolis and nearly all of those at Rochester were on fellowships paying (in the clinical fields) $800 the first, $900 the second, and $1,000 the third year of service. The fellowships at Minneapolis were supported chiefly by general University funds, but partly by the affiliated hospitals. Income of the Mayo Foundation and outside sources provided the fellowships at Rochester.

Dr. Jackson pointed out that of the 429 graduates, over the past 16 years, who took degrees in laboratory science some went into clinical work, but many continued their careers in laboratory teaching and research at Minnesota and other universities. The clinical graduates, to a large extent, engaged in specialized practice for which they were primarily trained. Many also received appointments as clinical teachers and investigators in various universities. Several headships in both laboratory and clinical departments were filled with men having higher degrees from Minnesota.

Dr. Jackson's final statement: "It would, therefore, appear reasonable to conclude that the experimental stage has been safely passed and that the University of Minnesota may be credited with successful leadership in graduate medical work as well as in other phases of medical education." Dr. Jackson's conclusion is born out by subsequent developments.

The growth in medical graduate work is indicated by the number of faculty members during 1965-66 when there were 780 of whom 394

TABLE I

MEDICAL GRADUATE TRAINING 1965-66

780 medical graduate faculty
- 394 at Minneapolis of which there were:
  - 163 professors
  - 121 associate professors
  - 89 assistant professors
- 386 at Rochester of which there were:
  - 89 professors
  - 89 associate professors
  - 96 assistant professors

1,483 current enrollment
- 855 at Minneapolis
- 628 at Rochester

4,056 total medical graduate degrees
- 3,312 total medical masters degrees
- 744 total medical Ph.D. degrees

1,955 medical graduate degrees at Minneapolis
- 1,308 masters degrees
- 647 Ph.D. degrees

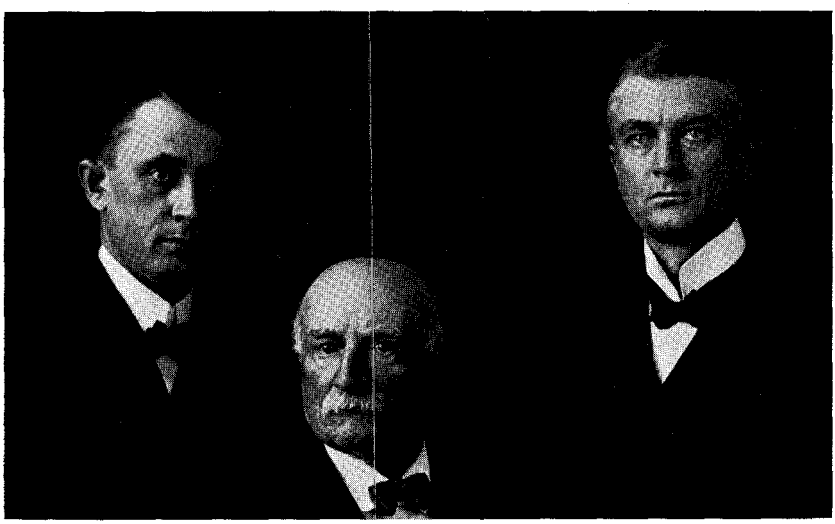
2,101 medical graduate degrees at Rochester
- 2,004 masters degrees
- 97 Ph.D. degrees

were at the University and 386 were at the Mayo Clinic (Table I). Of the 780 Graduate School faculty members, 252 were full professors, 210 associate professors, 185 assistant professors, 125 instructors, and 8 special lecturers. Of the 1,483 students registered that year, 855 were at Minnesota and 628 at Rochester. For the 52 years 1914-15 through 1965-66, a total of 4,056 graduate degrees including both medical and laboratory subjects were conferred. Of this number, 1,955 were at the University including 1,308 masters and 647 doctor of philosophy, while at the Mayo Foundation there were 2,101 including 2,004 masters and 97 doctor of philosophy degrees.

Chapter XIII

The Mayo Foundation for Medical Education and Research 1915-1963 to Mayo Graduate School of Medicine of the University of Minnesota 1964

At the age of 26 years, in 1845, William Worrell Mayo, a professional chemist emmigrated from near Manchester, England to the United States. In 1851, he married Miss Louise Wright of Jordan, New York. Three years later he had earned the degree of doctor of medicine from the University of Missouri. After practicing briefly in La Porte, Indiana and St. Paul, they moved to LeSuer, Minnesota where their son, William James was born in 1861. Two years later they located in Rochester, Minnesota where Charles Horace was born in 1865.

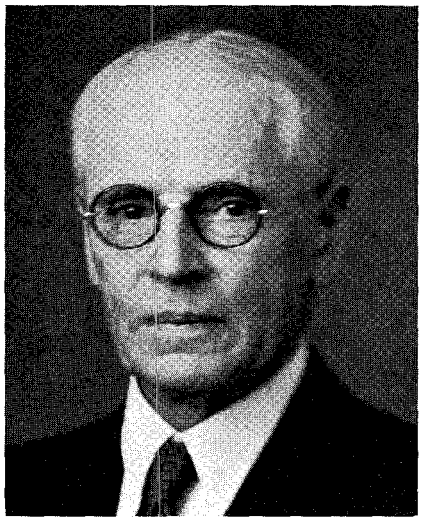


Dr. W. W. Mayo and his two sons. (Courtesy, W. B. Saunders Co.)

At the age of 22 years, William J. was awarded the degree of doctor of medicine by the University of Michigan and at the age of 23, Charles H. received the degree of doctor of medicine from Northwestern University. They entered practice with their father and took graduate work in New York. Over the succeeding years, they traveled extensively not only in this country, but also abroad to observe the work of and learn from the best physicians, clinics and hospitals of the world. Their keen interest in surgery and the excellent results obtained began to attract attention far and wide so surgical cases were sent to them in large numbers. Young physicians were attracted to them and the immense volume of work required employment of many physicians and surgeons. As early as 1904, 3,131 operations were performed by the Mayo Clinic staff. In 1915, 35,358 patients registered in the Clinic and 14,951 operations were performed. Their excellent work developed with such rapidity that they established the Mayo Foundation and became affiliated with the Graduate School of the University of Minnesota in 1915 (see Chapter XII). That year, the following Mayo Clinic staff physicians were appointed to the Graduate School faculty:

Balfour, Donald C.
Beckman, Emil H.
Bissell, Wayne W.
Braasch, William F.
Carman, Russell D.
Eusterman, George B.
Fisher, Carl
Giffin, Herbert Z.
Graham, Christopher
Henderson, Melvin S.
Judd, E. Starr
Kendall, Edward C.
Logan, Arch H.
MacCarty, William C.
Mann, Frank C.
Matthews, Justus
Mayo, Charles H.
Moore, Alexander B.
Mussey, Robert D.
New, Gordon B.
Plummer, Henry S.
Robinson, Samuel
Rosenow, Edward C.
Sanford, Arthur H.
Shelden, Walter D.
Sistrunk, Walter E.
Wilson, Louis B.

Following a two year trial period between the Graduate School of the University of Minnesota and the Mayo Foundation, a permanent agreement was signed on September 13, 1917. Dr. *Louis Blanchard Wilson* had been appointed director of the Mayo Foundation for Medical Education and Research. He was born in Pittsburgh, Pennsylvania on December 22, 1866. In 1896, he received the degree of doctor of medicine from the University of Minnesota. That year, with the support of Dr. William J. Mayo, he was appointed assistant bacteriologist in the laboratory of bacteriology of the Minnesota State Board of Health of which Dr. Mayo was a member. From 1896 until 1900, he was instructor and in 1900 he was promoted to an assistant professorship in



Louis B. Wilson

pathology and bacteriology in the University of Minnesota College of Medicine and Surgery. (See Chapter XXIII.)

Dr. Wilson came to Rochester, Minnesota on January 1, 1905 as director of laboratories for the partnership of Mayo, Graham, Plummer, Judd and Stinchfield. He was 51 years old when, in 1915, the Mayo Foundation for Medical Education and Research was established as a part of the Graduate School of the University of Minnesota. He was appointed professor of pathology and director of the Mayo Foundation. These two posts he occupied until 1937, when he became emeritus professor and director.

Dr. Wilson entered the Medical Corps of the United States Army on September 17, 1917 with the grade of major. He was assigned at first as field director of the Army Medical Museum and then to the office of the director of laboratories of the American Expeditionary Force at Dijon, France. There, he became chief of the Museum and Art Section of the Division of Laboratories and Infectious Diseases.

The greatest contributions made by Dr. Wilson probably were those having to do with graduate medical education. He was a prime force in the Council on Medical Education and Hospitals, organized in 1904, of the American Medical Association, and in the Association of American Medical Colleges, founded in 1867. He was president of the latter

group from 1931 to 1933. When the National Board of Medical Examiners was established in 1915, Dr. Wilson was elected a charter member. He was chairman of the section on medical sciences of the American Association for the Advancement of Science in 1931 and 1932. He served as president of the Advisory Board for Medical Specialties from 1935 to 1937. In 1940, the University of Minnesota conferred upon him the honorary degree of doctor of science. He died from amyotrophic lateral sclerosis (bulbar type) on October 5, 1943.

With Dr. Wilson's appointment, a faculty member from Rochester and a director and an additional faculty member from Minneapolis were named to the Medical Graduate Committee which directed the new foundation.

The general plan of the graduate medical program consisted of a probationary period of six months for a select group of well-qualified medical school graduates who already had served at least one year's hospital residency. Successful probationers were recommended by the Regents for another six-month period and for annual reappointment of a total of no more than five years. Unless engaged solely in research, each student saw from 1,000 to 1,200 patients during each year of clinical work. In addition, he had to make clinical and laboratory investigations before he was eligible for candidacy for a graduate degree.

The graduate medical program at Rochester proved it had the four factors which Dean Ford of the Graduate School declared essential for graduate education. These factors were: "a growing body of clinical teachers who have abandoned opinion and the exploitation of skills for experimentation and investigation, men who see in medical research and teaching a career; a body of students adequately prepared to follow the new leadership; equipment in hospitals, clinical material and supporting laboratory and other facilities; and a body of data and methods of acquiring facts that are measurable and comparable."

Dr. William J. Mayo's Letter Solidified the Affiliation. A letter to the University of Minnesota from Dr. William J. Mayo on February 26, 1934 confirmed the convictions of those persons who recognized Dean Lyon's good judgment and trusted his vision and foresight during those trying days. Dr. Mayo's letter was most pleasing to Dean Ford and all who supported the Mayo Clinic affiliation. Dr. Coffman, who became president of the University in 1920 also was very appreciative of this letter, and had it printed as a brochure to which he added a preface

as follows: "Seldom in anyone's lifetime does the opportunity come to read a document as sincere, mature in philosophy, and yet unpretentious, as the letter written by Dr. William J. Mayo, in behalf of himself and his brother, Dr. Charles H. Mayo, to accompany the recent gift of $500,000 from the Mayo Properties Association to the University of Minnesota. Composed by a man who has been honored in every part of the world, it reveals the heart and thought of one at the peak of his profession who has never lost touch with the simple verities of life, or in achieving success failed to appreciate his obligations to his profession and the society in which he has practiced it.

"Dr. Mayo's letter contains, along with its splendid personal philosophy, a statement of the duties of wealth, an expression of the importance of education, and an embodiment of the highest ideals in the practice of medicine. In it, he puts into words the spirit that has been expressed tangibly in the gifts of $2,500,000 by himself and his brother to the Mayo Foundation for Graduate Medical Study and Research. With the idea of giving wider circulation to so fine a human document, the University of Minnesota is putting Dr. Mayo's letter into print."

Dr. Mayo's letter contains so much information about the Mayo Clinic and its unprecedented support of the medical and graduate schools of the University of Minnesota School of Medicine that it is here quoted in its entirety.

February 26, 1934, a letter to the University of Minnesota from Dr. W. J. Mayo:

> "As a man advances in years, he begins to look backward over those conditions and happenings in the past that influenced his life work. To grow up in a doctor's family with a professional background of some generations will likely have, as it did with my brother* and myself, that sort of influence which leads, not to conscious choice of medicine as a career, but rather to unconscious elimination of every other choice. Neither my brother nor I ever had an idea of being anything but a doctor.
>
> "Our father recognized certain definite social obligations. He believed that any man who had better opportunity than others, greater strength of mind, body or character, owed something to those who had not been so provided; that is, that the important thing in life is not to accomplish for one's self alone, but for each to carry his share of collective responsi-

*Charles

bility. Stepping as we did into a large general practice with a great deal of surgery from the beginning, my brother and I had an exceptional opportunity, and as we entered medical practice during the early period of development of asepsis and antisepsis in surgery which had come through the work of Pasteur and Lister, this opportunity was unique. We were especially fortunate that we had the benefit of our father's large experience to help us apply the modern methods to replace the old type of surgery which up to that time had been practiced. There being two of us, with absolute mutual confidence, each of us was able to travel at home and abroad each year for definite periods of study of subjects connected with surgery, as well as to attend medical meetings, while the other was at home carrying on the practice.

"In 1894, having paid for our homes and started a modest life insurance program, we decided upon a plan whereby we could eventually do something worthwhile for the sick. This plan was to put aside from our earnings any sums in excess of what might be called a reasonable return for the work we accomplished. It seemed to us then, as now, that moneys which should accumulate over and above the amount necessary for a living under circumstances which would give favorable conditions to work and to prepare reasonably for our families, would interfere seriously with the object that we had in view.

"Contented industry is the mainspring of human happiness. Money is so likely to encourage waste of time, changing of objectives in life, living under circumstances which put one out of touch with those who have been life-long friends, who perhaps have been less fortunate. How many families have we seen ruined by money which has taken away from the younger members the desire to labor and achieve and has introduced elements into their lives whereby, instead of being useful citizens, they have become wasteful and sometimes profligate.

"Medicine constantly became more complex. From time to time new members were added to the staff. Each member of the staff received a salary which was sufficient to permit wholehearted attention to his work. There was no profit-sharing, accumulations over and above the amount necessary for the purposes I have outlined were conservatively invested, and have been reinvested, adding all interest to principal.

"Year by year more young physicians applied for positions as assistants and interns in the hospitals. The need of providing in some way a better form of postgraduate medical education for these earnest young men soon became apparent.

"In 1907, I was honored by an appointment to the Board of Regents

of the University of Minnesota. During these twenty-seven years I have had the privilege and responsibility of becoming intimately acquainted with the work of the University. This association has been an inspiring influence, bringing me into contact with University presidents of wide vision, representative men and women on the Board of Regents, and able and experienced administrators, devoted to the University and the welfare of the state. I have found a capable and growing faculty in each college of the University, and have been impressed by these loyal men and women who are giving their lives to investigations, to teaching, and to public service. It seems to my brother and myself that the crowning endeavor of a life in medicine would be to aid in the development of medical education and research.

"Our State University is not political in origin or management. Yet it comes from and belongs to the people. The representatives of the people at intervals, elect a continuing board of twelve members each for a term of six years. The members of the Board of Regents have always been representative citizens, eminently fitted for their responsibility in safeguarding the interests of education, and I have been impressed with their sympathetic understanding of the changing economic and social conditions. The Regents are responsive to the public voice, but not to public clamor.

"Foundations which depend on self-continuing bodies of trustees may do well for the first and second generation, but there is the hazard that in later periods new trustees who are unfamiliar with the spirit and ideals of the founders may through lack of understanding defeat their purpose. Especially is there danger in laying down inflexible rules and regulations which may hamper and even obstruct the original purpose of the Foundation. However, the control and management of the University of Minnesota, which places the responsibility for its institutions in the hands of each succeeding generation, furnishes ideal conditions for perpetuation of broadly outlined trusts and purposes.

"The fund which we had built up and which had grown far beyond our expectations had come from the sick, and we believed that it ought to return to the sick in the form of advanced medical education, which would develop better trained physicians, and to research to reduce the amount of sickness. My brother and I came to the conclusion that this purpose could be best accomplished through the state University.

"In 1913, when our fund seemed to be of sufficient size to warrant the endowment of a foundation at the University of Minnesota to carry out these purposes, we proposed the affiliation. After careful

consideration, the arrangements were agreed upon, June 9, 1913. My brother and I gave to the University of Minnesota a million and a half dollars, which was the entire fund which we had been able to accumulate up to that time, to found the Mayo Foundation for Medical Education and Research, with the understanding that the sum should reach two millions or more before any part of the income should be expended. September 13, 1917, the temporary arrangement became a permanent affiliation, and the results have shown the wisdom of the course pursued.

"Our relations with the University of Minnesota and its Medical School have been most cordial. The graduate students in medicine who have come to the University and through the University to Rochester for graduate medical instruction make a splendid roster. Before the Mayo Foundation for Medical Education and Research was established, there had been at the Clinic in Rochester 105 internes, special students, or assistants 41 of whom are now in university positions. The 36 students of this category who were in Rochester at the beginning of the Foundation, became fellows. Of the more than 1,350 men and women who have studied on the Mayo Foundation for Medical Education and Research, more than 450 are in responsible teaching positions in medical schools in this country and abroad.

"In order to care for additional funds which had been accumulating since the affiliation with the University in 1915, the Mayo Properties Association, a charitable corporation without capital stock, was formed on October 8, 1919, under a thirty-year charter from the State of Minnesota which was later by legislative enactment made a perpetual charter. The Mayo Properties Association holds title to all the lands, buildings, laboratories, and equipment of all kinds and description used in Rochester in the work of the Mayo Foundation. This Association also owns and handles the moneys accrued for the same purposes as the endowment of the Mayo Foundation for Medical Education and Research, for future disposal. These moneys and properties never can inure to the benefit of any individual.

"Nineteen years have gone by since the Mayo Foundation for Medical Education and Research was established. The association between the University and the Foundation at Rochester has been most harmonious, and has been distinguished by splendid cooperation on both sides for the benefit of higher medical education and research. The people's money, of which we have been the moral custodians, is being irrevocably returned to the people from whom it came.

"The practice of medicine in Rochester is carried on in the same

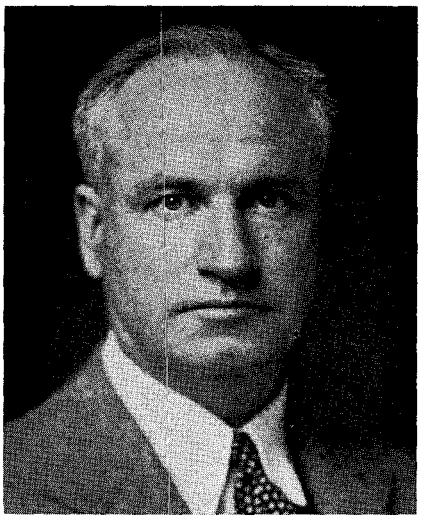
manner as by other members of the regular medical profession throughout the state and nation. All classes of patients, without regard to race or creed, social or financial standing, receive necessary care without discrimination. The income from the Mayo Foundation Funds can be used only for medical education and research as approved by the administration of the University, and ordered by the Board of Regents.

"The affiliated hospitals in Rochester are approved by the American College of Surgeons. While under the medical direction of our staff, the hospitals are independently owned and managed.

"The trustees of the Mayo Properties Association are in entire accord with our plans, and therefore at this time they unanimously have authorized our proposal to transfer $500,000 from the Mayo Properties Association to add to the endowment of the Mayo Foundation for Medical Education and Research.

Very truly yours,
Signed: WILLIAM J. MAYO"

When Dr. Wilson retired in 1937, the Foundation was fortunate in having on the Mayo Clinic staff Dr. *Donald C. Balfour* who was thoroughly qualified for the directorship. He was born in Toronto on August 22, 1882 and obtained his preliminary education at the Hamilton Collegiate Institute. In 1906, he was awarded the degree of bachelor of medicine by the University of Toronto.



Donald C. Balfour

As an intern in the Hamilton City Hospital, he came under the influence of Dr. Ingersoll Olmsted, a distinguished surgeon and teacher of his day, who recommended Balfour an appointment as assistant in pathology at the Mayo Clinic. On arrival in Rochester on July 7, 1907, he met the chief of the section of pathology, Dr. Louis B. Wilson and Dr. W. C. MacCarty an associate.

One of the great contributions to surgery was in the making at that time, namely, the use of fresh frozen sections of tissue removed at operation, enabling an experienced pathologist to give the surgeon an immediate answer to the nature of the lesion with which he was dealing. It was "living pathology." There was also a challenging aspect to it: if one could not collect the tissue, freeze it, cut the section, stain it and have it under the microscope in less than 1 minute, it was considered clumsy technic. Every specimen was demonstrated to the operating surgeon, to the visiting surgeons and to the relatives of the patient, then recorded, indexed and filed for future review.

At the Mayo Clinic, Dr. Balfour watched world-famous surgeons carry on their daily work and he heard them discuss with visitors the problems involved, which were then many and controversial. In such an atmosphere, his decision to become a surgeon became fixed.

He perceived that Doctors William J. and Charles H. Mayo made every effort to lessen the emotional, economic and physical burdens of the patient; that is, no patient was ever refused treatment, and all patients were accorded the same treatment, regardless of economic or social position. This was a philosophy of the conduct of medicine which made a deep impression on Dr. Balfour. He became a junior surgeon in 1909, with rotation of services with Doctors William J. and Charles H. Mayo, E. Starr Judd and Emil H. Beckman. He gradually assumed increasing responsibilities, and in 1912 became head of a section on general surgery in the Mayo Clinic.

He designed various instruments and equipment, such as a device for holding bottles of solution, an abdominal retractor, an operating table and an operating-room mirror, to facilitate and enhance the safety of the operating-room procedures. Gradually, his interest became focused on diseases of the stomach and duodenum, and it is probably in this particular field of surgery that he is best known. His papers indicate that his primary objective was "not only to make the operation safe for the patient but to make the patient safe for operation," and to this

end he made significant contributions affecting the preoperative preparation of the patient and in methods for avoiding postoperative complications.

The fact that his contributions dealt with abdominal surgery more or less forced the direction of his surgical activities toward gastric surgery, and his experience is recorded in the major publication, with his colleague, Dr. C. B. Eusterman, of *The Stomach and Duodenum,* published in 1935. He contributed more than 225 writings of his own to the medical and surgical literature, and he was a member of the editorial board of *Surgery* and also of *Surgery, Gynecology and Obstetrics.*

On the basis of his own training in the Mayo Clinic from 1907 to 1912, Dr. Balfour became convinced that the first obligation of the Mayo Clinic, with its large practice, its extensive facilities for research and its program of education, was to make these distinctive educational assets available to those who were qualified to undertake graduate training in the several fields of medicine. The desirability of formalizing this training resulted in his devotion to the purposes of the Mayo Foundation and its relationship to the Graduate School of the University of Minnesota. In 1915, his interest in this endeavor was heightened by membership on the Graduate Committee, the body responsible for the graduate training program in medicine in the University of Minnesota Medical School and the Mayo Foundation. From 1915 to 1923, he was associate professor of surgery in the Mayo Foundation, and from 1923 to 1947 he was professor of surgery. He was chief of the Division of Surgery of the Mayo Foundation from 1923 to 1935, and became director of the Mayo Foundation upon Dr. Wilson's retirement in 1937. He served in that capacity until his retirement in 1947. From 1929 to 1947, he was a member of the Board of Governors of the Mayo Clinic, and he was chairman of the Board from 1933 to 1936.

During the period of his tenure as a director of the Mayo Foundation, a multitude of problems brought about by World War II and its aftermath evolved. Paramount was the maintenance of the training program on a high level, caring for a greatly increased number of patients, all with a markedly depleted staff and limited fellowship personnel. More than 1500 medical officers of the armed services in groups of from 75 to 100 were assigned to the Mayo Foundation for varying periods for training in certain special fields for which the number of available trained physicians was insufficient. In recognition of his services to the Army

and Navy, he received the President's Certificate of Merit in 1948, and citations by the Secretaries of War and of the Navy were awarded to Dr. Balfour and the staff of the Mayo Clinic and faculty of the Mayo Foundation. Fellows of the Mayo Foundation who were also veterans of World War II presented him with a scroll.

Extensive research in aviation medicine was carried on for several years at the request of the government, and from this work developed the G suit and the first human centrifuge to be built in the United States. Dr. Balfour was a member of the Committee on Surgery of the National Research Council.

It was during Dr. Balfour's directorship of the Mayo Foundation that Dr. and Mrs. W. J. Mayo gave their home at 701 Fourth Street Southwest to the Foundation with their expressed hope that it would serve "as a meeting place where men of medicine may exchange ideas for the good of mankind." It is in the Mayo Foundation House that many distinguished persons and medical societies from this country and abroad have met the staff and conducted their meetings, where members of the staff meet for discussions, and where fellows meet for seminars. A large room which was constructed in the form of a guild hall has been named "Balfour Hall" by the staff of the Mayo Clinic and faculty of the Mayo Foundation. In this hall is a stained-glass window depicting the history of medicine from the beginning of recorded medical history. Dr. Balfour was chairman of the group which designed this window, installed in 1941, and a scroll was presented to him when the hall was completed. On December 2, 1947, the Association of Fellows presented to the Mayo Foundation a portrait of Dr. Balfour which is now in Balfour Hall, Mayo Clinic and Foundation House.

Dr. Balfour had been director of the Mayo Foundation only approximately two years when he suffered a severe blow in the death of Dr. C. H. Mayo at the age of 74 years on May 22, 1939. A second severe blow came when Mrs. Balfour's father Dr. W. J. Mayo died at the age of 78 years on July 26, 1939. Maintenance of the policies established by Dr. Wilson of the closest possible affiliation with the University of Minnesota and continuance and advancement of the program of the Mayo Foundation on a high graduate school level was of great help in bridging the gap occasioned by the death of the Mayos. The University recognized Dr. Balfour's important contributions by conferring upon him the Builder

Victor Johnson

of the Name Award in 1950. He died from pulmonary edema caused by myocardial infarction on July 25, 1963.

When Dr. Balfour retired, Dr. *Victor Johnson* who was born in Chicago, Illinois on January 19,1901, succeeded him. He attended the elementary schools of Chicago and entered the University of Chicago, from which he received the degrees of bachelor of philosophy in 1926, doctor of philosophy in physiology in 1930, and doctor of medicine in 1939.

Dr. Johnson was an assistant in physiology in the University of Chicago School of Medicine from 1927 to 1929, an instructor from 1929 to 1937, assistant professor from 1937 to 1940, and associate professor and dean of students in the Division of Biological Sciences (including students in the School of Medicine) from 1940 to 1944. He was a professorial lecturer in physiology in the University of Chicago from 1944 to 1947, and in 1946 he became a member of the Council on Medical Education and Hospitals of the American Medical Association.

From 1942 to 1945, Dr. Johnson was a member of the Committee on Medical Education of the Procurement and Assignment Service for Physicians of the War Manpower Commission, and from 1943 to 1946 he was a member of the Advisory Council of the Office of Vocational

Rehabilitation of the United States Department of Health, Education and Welfare. From 1944 to 1946, he served on the Advisory Committee of the Office of Civilian Penicillin Distribution of the Civilian Production Board. He has been a member of the Committee on Medical Education and Research of the American National Red Cross, and was a member of the advisory board on health services of that organization from 1945 to 1948. From 1946 to 1950, he was a member of the Citizens Federal Advisory Committee of the United States Office of Education, and from 1946 to 1948 he was a member of the Advisory Committee of the Federal Hospital Council of the Federal Security Agency. He has been a member of the board of directors of the National Society for Medical Research since 1945 and he was a member of the House of Delegates of the American Medical Association in 1948.

Dr. Johnson was secretary of the Council on Medical Education and Hospitals of the American Medical Association from 1943 to 1947, and in the latter year he was appointed director of the Mayo Foundation of Medicine and professor of physiology in the same school. In 1950, he became a member of the board of directors of the American Medical Education Foundation and a member of the advisory council of the National Fund for Medical Education. In 1951, he was appointed to the Board of Honorary Civilian Consultants to the Surgeon General of the Navy, a post he occupied until 1954.

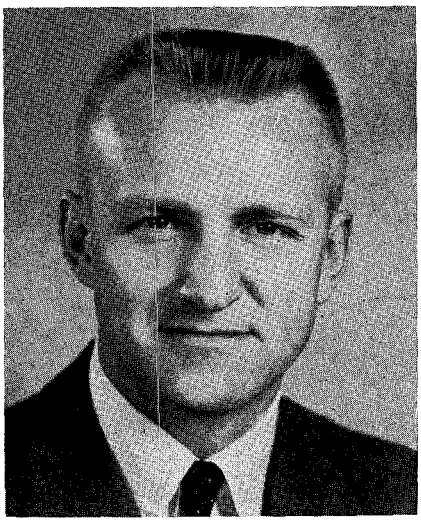
Dr. Johnson was a member of the Council on Medical Education and Hospitals from 1946 to 1958, and was vice chairman of the council from 1955 to 1958. Since 1954, he has been a member of the board of directors of the United States Committee of the World Medical Association, and he was deputy president of the Second World Conference on Medical Education in 1958, and chairman of the program committee for that conference. Since 1957, he has been a member of the board of trustees of Shimer College, Mount Carroll, Illinois; and since 1958 he has been a consultant to the Education and Training Division of the Office of the Surgeon General, United States Army. He was elected to the Senate of the University of Minnesota in 1958 and re-elected in 1959. Since 1959 he has been a member of the board of directors of the Alpha Omega Alpha medical honor society and a member of the Committee on Extension and Policy of that organization. He was elected national president of Alpha Omega Alpha in 1963.

With Dr. Anton J. Carlson, Dr. Johnson is the author of *The*

Machinery of the Body, published by the University of Chicago Press in several editions; and with Dr. Louis N. Katz, of *Elements of Electrocardiographic Interpretation,* also published by the University of Chicago Press in 1944. He has contributed extensively to the literature on the physiology of the blood, lymph and circulation, and on undergraduate and graduate medical education.

He was managing editor of the *Bulletin of the Federation of State Medical Boards* from 1943 to 1947, and a member of the Advisory Board for Medical Specialties, representing the Association of American Medical Colleges, from 1947 to 1949. He retired on April 1, 1966.

In 1959, Dr. *Roland Drew Miller* was appointed assistant director and in 1961 associate director of the Mayo Foundation for Medical Education and Research. Dr. Miller was born in Chicago, Illinois on March 16, 1922. He attended high school in Hammond, Indiana, and De Pauw University in Greencastle, Indiana from 1939 to 1942, receiving the de-



Roland D. Miller

gree of bachelor of arts. He then enrolled in the Northwestern University Medical School, from which he received the degree of doctor of medicine in 1946.

Dr. Miller was a lieutenant (jg) in the United States Navy Medical Corps from June 1945 to March 1948, and he served as medical officer on the *U.S.S. Rankin* from June 1946 to March 1947. He was assigned

to the United States Naval Ordnance Test Station at Inyokern, California from March 1947 to March 1948.

Dr. Miller came to Rochester on October 1, 1948 as a fellow in medicine of the Mayo Foundation. He was appointed first assistant in 1951 and assistant to the staff of the Mayo Clinic in 1952. He received the degree of master of science in medicine from the University of Minnesota in 1951. On July 1, 1952, he was appointed to the staff of the Mayo Clinic as a consultant in medicine. He became an instructor in medicine in the Mayo Graduate School of Medicine, University of Minnesota, in 1953, was advanced to assistant professor in 1957, to associate professor in 1961 and to professor in 1965. In 1963, he was elected to a three-year term in the Senate of the University of Minnesota.

He was certified as a specialist in internal medicine in 1953 by the American Board of Internal Medicine, Inc., and as a specialist in pulmonary diseases in 1955. He is an associate of the American College of Physicians, a fellow of the American College of Chest Physicians, and a member of the Central Society for Clinical Research, the American Federation for Clinical Research, the Society of the Sigma Xi, the Alumni Association of the Mayo Graduate School of Medicine, the Alpha Omega Alpha Medical Honor Society, the Phi Eta Sigma Scholarship Honor Society, the Phi Beta Pi Professional Medical Fraternity and the Beta Theta Pi Academic Fraternity. He is a member of the Committee on Pulmonary Physiology and the International Committee on Education of the American College of Chest Physicians and was a member of the editorial board of *Minnesota Medicine* from 1956 to 1960. He was chairman of the midwest section of the American Federation for Clinical Research in 1961.

MAYO FOUNDATION BECOMES MAYO GRADUATE SCHOOL OF MEDICINE OF THE UNIVERSITY OF MINNESOTA

After the celebration of the 25th Anniversary of the Mayo Foundation during which marvelous accomplishments were related, support, cooperation and inspiration continued to characterize University-Mayo relations throughout the next 25 years. In 1964, Mayo Centennial Year and the 50th Anniversary of the Mayo Foundation for Medical Education and Research, the Foundation was renamed the Mayo Graduate

School of Medicine of the University of Minnesota. The Mayo Association, a charitable nonprofit corporation whose purposes are the promotion of medical education and research, was originally designated the Mayo Foundation (1915).

The continuing harmonious relationship between the University and the Mayo Foundation is indicated by the responsibilities which the University has delegated to the Mayo Graduate School throughout the years of their affiliation. Among these are the appointment of fellows, the conduct of the training program and the final examination of masters degree candidates. The most recent transfer of responsibility is the direct transmittal of faculty appointments or promotions with clinical designations from Rochester to the dean of the University Graduate School without prior consideration by the Minneapolis Medical Graduate Committee.

The director of the Mayo Graduate School is responsible directly to the dean of the University Graduate School. He is assisted by an associate director, assistant director, administrative associate and a nine-member Medical Graduate Committee in Rochester. A joint Medical Graduate Group Committee of six members from each of the Minneapolis and Rochester Medical Graduate Committees is responsible for the overall standards of graduate degree programs in the medical sciences at the University.

The financial organization of the Mayo Graduate School is based on the original gift of the Doctors Mayo which is currently valued at $3.5 million. The principal has remained intact throughout the years while earnings of about $170,000 a year support both education and research training. The funds are the property of the University and are held by the State Treasurer; the Mayo Graduate School is not a budget item on the University's state budget.

The Mayo Foundation which is responsible for overall research and education (through the Mayo Graduate School of Medicine) at Rochester, receives about $3.5 million a year from various agencies, of which the National Institutes of Health is the largest contributor. Outside training grants and individual postdoctoral fellowships total about $500,000. Another $3.5 million in support comes from earnings of an endowment of about $50,000,000 which is held by the Board of Trustees of the Mayo Foundation. The latter funds, together with the earnings

of the University Mayo Foundation are used primarily for the support of the fellowship program and other educational expenses.

The permanent staff of the Mayo Graduate School consists of 449 physicians and scientists of whom 383 hold University of Minnesota faculty appointments. There are 89 professors, 89 associate professors, 96 assistant professors and 108 instructors. In addition, there were 125 visiting lecturers in 1965.

Students in the Mayo Graduate School are termed doctor-fellows or fellows which is synonymous with the term "residents" except that the Mayo Fellows are registered in the University of Minnesota Graduate School. In 1965, a total of 529 applications were received of which 498 were from graduates of medical schools in the United States and Canada and 121 from graduates of foreign medical schools. About 40% or 215 of the applicants were interviewed. An average of 150 fellows is accepted each year.

The current total enrollment is 628 fellows, which does not include about 50 research assistants, research associates and assistants to the staff whose positions are beyond student status but are still non-tenure positions.

Of the 239 non-citizens who completed fellowship training in the last five years, 118 became eligible for advanced degrees and 60 were awarded such degrees. Forty percent of the total remained in the United States, 54% returned to their native countries and 6% are located in other foreign countries.

Yearly stipends for fellows range from $3600 to $7200. In 1965, 163 fellows were supported by training grant funds; the remainder were supported by the Mayo Foundation.

All fellows are potential candidates for advanced academic degrees. Forty fellows received masters degrees and four fellows received doctorate degrees in 1965. Theses were registered by 84 fellows. Forty to 45% of the enrollment become candidates for degrees and about half of that number complete degrees.

More than 2,100 fellows have received advanced academic degrees at Rochester during the past half century and of that total, 2,004 have received masters degrees and 97 have received doctorate degrees.

The Mayo Graduate School also has off-campus affiliations with 29 institutions, of which four affiliations were established in 1965. Forty-eight fellows were assigned to other institutions last year. While

away on assignments, fellows maintain their enrollment as fellows of the Mayo Graduate School.

For names of current faculty members of Mayo Graduate School who have attained the rank of assistant professor or higher see Appendix J.

The Mayo Graduate School also awards certificates to fellows who have completed a minimum residency of one year in good standing. In the two and a half years that the certificates have been issued, 437 graduates and 211 former fellows have received them.

A recently added undergraduate program, the Medical Student Trainee Program which was begun in 1957, had an enrollment of 79 medical students in 1965. The students, representing various medical schools, take eight to twelve-week assignments as trainees in the Mayo Graduate School. Financial support of the program comes from special endowments or grants especially dedicated to medical education. A Medical Student Traineeship Fund was established in 1964 in hope of providing additional funds.

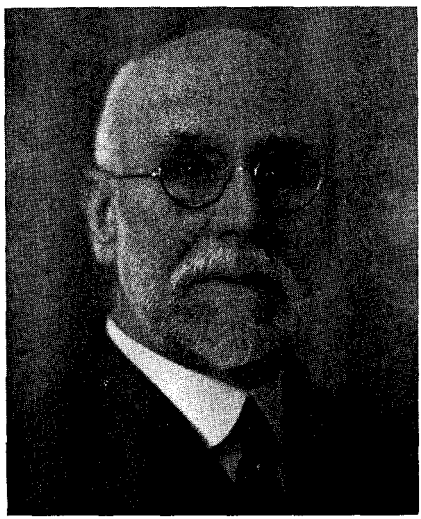
An in-depth survey of the Mayo educational program, conducted by an intramural committee of 11 Mayo Graduate School faculty members and an extramural committee representing both medical graduate and general graduate education, is currently in progress. The study, which seeks to define future goals for preserving and improving the program is considering education in the broadest sense, including undergraduate, internship, residency and graduate degree programs, besides continuing education of those engaged in medical practice and research.

Thus, the Mayo Graduate School of Medicine of the University of Minnesota has developed and continues to develop as a "graduate school of medicine which will stand alone in the sphere of medical education in America."

Chapter XIV

Thirty-seven Years of Foresight and Achievement

In 1925, the one physician who outlived all others on the original teaching faculty—Dr. Richard O. Beard—attained retirement age. From 1888 until 1925—37 years—he worked unceasingly to promote the welfare of the School of Medicine. Indeed, he played a considerable role in uniting the St. Paul College of Medicine and the Minnesota Hospital College with the University of Minnesota College of Medicine and Surgery as it was being organized in 1888. Dr. Beard taught physiology in the Minneapolis Hospital College, but he saw the advantages of a united school at the University. Therefore, he accepted the professorship of physiology in the University teaching faculty when Perry Millard became dean. Dr. Beard served as secretary of the faculty throughout a major part of his faculty career. In 1913, the Board of



Richard O. Beard

Regents elected him assistant dean and secretary of the School of Medicine.

Dr. Beard played the leading role in departmentalizing the College of Medicine and Surgery in 1909. He was responsible for establishing the University School of Nursing in 1909 and promoted it on through to his retirement and beyond.[1, 2] He initiated appointment of a committee to study and make recommendations pertaining to sanitary conditions on the campus and protection of the health of students in 1910. He took an important part in President Vincent's reorganization of faculty and establishing a Graduate School affiliation with the Mayo Clinic. When one lists and studies every forward step of the school between 1888 and 1925, Dr. Beard's participation is in evidence. One of his last outstanding contributions was the chairmanship of the Committee on Endowment for the Schools of Medicine and Nursing.

After the last major attack on the affiliation of the University and the Mayo Foundation and following President Vincent's resignation, Dean Lyon and Dr. Beard were targets for minor attacks because they had supported President Vincent. Some critics even committed the unpardonable sin of originating and disseminating false rumors—even among the students. As usual, many persons who heard such rumors accepted them without attempting to determine their authenticity. Consequently, Dr. Beard was less popular than he deserved to be during the later years of his faculty membership.[2] This is a price one often has to pay for displaying the courage of conviction.

Fortunately, those who worked most intimately with him and many others promptly recognized the falseness of the circulating rumors. On June 12, 1925, before he was to retire on June 30, members of the Board of Regents, the faculty of the School of Medicine and a group of friends gave a testimonal dinner for him.[3] President Coffman presided and closed his introductory remarks with, "All in all he has been a force of great influence, a leader who emphasized fundamentals and saw far into the future."

Mr. Fred B. Snyder, president of the Board of Regents said, "While you have done many things in the upbuilding of the Medical School of the University of Minnesota destined to carry your name forward when you are gone, it is safe to predict that the task you have undertaken, since your retirement, to raise an endowment for the Medical School, will bear fruit not only in gifts while you are active, but long

afterwards when wills and testaments are opened and reveal bequests and legacies which without your efforts would never have been made."

In speaking for the Administrative Board, Dean Lyon said, "In an institution some men are very intimately and fundamentally related to its destiny. Such a man in this medical school has been Dr. Beard. He has been a part of its brain, a part of its coordinating and planning mechanism, a part of the institutional consciousness. When such a man leaves it is like taking out a brain center. The loss can never be fully replaced. It is a great honor to Dr. Beard that he is one of the founders of this Medical School, which has accomplished so much and which appears to have such a large and useful future. Its high standards, its capable facilities, its excellent reputation, its large outlook and its plans for expansion are largely the work of his hands and his brain." In reviewing the 12 years he had worked with Dr. Beard, Dean Lyon said: "I can truthfully say that not one accomplishment, not one advance, not one plan of these 12 years, but has been largely influenced, shaped and invigorated by Dr. Beard."

Speaking for the faculty, Dr. S. Marx White who became a member in 1898 said: "The Medical School of the University of Minnesota has been distinguished as being manned by a group with high ideals and great desires for the advancement of medical education. In all these years there has been no movement with which I have been personally acquainted which has not born the impress of Dr. Beard's hand. He has had an active, effective and directing influence in all the advanced movements that have been made and they are many."

Marion L. Vannier, director of the School of Nursing said: "Probably no other man is so well known to the nursing profession. His articles and public addresses on the subject of nursing education have been read and appreciated by thousands of nurses in this country and abroad, in other words, Dr. Beard is an international figure in the nursing world and it is largely through his influence that the University of Minnesota School of Nursing has become so well and favorably known."

Speaking on behalf of the committee of arrangement of the evening, J. C. Litzenberg made a presentation in appreciation of Dr. Beard's long years of service. "This is an appreciation written by loving hearts and I may add that it was made by an artist with loving hands. When I asked the Medical School Art Shop to do this the head asked that she might do it herself because of her long association with you and

her admiration for you and your work." (The artist was Miss Jean Hirsch.) (See Chapter XXXIII.)

Dr. Beard demurred when asked to devote his time to reminiscences at the testimonial dinner given in his honor on June 12, 1925. He said, "The past is of value only so far as it is funded into the present . . . into the character of the men who have made the present what it is." Introduced by President Coffman, he made no reference to his *37 years of progressive work* in the development of the School. He said, "I should not have declined the invitation to talk reminiscences to you tonight. I should not have taken up this forward-looking task if I had not had vision to see and faith to believe that this Medical School of ours has a large future." He then proceeded to point out important needs for further development of the school much of which might be provided by the Committee on Endowment of which he was chairman.

Still Looking Into His Horoscope. He then presented *his vision of the future of the School of Medicine* as follows: "With a natural union of the naturally allied forces of the faculty, alumni and profession there need be no limit to the natural growth of the School, to the spread of its influence, to the realization of the values it may render to the public 'whose we are and whom we serve.' "

"With the faith and the affection I hold and have held in the Medical School, from its beginning to the present day, I can see a large vision of its future and the future of medical education in Minnesota for which we have long hoped and waited, a vision that has sustained us through years of difficulty and doubt and disappointment and sustains us yet. A born optimist, I love to look into the horoscope of its future and find there something to work for still.

"I see a school of *sufficient capacity,* its *laboratories* adequately manned and equipped, its *clinical material* abundant to its teaching needs, opening wide its doors to every properly prepared and fitly selected student who would enter. I would tenaciously cling in such a school to the principle of intelligent selection of the human material which may fitly be educated by the State to serve the State in preventive and remedial medicine.

"I see an equipment of *hospital services, suitably endowed* for the investigation of the cause of disease and the methods of their prevention, for the application of modern science upon the ever advancing crest of its progress to the diagnosis, the treatment and cure of disease. I

see this hospital of the future the most effective mechanism for the restoration of the sick to health and to economic efficiency.

"I see a *medical library* and a *medical literature* in the Minnesota school, complete and accessible, that will contribute its quota of funded influence to the education of graduate and undergraduate students alike; that will yield its gathered stores of literary wealth to the promotion of research; that will invite the use by the profession of a circulating system; that will serve to extend the knowledge of the people at large in the things that belong unto their health. I see the time when the University will take up the task of sending suitable information to the public, in the interest of the public health and in substitution of the miserable husks of knowledge fed to it by the lay and the pseudomedical press.

"I see the Minnesota School making its large perennial contribution to the sum and the *progress of medical science.*

"I see the widening of the limitless field of *preventive medicine and public health,* with physicians and public health nurses working hand in hand for the borning and the building of better human bodies and the development of better human minds.

"I see a *medical and hospital campus* around which a group of associated public and private hospitals will cluster, which will draw their resources of library, laboratory and nursing service from the institution's abundant stores.

"I see the creation of an *Institute of the Medical Sciences,* grouping, under its administrative direction, the *Medical School* and the *Colleges of Dentistry and Pharmacy,* the *School of Public Health* and the special courses which prepare for the technical services of them all.

"I see a medical school, again, of so high ideals and so generous proportions that it will attract *great teachers* and draw great scholars, and train, in turn, great educators and scientific investigators and clinical leaders who will mold the movement of their time in modern medicine.

"I see a school whose *graduates* will be of so initial fitness, of so cultural preparation, of so thorough professional training that the University may fitly and unquestioningly set its seal upon them *as a guaranty to the public* that the health of mind and body, the issues of life and death, may be safely entrusted to their guiding hand.

"I see a profession, born of such a school, that shall rise above the strifes and jealousies of other days, that shall *no longer tolerate mediocrity*

and commercialism, in its midst, that shall rise to the full conception of its obligation of service, that shall awaken to that sense of social consciousness which will compel the full exercise of its educational functions for the benefit of the great mass of mankind, that will inspire and justify the public trust, that will make it the natural instigator and promoter of every measure for the public good. May these things be in Minnesota."

There is no doubt that Dr. Beard's vision inspired and stimulated Minnesota citizenry to bring forth its realization.

Following retirement from the School of Medicine, Dr. Beard continued as chairman of the School of Nursing Committee and the Committee on Endowment. From 1925 to 1932, he served as Executive Secretary of the Hennepin County Public Health Association. Throughout the years since 1907 when Dr. W. J. Mayo was first elected Regent of the University, Dr. Beard was in close touch with the Mayo Clinic staff. He promoted staunchly the Mayo Foundation, beginning his campaign in its support in 1914. He felt the crowning event of his life would be the writing of a complete history of the Mayo Clinic. The Mayos provided him with an office at the clinic and with other needed facilities. There he spent the greater part of two years assembling historical material and writing.[4] In late 1934, he returned to Minneapolis, where he continued on his manuscript. Unfortunately, he started too late. After nearly completing four chapters, he began to develop symptoms of cerebral arteriosclerosis after which he accomplished very little. He died from essential hypertension with arteriosclerosis on August 14, 1936 at the age of 80 years.

In the book *The Doctors Mayo,* Miss Helen Clapsattle said,[5] ". . . I want to acknowledge my deep obligation to Dr. Richard O. Beard and Thomas E. Steward, whose work over a period of years in assembling materials and recording interviews enabled me to start with a body of valuable data already accumulated."

Concerning the history of the Mayo Clinic, Dean Lyon said,[6] "If, as this writer suspects, this work is unfinished, we may be certain that this is due to Dr. Beard's unflinching pursuit of detail. Not one date, number of smallest fact would be set down until after the fullest verification. He abhorred sketchy outline and summary. These traits demonstrate intellectual honesty of a high type."

"One day shortly before he died Dr. Beard eluded his attendant, got

himself dressed, went by streetcar to the University, pursued his usual pathway to Millard Hall, followed its corridors so often trod by him and doubtless stopped to glance at old class pictures, nearly every individual in which he knew. He went to the dean's office and talked for a time with Dr. Diehl. Here he was located by anxious friends who induced him to go home to bed."

"This episode is emblematic of the man and illustrates his two great qualities, loyalty and enthusiasm. The prime object toward which these qualities were directed was the Medical School of the University of Minnesota. He was the last of the old wheel horses of that institution and one of its staunchest supporters."

Although the name Richard Olding Beard is not engraved on any hall or in any prominent place on the Schools of Medicine and Nursing Campus, time can never erase the University's great indebtedness to him.

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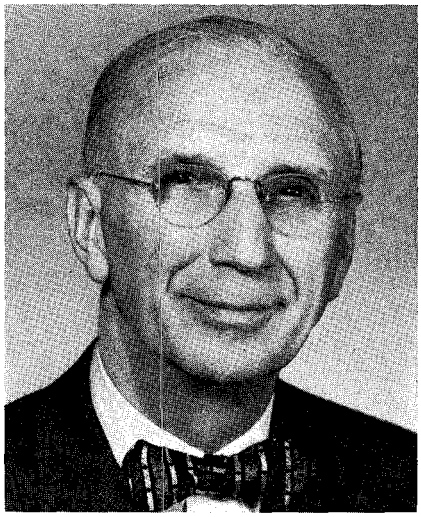
Chapter XV

Harold S. Diehl Second Dean of the College of Medical Sciences and Fifth Dean of the School of Medicine

Twenty-three Years of Superb Administration. When Dean Lyon retired on June 20, 1936, Dean Diehl told President Coffman that because of his great interest in all aspects of the Medical School and Hospital activities he preferred, at least for a time, to carry the responsibility of the deanship of the Medical School as well as the deanship of the College of Medical Sciences. President Coffman approved this arrangement and thus Dr. Diehl became the fifth dean of the School of Medicine. In 1936, Dean Diehl re-established the position of assistant dean. The first appointee was Dr. *C. D. Creevy* in 1936. Dr. Creevy was born in Minneapolis on February 5, 1902. He was awarded the degree of doctor of medicine in 1927, master of science in 1930, and doctor of philosophy in 1931. In 1927, Dr. Creevy was appointed to



Harold S. Diehl

an instructorship in surgery, and in 1932 to an assistant professorship, Division of Urology and Surgery. When he became assistant dean in 1936, he continued his work in the Division of Urology and in 1937 became a full professor. From 1944 to 1947, he engaged in private practice.

In 1947, he returned to the University as head of the Division of Urology on a full-time basis. He has continued in this position doing excellent teaching and research. Dr. Creevy holds membership in all of the usual medical organizations and all of the local, state and national organizations in his specialty. He has published many articles and his most recent book, *Outline of Urology* was published in 1964.

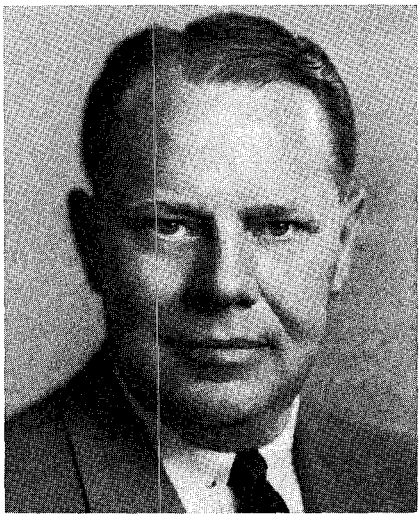
Dr. *Myron M. Weaver* replaced Dr. Creevy as assistant dean. He was born in Detroit in 1901. Weaver was awarded the master of science degree at the University of Chicago in 1927, and the degree of doctor of philosophy in 1929. After receiving the degree of doctor of medicine from Rush Medical College in 1932, he became associate professor of health and physical education and director of the Student Health Service at Carleton College. From 1934 to 1941, he was director of medical relations of Eli Lilly and Company, Indianapolis, Indiana. In 1941, he was professor of public health and director of Student Health Service at Knox College, Galesburg, Illinois. One year later, he accepted the position of associate professor of preventive medicine and public

C. Donald Creevy

Myron M. Weaver

health and physician in the Student Health Service, University of Minnesota. From 1944 to 1949, he was assistant dean of Medical Sciences. In 1949, Weaver was appointed as the first dean and professor of medicine of the faculty of the new School of Medicine of the University of British Columbia. Because of ill health, he retired in 1956, when he was named dean emeritus. He then became director of the Health Service of Union College, Schenectady, New York and was appointed dean of the Graduate School, Union University in 1959. He died from coronary occlusion on December 25, 1963.

Dr. *Howard L. Horns* succeeded Dr. Weaver as assistant dean of Medical Sciences on July 1, 1949. He was born in Bemidji, Minnesota in 1912. The University of Minnesota awarded him the degree of doctor of medicine in 1944. In 1946, he was appointed instructor in medicine and from 1947 to 1949 he was University staff representative at the Ancker Hospital in St. Paul and was senior resident at the Minneapolis Veterans Administration Hospital. It was in 1948 that he set up the radioisotope equipment service for the Veterans Hospital. He directed the service until he was appointed assistant dean of Medical Sciences in 1949. While serving as assistant dean, he was called to military service. Soon after he returned, he entered private practice in the Department of Medicine of the Nicollet Clinic in Minneapolis. However, as clinical associate professor he continues to teach in the School of Medicine.



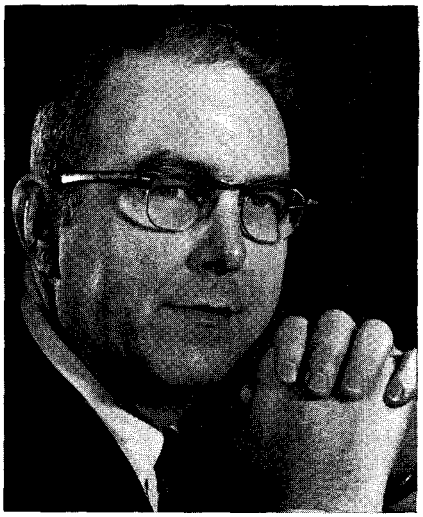
Howard L. Horns

When Dr. Horns was on leave for military service, Dr. *William F. Maloney* became assistant dean in 1954. He was born in Minneapolis on June 20, 1919. From the University of Minnesota, he received the degree of bachelor of business administration, 1941; master of science, 1943; and doctor of medicine, 1946. From 1951 to 1955, he served as resident in internal medicine, University of Minnesota and from 1952 to 1953 he was recipient of a traineeship from the National Heart Institute.

In 1953, he was instructor in internal medicine, assistant professor in 1955, and was assistant dean of the College of Medical Sciences, University of Minnesota from 1954 to 1957. In the spring and summer of 1956, he was adviser in medicine at Seoul National University Medical School. In 1957, he became dean of the Medical College of Virginia and associate professor of internal medicine. Then, in 1963, he became lecturer, Northwestern University School of Medicine and associate executive director of the Association of American Medical Colleges. Effective July 1, 1966, Dr. Maloney was appointed dean of Tufts University Medical School of Boston.

Dr. *Neal L. Gault,* Jr. was appointed to an assistant deanship in September 1955. He began his deanship on January 1, 1956, after returning from a three months period of training in arthritis and rheumatic diseases in the specialized clinics of several medical schools in

William F. Maloney



Neal L. Gault

New York City. He was born in Austin, Texas in 1920. He attended the University of Texas from 1938 to 1942 when he entered the United States Army. His experience as an x-ray technician and then as a medical administrator in the medical services of the United States Air Force reinforced his decision to study medicine. He completed two years of medical school at Baylor University, Houston, Texas, but transferred to the University of Minnesota Medical School in 1948 where he received the degree of doctor of medicine in 1950. In 1951, he entered the Graduate School for study of internal medicine. His assignments as a medical fellow included 18 months at the Veterans Administration Hospital, 6 months as chief resident in internal medicine, Ancker Hospital, and 12 months as chief resident in internal medicine, University Hospitals. He then joined the staff of the Chest Service at the Veterans Administration Hospital where he served until he accepted the assistant deanship.

Dr. *H. Mead Cavert* also was an appointee of Dr. Diehl as part-time assistant dean. He was born in Minneapolis in 1922. He received the doctor of medicine degree in 1951, and the degree of doctor of philosophy in physiology in 1952 at the University of Minnesota. In 1952, he was awarded a research fellowship of the American Heart Association and in 1954 designated an established investigator by that organization. In

H. Mead Cavert

1952, he became an assistant professor of physiology becoming assistant dean of the College of Medical Sciences in 1957.

CENTER FOR CONTINUATION STUDY— ONLY UNIT OF ITS KIND IN THE UNITED STATES

President Coffman (1920-1938) whose name among educators was known around the world, was a strong advocate of providing facilities for "schooling" of adults. Through long and strenuous effort he and the Board of Regents procured a University building for adult education, constructed and furnished at a cost of $330,000 and opened November 13, 1936. It soon became known as the *Center for Continuation Study*. Courses offered throughout the subsequent years have usually extended from a few days to a week. These courses have been in a great variety of fields. From the beginning, among the most popular were those in subjects pertaining to health, medicine, public health and hospital administration. The Center was distinctive in that it was the first educational unit of its kind in the United States. Since Professor Julius N. Nolte was long-time manager of the Center and contributed so much to its development, the name was changed to Nolte Center for Continuing Education in 1965. This Center for Continuation Study has proved to be one of President Coffman's finest contributions to the University of Minnesota. (See Chapter XXXV.)

Coffman Took Real Interest in School of Medicine. President Coffman enthusiastically supported the School of Medicine. (See Chapter VI.) He took great pride in accomplishments of faculty members in both teaching and research. He worked untiringly for new buildings and equipment so as to provide for the best possible facilities for students and faculty, alike. In 1925, soon after several new buildings had been provided by private citizens he said, "It is a fine thing for persons of private means to cooperate with the State in the building of a Medical School where young men and young women may study the sciences of medicine and nursing. If this movement continues, there is no reason why we should not have built here at the University of Minnesota as great a medical center as can be found anywhere in the world. This dream can be realized only by the cooperation of private and public capital."

When President Coffman died in 1938, he was succeeded by Dean Guy Stanton Ford. When Dean Ford was elected president, plans were

getting under way for observing the 50th Anniversary of the School of Medicine. The following statement appeared on the program: "To take stock of progress to date, to pay tribute to the founders of this school and builders of its name, and to cast glances toward the future, the special program herein described has been arranged." In November 1939, Dr. Maurice B. Visscher[2] published a splendid summary of the Celebration. The first section of the article dealt largely with the history of the School of Medicine. The second part, entitled "The Scientific Program of the Semi-Centennial Celebration," was prepared by Dr. Visscher in collaboration with George O. Burr, Ancel Keys, W. P. Larson, Irvine McQuarrie and Lee Smith. A preface to Part II follows: "In planning the scientific program, the committee in charge chose a theme which they believed would symbolize the advance of medicine over the past fifty years and would point the way that progress may be expected to take in the immediate future. Among the several general themes which might obviously suggest themselves, the topic, 'Some Trends in Medical Progress with Particular Reference to Chemistry in Medicine' was chosen. Fifteen papers bearing on this general topic were presented."

In addition, on October 14, six anniversary clinics were presented by members of the staff of the University of Minnesota, at the Mayo Foundation and in the Medical School at the University.

At the second public meeting, Governor Harold E. Stassen[3] addressed a large audience in Northrop Auditorium entitled, "Medicine and the Commonwealth." President Guy Stanton Ford[4] spoke on the "Place of Medicine in a University."

Anton J. Carlson,[5] Professor of Physiology, University of Chicago, gave the last of the public addresses entitled, "The Role of the Fundamental Sciences in Medical Progress," on October 12. This was the first Elias Potter Lyon Lecture. Dean Diehl[6] spoke on "Medical School of the University of Minnesota in Retrospect and Prospect." The Herman M. Johnson Lecture of the Minnesota State Medical Association was delivered by one of the most distinguished alumni of the University of Minnesota Medical School, Dr. O. J. Hagen, of Moorhead. He spoke on the subject, "The Medical School from the Point of View of the Alumni." Dr. Donald C. Balfour[7] had prepared an address on "Graduate Medical Education."

Dr. George Earl, president of the Minnesota State Medical Associa-

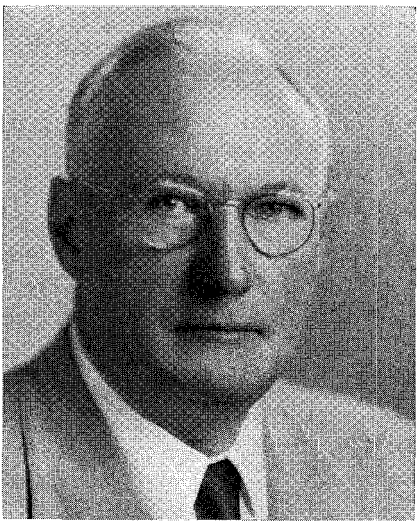
tion, presented the Distinguished Service Award of the Association posthumously to Doctors William and Charles Mayo and Dr. Herman M. Johnson.

Minnesota Medical Foundation Established. In 1939, Dean Diehl appointed a committee of interested alumni to advise in planning and carrying out the celebration of the 50th Anniversary of the Medical School. At the last meeting of this committee, some of the alumni suggested that a continuing organization of alumni with a special interest in the Medical School be considered. Dean Diehl appointed a committee of whom Dr. Visscher and Dr. Platou were members to formulate suggestions which could be presented to the alumni. When their work was completed, Dean Diehl invited 50 or 60 alumni to meet for dinner at the Center of Continuation Study to consider these suggestions. The response of this group to the proposal was one of very real enthusiasm and a number of those present left checks of $100 for life memberships in the proposed Minnesota Medical Foundation. On this occasion Dr. Platou was elected first president of the Foundation and Dr. Visscher the secretary. Dr. Platou promptly published an article[8] emphasizing the objectives of the organization. The Foundation's subsequent history appears in Chapter XXXV.

When President Ford reached retirement age in 1941, Dean Walter Castello Coffey succeeded him (see Chapter VI).

Organization and Activities of Base Hospital Number 26 for World War II.[9] At a meeting of the Administrative Committee of the Medical School of April 9, 1940, consideration was given to a proposal that the Medical School offer to provide the staff for an army reserve hospital to be known as United States General Hospital No. 26—the designation given to the hospital which during World War I was staffed by members of the Mayo Clinic and the faculty of the Medical School. The suggestion was approved in principle by the Committee. Dean Diehl, who served as intern with the rank of sergeant in Base Hospital 26 during World War I, had the responsibility of organizing the staff for United States General Hospital in World War II.

He placed *Colonel Haynes L. Fowler* in charge of the Surgical Division. Fowler was born in Binghamton, New York in 1896. He received the degree of doctor of medicine in 1921 from the University of Minnesota. In May 1921, he entered the Mayo Foundation as a fellow in surgery. After receiving the masters degree in surgery in 1924, he was



Haynes L. Fowler

Joseph F. Borg

appointed as instructor in surgery while he developed a private practice with Dr. W. H. Hanson. Later, he was promoted to a clinical assistant professor and soon to associate clinical professor in surgery. Dr. Fowler and Dr. Hanson played an active part in development of the Minnesota Medical Foundation. At the close of the war, he resumed practice but because of failing health he retired and moved to California where he died in 1965.

Dr. *Joseph Franklin Borg* was appointed chief of the Medical Service as colonel. He was born in St. Paul, Minnesota in 1898. After receiving the degree of doctor of medicine, University of Minnesota in 1922, he established private practice in St. Paul with membership in Bethesda, St. Luke's, Miller, St. John's and Ancker Hospitals. He also engaged in teaching in the School of Medicine, University of Minnesota where he became associate professor of internal medicine. He held membership in all organizations in his field of activity and served as president of the Minnesota Society of Internal Medicine, the Minnesota Society for the Study of Diseases of the Heart and Circulation, the Constantinian and the American Therapeutic Society. At the close of the war, he resumed private practice in St. Paul from which he retired in 1966. He now resides in Tryon, North Carolina where he is consultant in cardiovascular disease to the Tryon Medical Associates.

Details concerning Base Hospital 26 appear in annual reports[9] 26th

General Hospital 1942, 1943, 1944 and 1945, Office Surgeon General United States Army, Washington, D.C.

When President Coffey retired, he was succeeded by James L. Morrill whose background thoroughly qualified him [10] and contributed magnificantly to the support of Dean Diehl's program (see Chapter VI).

Devastating Scourges Controlled. As soon as possible after becoming head of the Student Health Service, Dr. Harold Diehl enforced every measure already in vogue and instituted every other procedure of known value for the protection of health of students. Since that time, no significant epidemic has occurred on the campus. The worst scourge among both faculty members and students was tuberculosis. The first well-documented study revealed that in the classes that graduated from 1919 to 1932, inclusive, demonstrable tuberculous lesions developed in 92 (7.07%) while in school or soon after graduation and 11 died.

First Tuberculosis Clinic in a Student Health Service in America Established. When the Student Health Service was established, its first director, Dr. John Sundwall, saw such prevalence of tuberculous students and personnel on the campus that one of his early acts was to provide for a tuberculosis clinic established in the fall of 1920. It was the first clinic of its kind in America.

When Dr. Diehl became director in 1921, he emphasized the Student Health Service Tuberculosis Clinic at every opportunity. From 1921 to 1927, observations of cases found among students showed a preponderance of occurrences in the Schools of Nursing and Medicine. He strongly urged administration of the tuberculin test for all students entering the University in 1928. This testing revealed that only 33% were infected instead of 100% as was generally believed and taught. However, all the clinical cases were derived from that 33%.

In 1929, he arranged to examine two classes from the schools of medicine, nursing and education each year they were in school. From the beginning, this study was most revealing. He immediately began working on plans for making chest x-ray film inspection of all students who reacted to the tuberculin test on admission. This step was accomplished in the fall of 1931. So much clinical tuberculosis was found that thereafter this procedure became a permanent part of students' entrance examination.

Elisabeth Phillips Pioneered in Tuberculosis Communicable Disease Technique. Dr. Diehl was greatly interested in a small tuberculosis

Elisabeth Phillips

service established in the University Hospitals mostly for communicable cases admitted mainly for chest surgery. He watched especially the work of Miss Elisabeth Phillips who had recently graduated from the Johns Hopkins School of Nursing where she had taken special work in communicable disease technique. In May 1932, she volunteered to make an effort to develop communicable disease technique on the tuberculosis service. Thus, for the first time as far as we have been able to ascertain, rigid communicable disease technique was instituted for tuberculosis. It proved to be so effective that soon it was being employed in other hospitals and throughout subsequent years it has continued to gain in popularity. Thus, Miss Phillips pioneered one of the most important steps that has been taken in preventing tuberculous patients from infecting students of nursing and medicine and other personnel.

The real seriousness of the situation in the schools of nursing and medicine was not recognized until the tuberculin test was administered to students on entrance to the University and every six months to those who did not initially react as long as they remained nonreactors. This revealed the secret of the higher incidence of tuberculosis among medical and nursing school students.

The 1929 Study Provided a Unique Opportunity for Research in Tuberculosis. Periodic examination of students infected before entering the school eliminated those who already had clinical disease on admis-

sion and found those in whom such disease evolved while they were in school. This prevented tuberculous students from infecting others.

Periodic testing with tuberculin of the uninfected provided information as to the interval between exposure to contagious cases and the development of sensitivity of tissue as well as the appearance of demonstrable lesions with reference to prevalence and nature of lesions. Knowing that when students became reactors to tuberculin they had been in contact with persons who had contagious disease, the sources of their infections were sought.

This study demonstrated that numerous persons who were being admitted to general hospitals with various authentic diagnoses had coexisting, contagious and frequently unsuspected tuberculosis.

It was observed that clinical tuberculosis developed only among those who reacted to tuberculin. Among the students of medicine of the class of 1936 (128), 50 reacted to tuberculin on admission, but 99 reacted on graduation. Thus, 49 of the nonreactors on entrance to the School became infected with tubercle bacilli while in school. By administrating the tuberculin test with sufficient frequency, it was possible to learn in which department of the hospital or in which affiliated hospital students were being invaded with tubercle bacilli.

Compulsory Tuberculin Test and Chest X-ray Films at University Hospitals Goes Nationwide. When Dr. Diehl became dean of Medical Sciences in 1935, one of his first acts was to start making the University Hospitals safe for all persons who associated in any capacity with patients. The first step was to have all patients admitted tested with tuberculin and have x-ray film inspections of the chest. Those found to have demonstrable lesions were isolated until differential diagnostic procedures could be completed. In proved cases of tuberculosis, isolation was continued as long as they needed care in this institution. By this procedure, such impressive numbers of cases of clinical tuberculosis were found that the technique quickly spread to hospitals everywhere.

The second step consisted of requiring the tuberculin test and x-ray film inspection of the chest of the entire personnel of the hospitals with subsequent pre-employment and semiannual re-examinations. The first time the members of the personnel were examined five were found to have clinical tuberculosis, one of whom was a hospital librarian and another was a teaching laboratory technician.

Having set his own house in order, Dean Diehl advised affiliated

hospitals to do likewise. At the meeting of the Administrative Committee on October 9, 1935, the general policy of having medical students and nurses serve in a tuberculosis hospital was considered but action was postponed. *So many students were being infected at the sanatorium that the medical student body was urging discontinuance of that service.* In 1937, Diehl discontinued the teaching service of medical students at the sanatorium.

The sanatorium service was replaced by one which was operated under rigid communicable disease technique. With these procedures, there was a marked drop in the number of tuberculous infections acquired by medical students while in school. Clinical tuberculosis among students first diminished and then practically disappeared. In fact, only one clinical case has occurred on the campus since 1943.

An equally serious situation existed in the School of Nursing, where for a good many years an affiliation had been in vogue with the county sanatorium. Nursing students spent six weeks in residence working with communicable cases, while lacking a significant communicable disease technique. Beginning in 1940, a provision was made whereby only student nurses who reacted to tuberculin were permitted to attend patients who had communicable tuberculosis. Those who did not react to tuberculin spent only two weeks at the sanatorium and were in contact only with noncommunicable cases. This move resulted in a precipitous decrease of tuberculous infections and subsequent clinical cases among student nurses. Later, the sanatorium service for student nurses was discontinued.

When Dr. Ruth E. Boynton became head of the Health Service in 1935, she continued all of the excellent procedures that Dr. Sundwall and Dr. Diehl had instituted. She sought to close the one remaining serious gap in the protection of students against communicable disease in hospitals and the entire University personnel. Working closely with Dr. Diehl, who was then dean of the Medical Sciences, and also of the School of Medicine, the Board of Regents carried out their recommendations and ruled that physical examination must be completed for each new faculty member, and for each one receiving promotion to the rank of assistant professor or above. No appointment was complete until the satisfactory physical examination report was filed in the president's office.

The effectiveness of this program showed quickly, first in a decrease

in the infection attack rate among students who had entered school uninfected, as well as in morbidity and mortality rates. For example, among the students graduating from the School of Medicine in the classes of 1919 to 1932, 92 had developed demonstrable tuberculosis and 11 had died. However, in the classes graduating from 1943 to 1966 only one student of medicine had a clinical lesion evolve to x-ray shadow-casting proportion.

Physical Medicine and Rehabilitation. On January 25, 1924, Dr. Beard presented an outline of a course of occupational therapy to be submitted to the College of Education. The plan in general was approved and his committee asked the president for a full-time technician for physiotherapy to be under the control of Dr. K. Wilhelm Stenstrom. It was also recommended that a diathermy machine be purchased and placed in the Radiology Department.

On February 6, 1940, a committee proposed a curriculum for physical therapy technicians. The tentative plan called for a four-year course, three years devoted to the fundamental sciences and one year to practical work in physical therapy. Dr. E. T. Bell suggested that the practical year be set up and that the fundamental work be made to coincide with that required in medical technology. On November 12, 1945, Dr. Miland E. Knapp requested approval of a course on muscle function and physical therapy, which was unanimously approved. That day Dr. Maurice Visscher reported on physical medicine, stating that for nine years we have had a one-year course: "The Committee on Physical Medicine feels that this course is not adequate and that only a four-year program leading to a bachelor of arts degree should be offered in the future." However, on December 18, 1945, Dean Diehl presented a proposed four-year course in physical medicine.

On December 23, 1947, Dr. Diehl read a report from Dr. F. J. Kottke who served as chairman of a committee to outline the financial and other needs of such an occupational therapy center. The committee recommended a rehabilitation center where physiotherapy, occupational therapy, vocational training and other active treatment could be given. The new department came into being in the fall of 1952 (see Chapter XXXIX).

Establishment of School of Public Health. At the meeting of the Administrative Committee on November 29, 1943, Dr. Diehl suggested

the expansion of the Department of Preventive Medicine and Public Health into a School of Public Health as a division of the College of Medical Sciences. This proposal was approved by the Administrative Committee and transmitted to, and authorized by, the Board of Regents in 1944. Dr. Gaylord W. Anderson, who had been head and professor of the Department of Preventive Medicine and Public Health since 1934, became director of the new School (see Chapter XXXVII).

Affiliation with Veterans Administration Hospital.[15] During the late 1930's and early 1940's, occasional reports were issued questioning the quality of medical service for tuberculous veterans in various parts of the United States. In 1940, Dr. Louis I. Dublin read a paper before the annual meeting of the National Tuberculosis Association severely criticising the Veterans Bureau care of tuberculous patients. This resulted in a Committee on Tuberculosis Among Veterans being organized by the National Tuberculosis Association in the spring of 1943. This Committee consisted of 15 members, 11 of whom were physicians. The medical members were charged with the duty of inspection of all Veterans Hospitals housing and treating tuberculous patients. These inspectors made their reports to the entire Committee at meetings in various parts of the country.

The physician who inspected those institutions in Chicago, Milwaukee, South Dakota and Minneapolis made a number of recommendations including the following: "Whenever possible, the Veterans facilities should have an affiliation or at least a close relationship with a medical school. Such schools have many resources such as departments of pathology and bacteriology, experts in medicine, surgery, etc. who can be of great value to facility staffs. On the other hand, veterans should be available as teaching patients and well-qualified members of the hospital staff should participate in such teaching. Interns and fellows should rotate through at least some of the departments of the Veterans Hospitals to the advantage of themselves and the facility."

In March and April, 1945, *Cosmopolitan Magazine* published an article entitled, "Third Rate Medicine for First Rate Men," by Albert Hugh Maisel. Part I of the article contained scorching criticisms of the management of tuberculous patients in Veterans Bureau Hospitals.

In 1944, the American College of Surgeons suggested that some of the Veterans Administration Hospitals that were located in cities in

which there were medical schools might make contact with these schools and attempt to work out programs by which residencies in surgery could be approved.

On November 12, 1914, Dean Diehl reported that Dr. Paul Magnuson, director of the Division of Education and Research of the Medical Department of the Veterans Administration (formerly Veterans Bureau) had visited him recently.[10] Dr. Magnuson proposed that medical care of veterans in selected facilities be under the direction of consultants appointed by a committee of the faculty of an affiliated medical school. In addition to senior consultants, part-time consultants who would serve as visiting physicians could also be appointed. There would also be residents who would serve as ward officers who would be candidates for recognition by specialty boards. Dr. Diehl stated that it should be possible to arrange for these residents to spend two years at the Medical School without stipend from the University. He pointed out that while on the campus they would review basic sciences and receive training to make them efficient ward officers. This arrangement would place the residencies in veterans facilities under University control.

Dr. Magnuson had selected the Minneapolis Veterans Hospital because of its proximity to the Medical School of the University of Minnesota for the inauguration of a program which could serve as a model for other centers throughout the country.

In conversation with Dean Diehl in December, Dr. Magnuson said: "What we want the Medical School to do is to take over the responsibility for the medical service in the Minneapolis Veterans Hospital. We want you to run that on the same basis that you operate your University Hospital. We want a first class graduate medical program and the same quality of care as you give in your own hospital." Dr. Diehl made several inquiries to which Dr. Magnuson replied: "Your job is to see that it is done the way you feel it ought to be done." This program was developed, and the committee with Dean Diehl as chairman, O. H. Wangensteen, C. J. Watson and E. T. Bell became known as the Dean's Committee.

After laying the ground work for this program, conferences were held with the Mayo Clinic physicians who offered to make available members of their staff for consultation or other participation in the program. Thus, the affiliation of the Medical School and the Veterans

Administration Hospital in Minneapolis in 1946 became the model for other institutions across the country.

First Distinguished Achievement Award for Alumni. During 1951, the Centennial year of the University of Minnesota, the several schools and colleges of the University were authorized by the Regents to nominate certain of their graduates, not currently associated with the University, for *Distinguished Achievement Awards.* The presentation of these awards was made to graduates of the Medical School and affiliated units of the University at a special faculty dinner held on October 8, 1951 with Dr. George N. Aagard master of ceremonies. The awards were conferred by President Morrill. He said, "Nowadays it is difficult to keep abreast of the medical attainments which merit praise. But we can begin to catch up on our own obligations, at least, this very moment. It is now my happy privilege to present the awards through which the University endeavors to acknowledge, with admiring respect and appreciation, some of its outstanding alumni in medicine and public health." Awards were granted to Fred L. Adair, Frank E. Burch, Earl R. Carlson, Albert J. Chesley, Arild E. Hanson, Alma C. Haupt, Herman E. Hilleboe, Pearl L. McIver, James E. Perkins, Edith L. Potter, William P. Shepard, Albert M. Snell, Edward L. Tuohy, all of whom were present. Raymond B. Allen, George O. Burr, Olaf J. Hagen, and C. J. Van Slyke received their awards in absentia. Since this beginning on October 8, 1951, Distinguished Achievement Awards have been made to other Medical School alumni.

The same evening that the Distinguished Achievement Awards were made, Dr. E. T. Bell on behalf of the Administrative Committee of the School of Medicine presented the University with a portrait of Dean Diehl. President Morrill accepted the portrait remarking: "The integrity and prestige of our University, as all of us know, are the sum of the productiveness and the distinction of the individual staff members —inspired and assisted by farsighted and energetic leadership. Dean Diehl indeed has brought leadership of the highest order to the College of Medical Sciences and thereby to the University of Minnesota."

Importance of Part-time Clinical Teachers Expressed: In 1940, Dean Diehl observed,[6] "We now have a nucleus of full-time teachers in all but one of the clinical departments. In spite of this, a very considerable and important portion of the clinical teachings is still done,

and in my opinion always should be done, by physicians who are devoting themselves primarily to private practice. Such men have a richness of practical experience and a point of view which should not be lost to the student."

Private Patients in the University Hospital and Clinic. In April 1952, Dean Diehl released rules and regulations governing the University as codified in 1931 containing regulations concerning private work by members of the full-time University faculty.

In accepting the gift for the construction of the George Chase Christian Memorial Cancer Hospital in 1924, the Regents approved the inclusion of a provision that "this hospital shall be available for use for all classes of persons, both those who are able and those who are unable financially to secure such care and treatment." The acceptance of this provision provided the basis for the care of private patients in the University hospital by members of the full-time faculty of the Medical School. The several conditions under which the acceptance of private patients was authorized were as follows:

1. Private patients shall be accepted by full-time faculty members only when referred by another physician.
2. Full-time members of the faculty shall not maintain a private office nor care for patients in other hospitals or in other physicians' offices. Medical fellows are not permitted to engage in any private medical practice.
3. The amount of work any full-time faculty member engages in shall not become a major interest nor interfere with his teaching and research activities. It is the responsibility of the heads of the clinical departments to control the amount of private work engaged in by the members of their staffs.

"In order to assure that these policies will be carried out, the Administrative Committee of the Medical School requires that all references of private patients shall be in writing and that a letter from the referring physician be made a part of the patient's file. This is to apply both to ambulatory and to hospitalized patients. In case a reference is made on an emergency basis by telephone, this must be confirmed in writing. The letter of reference should indicate whether the patient is referred for care or merely for consultation and report. It is the responsibility of the physician to whom the patient is referred and of the hospital personnel in charge of admissions and registrations

to see that these regulations are carried out. Exceptions to these policies and regulations shall be permitted only upon the specific approval of the dean.

"The Administrative Committee of the Medical School has designated to the Committee in charge of the 'North Clinic' the responsibility to investigate reports of irregularities in admission or complaints by practicing physicians concerning the handling of private patients."

Department of Mortuary Sciences. A school of a few weeks duration was conducted during the summer of 1908. On December 29, 1908 the Board of Regents voted that the School of Embalming be continued the coming year under the same arrangements as the previous year.

On October 20, 1913, the Administrative Board voted a projected professional course for embalmers be maintained in cooperation with certain departments in the University, the Medical School assuming the administration of the course through the mechanism of a committee to be appointed by the dean. The first session under the auspices of the Medical School began on January 5, 1914 and continued for six weeks. The Committee of the School of Embalming on May 5, 1915 in conference with officers and a committee representing the Minnesota Funeral Directors Association recommended that the length of the course be eight weeks the next year and gradually increased thereafter. On December 6, 1917, the Committee recommended extension of the course from eight weeks to three months beginning in 1919.

In 1920, the University administration began to consider the advisability of shifting the administrative responsibility for the curriculum in embalming to another college. In 1922, the General Extension Division assumed the responsibility for all mortuary science instruction, and all announcements indicated that the Division was assuming the responsibility on behalf of the Medical School. However, in 1928, it was referred to as a curriculum of its own standing offered by the General Extension Division with the supervision of the Medical School.

In 1927, President Coffman, Dr. C. A. Erdman and Mr. R. P. Lee cooperated in drafting a resolution to be presented at a national meeting called for the purpose of establishing accreditation rules and regulations. Their resolution and persuasive arguments were instrumental in establishing the first national accreditation procedures and the current method and standards were an outgrowth of their early

interest and contribution. In 1944, the name was changed from "Course in Embalming" to "Course in Applied Mortuary Science."

On December 16, 1950, the Administrative Committee of the Medical School voted that the course in Applied Mortuary Science with reference to administration did not fall within the province of the Medical Sciences. Therefore, the dean of the General Extension Division remained in charge of administration and supervision.

Marked Increase in Gifts and Research Funds Very Encouraging. In 1940, Dean Diehl said,[6] "Over the years our Medical School has received more gifts than most people realize. Chief among these which total more than $4,500,000 have been the Elliot, Todd, Christian and Eustis donations."

After the Board of Regents established five graduate teaching fellowships in medicine in 1914, charitable individuals began to provide for fellowships and graduate scholarships in clinical departments. Among the first individuals were Frank C. Todd and F. E. Burch, faculty members of the Division of Otolaryngology. Each personally endowed a fellowship in April 1917 for a period of three years in amounts of $500 for the first year, $750 for the second year and $1,000 for the third year. A little later, Dr. Horace Newhart endowed a similar fellowship.

In 1944, Maurice Visscher called special attention to the importance of research funds.[16] Dean Diehl announced that from July 1, 1952 to June 30, 1953; $1,835,414 was provided for medical research grants aside from regular University budgets.[17] Of the fellowships for graduate students, there were 54 involving a total of $188,015. In the affiliated hospitals including Ancker, Minneapolis General, Veterans Hospital and other Twin Cities hospitals, there were 155 such graduate fellowships with total grants of $399,838. In the School of Public Health, there were nine at an expense of $20,600. In the School of Nursing, there were 14 with $22,100 involved. Thus, a total of 232 fellowships were in operation supported by grants amounting to $632,553. At the close of Dean Diehl's administration in 1958, Federal support for medical research and training had risen to $4,243,569 with a total of 468 fellowships in operation.

Literary Accomplishments of Dr. Diehl. The medical world is fortunate that Dr. Diehl has recorded in medical journals and books his numerous observations on methods, procedures, and results obtained.

There is no substitute for experience. With approximately forty years of experience as a physician, Dr. Diehl has spoken and written with ever-increasing authority. Careful perusal of his bibliography of approximately 200 references provides an insight of the tremendous volume of work he has done and informs readers of the phases of medicine in which he has labored most.

Many physicians who write do so only for medical readers. In addition to such laudable writing, Dr. Diehl always envisioned the importance of transmitting health information to the public. His long and broad experience admirably qualified him for writing the book, *Healthful Living,* published in 1935. Now in the eighth edition, this book is dedicated "to those who prefer facts to fads, sanity to superstition, understanding to belief." This has become a textbook in personal hygiene in many colleges and universities throughout America.

Dr. Diehl's Contributions to National, Military and Health Affairs. Dr. Diehl was one of the moving spirits in organizing the American Student Health Association now known as the American College Health Association. In this organization, he promoted formation of student health services in various colleges and universities throughout the country. He headed the organization from 1927 to 1929.

In addition to service in World Wars I and II, Dr. Diehl later contributed significantly to military and health affairs of this nation. He was a member of the National Advisory Health Council of the United States Public Health Service from 1937 to 1941. From 1940 to 1941, he was a member of a Committee on Medical Education of the Office of Emergency Management in Washington.

From 1941 to 1946, he was a member of the Directing Board of the Procurement and Assignment Service for Physicians, Dentists and other Medical Personnel of the War Manpower Commission, and chairman of the Committee on Allocation of Health Personnel. This board, with Dr. Frank Leahy as chairman, was responsible for formulating policies and making plans of operation to assure the best possible distribution of health personnel to meet military and civilian needs. The Committee on Allocation, of which Dr. Diehl was chairman, prepared the actual programs for staffing medical schools, health departments, wartime industrial establishments, and civilian practice as well as the military services.

From 1950 to 1957, he was vice-chairman of the Health Resources

Advisory Committee of the Office of Defense Mobilization. During this time, he was also vice-chairman of the Medical Advisory Committee of the National Headquarters of Selective Service.

From 1946 to 1952, he was a member of the Advisory Board of Health Services of the National American Red Cross. He also served as honorary consultant to the Surgeon General of the United States Navy from 1955 to 1959 and as a member of the Medical Advisory Panel of the United States Office of Vocational Rehabilitation. He was a member of the United States delegation to the World Health Assembly in Geneva in 1954, in Mexico City in 1955, and in Minneapolis in 1958.

For many years, he has been a fellow of the American Public Health Association and a member of the governing council from 1946 to 1950. He is a fellow of the American Medical Association and chaired the section of Preventive Industrial Medicine and Public Health from 1938 to 1940. He was a member of the American Medical Association Council on National Defense from its establishment in 1950 to 1959, serving as chairman from 1955 to 1959.

Building Program Stepped Up During Diehl's Administration. Buildings acquired during Dr. Diehl's deanship far surpassed all that had been constructed from the time the School opened until 1935 when he became dean of the Medical Sciences. The first president of Johns Hopkins University, D. C. Gilman said: "Buildings are but the shell of the University; its real life lies in its men." While this is a generally accepted statement, the women and men who procure funds, plan and construct buildings, including legislators, regents, presidents, deans, faculty members, individual donors, etc., etc. make contributions without which our universities could not exist. Therefore, it is impossible to overstate their importance. The first new building completed during Dean Diehl's administration was the Psychopathic Hospital Unit in 1936 (see Chapter XXVII).

Variety Club Heart Hospital Another Reality. When it was assumed that substantial funds were available for the Mayo Memorial Building in 1945, Dean Diehl began to make a careful prediction of the needs of the Medical School over the next 10 years.

The Variety Club Heart Hospital was the outgrowth of a plan of Dr. Morse Shapiro. He had conducted a cardiac clinic at the Lymanhurst School and Clinic since about 1921. He had a friend, Mr. Al Steffes, chief barker of the Variety Club of the Northwest who had become

one of the major motion picture exhibitors in Minneapolis. Dr. Shapiro and Mr. Steffes held a conference with Dean Diehl. Later, Mr. Ray Amberg and Dean Diehl attended a meeting of the Variety Club where a proposal was presented for the housing of Dr. Shapiro's clinic. During the discussion, Dean Diehl suggested the construction of a hospital, half of the funds for which he felt could probably be obtained on a matching basis under the new Hill-Burton Federal Hospital Construction Act. With the funds assured, the architect proposed that the new hospital be built on the river bank with the upper floors of the Variety Club Heart Hospital connecting with the lower floors of the University Hospital. Achievement again resulted in the internationally famous Variety Club Heart Hospital which was dedicated in 1951 (see Chapter XXVII).

American Legion Heart Research Professorship. In 1946, Dr. L. F. Richdorf conceived the idea of a professorship for research in heart disease to be sponsored by the American Legion of Minnesota. As chairman of the Child Welfare Department of the State of Minnesota American Legion, he conferred with Dr. Irvine McQuarrie, head of the Department of Pediatrics, regarding the raising of a fund by the Legion for the establishment of such a professorship as a memorial to the Minnesota boys who lost their lives in World War II. After numerous conferences, the state convention of the American Legion voted a commitment to raise $500,000 to endow an American Legion Heart Research Professorship. A laboratory for the work of this professor was made an integral part of the Variety Club Heart Hospital. Dr. Lewis Thomas was the first recipient in 1950 and served until 1954. Dr. Robert A. Good was then appointed to this professorship, in which capacity he continues to make numerous important contributions to knowledge through his research endeavors.

With the Mayo Memorial Building reduced from 22 to 14 stories, the *Lyon Laboratories Building* was erected between the East Wing of Jackson Hall and the West Wing of Millard Hall and dedicated in 1954. Lyon Laboratories constitutes a better location for specialized facilities for research in cancer and heart disease than would have been available in the Mayo Memorial tower.

The Masonic Memorial Hospital. In 1956, Dr. C.W. Del Plaine arrived late at a meeting of the Grand Council of the Minnesota Masons. He explained that his lateness was due to the fact that he had to stop

to see two cancer patients in their homes who had terminal malignancies. They needed more care than they could receive at home and they felt that they were burdens to their families. Judge Mattson, a member of the council, asked whether the Masons could do something for such patients. Dr. Donald J. Cowling, a member of the council and a 33rd degree Mason, was appointed president and chairman of the Executive Committee of the Masonic Cancer Relief Committee of Minnesota. He said he favored the proposed effort and thought it would be helpful if a hospital for such patients was located and associated with the Medical School.

The project caught the imagination of the State's 80,000 Masons and they launched a $500,000 fund-raising project. Dean Diehl pointed out that if the Masons would raise the first $500,000 he could obtain the matching $500,000 from the Federal government. With admirable independence, the Masons said they would prefer to assume the responsibility for the entire amount because they wished this to be a Masonic enterprise, not financed in part by state or Federal tax funds. They proceeded to raise more than $1,000,000.

Dr. Cowling also played a major role in making possible the Mayo Memorial Building (see Chapters XVI and XXVII). Dean Diehl said: "This was a unique and magnificant achievement on the part of Dr. Cowling. Yet, it was only a beginning, for the interest which Dr. Cowling developed in the Medical School as a result of this experience led him to devote a large proportion of his time and efforts, after retiring from the presidency of Carleton College, to the development of the Medical School. For this, I will be eternally grateful to Dr. Cowling—but I am equally grateful for the privilege of knowing, of working with, and of counting as a friend, this great educator, public servant and true humanitarian."

Biological-Medical Library. When Dr. Diehl became dean of Medical Sciences in 1935, President Coffman asked him what buildings were most urgently needed by the Medical School. After consultation with the heads of departments, he reported a Biological-Medical Library building rated top priority. After several unsuccessful efforts to obtain funds for this library, the Minnesota Legislature in 1954 finally made an appropriation for this purpose.

It was decided that an ideal location would be across from the University Hospitals and Powell Hall at the corner of Union and Essex

Streets (site of the old Nu Sigma Nu fraternity house). During the next two years, plans and specifications for the library were made and the first two floors were completed in 1958 (see Chapter XVIII).

Dr. Diehl Accepts Another Large Responsibility. In 1957, Dr. Diehl left the University to accept the position of Senior Vice-President for Research and Medical Affairs and Deputy Executive Vice-President of the American Cancer Society. This resulted from solicitation by the American Cancer Society whose officials had long appreciated his ability and his vast experience as an educator, administrator, scientific researcher, author and humanitarian.[10] When Dr. Diehl accepted the position with the American Cancer Society in New York City, a spokesman of that organization said: "We are extremely fortunate in obtaining Dr. Diehl's great talent and rich experience." Thus, he continues to serve in an important health field.[19]

When it was announced that Dr. Diehl was leaving, the faculties of the College of Medical Sciences were unanimous in the statement of President Morrill, "The University must regard his ultimate departure with deepest regret, yet with heartiest congratulations and pride." He was on leave of absence at the University of Minnesota from January 1 until he retired on June 30, 1958, after which he became dean emeritus. At the time of retirement, President Morrill said, "In the long history of the University, Dean Diehl's career will shine as a beacon of strength and integrity and example."

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Chapter XVI

Mayo Memorial—How a Building is Born

PLANNING FOR AND SECURING the Mayo Memorial Building was by far the largest single building project to be accomplished on the University of Minnesota Campus.

Dr. Donald J. Cowling Enters Mayo Memorial Building Program. After serving as president of Carleton College for 36 years, Dr. Donald J. Cowling retired at the age of 65 years in 1945. In the summer of 1939, Governor Harold Stassen said that the State of Minnesota should provide an appropriate memorial to its two most distinguished citizens, the Doctors "Will and Charlie" Mayo who had died that year. He appointed a commission consisting of renowned citizens with Senator Richardson of Rochester, Minnesota, as chairman to recommend and provide for such a memorial. Dean Diehl promptly communicated with Senator Richardson and urged that consideration be given to a memorial

Donald J. Cowling

at the University of Minnesota Medical School which would carry forward in perpetuity the interests and the contributions of the Doctors Mayo in medical education and medical research (see Chapter XV). At the first meeting of the commission, Dr. Donald J. Cowling was appointed chairman of a committee to investigate the possibilities and make recommendations relative to an appropriate memorial. Dean Diehl met several times with this committee and presented the members with a drawing of a possible Mayo Memorial Building for medical research and teaching to be constructed in the center of the University quadrangle. Other proposals were made and after various considerations covering approximately a year the committee recommended Dean Diehl's proposal.

It was estimated that such a building would cost at least a million dollars. The recommendation of the committee headed by Dr. Cowling was unanimously adopted by the commission. Then Senator Richardson appointed another committee to consider procedures for raising the funds for such a memorial. However, Senator Richardson did not call another meeting of the commission.

Approximately a year later, Dean Diehl and Dr. Cowling decided that the memorial project was dead as far as the original commission was concerned, whereupon Dr. Cowling stated that the only way to get action would be for the dean to see Governor Stassen. However, Dean Diehl requested that Dr. Cowling discuss the proposal with the Governor. Governor Stassen's immediate response was that the only way to get anything done would be to discharge the present commission and appoint a new one which he would gladly do if Dr. Cowling would serve as chairman. After due consideration Dr. Cowling accepted the chairmanship of the new committee on two conditions: 1) that the memorial project have the endorsement of the legislature as well as the Governor, and 2) that he be permitted to suggest the names of individuals for appointment to this committee. Governor Stassen immediately directed the Attorney General to prepare a conjoint resolution for adoption by the House and the Senate endorsing the Mayo Memorial Project. The resolution was unanimously approved by both houses of the legislature.

Among the public spirited citizens chosen to serve on the Committee of Founders under the chairmanship of Dr. Cowling were: Claude H. Allen, James F. Bell, Earle Brown, Walter Burdick, Mrs. George Chase

Christian, Dr. George Earl, Frank T. Heffelfinger, Jay C. Hormel, Raymond J. Julkowski, George W. Lawson, Dr. Leo Madsen, Most Reverend John C. Murray, Charles N. Orr, I. A. O'Shaughnessy, Mrs. Mabeth Hurd Paige and Dr. Edward L. Touhy.

Soon, this Committee of Founders had a dinner meeting at the Radisson Hotel at which the owner of the hotel, Mr. Thomas Moore, was host. He invited business and civic leaders of Minneapolis to be informed of the proposed Mayo Memorial Project and to give their reaction. To this group Dr. Cowling described the proposal for a Mayo Memorial and Dean Diehl explained what the proposed facilities would mean to the future of medicine at the University and throughout the State of Minnesota. The endorsement was unanimous and enthusiastic.

Following this session Dr. Cowling called a meeting of the Committee of Founders which set a preliminary goal of two million dollars for the memorial—one million of which was to be requested from the legislature and another from private sources. Dr. Cowling then stated that Mr. Byron Shimp, the director of the Minnesota War Chest, was experienced and competent in fund raising and that it would be desirable to employ him on a part time basis to raise funds for the proposed Mayo Memorial. As time passed, Mr. Shimp devoted an increasing amount of time and eventually full time to the project.

Dean Diehl and Dr. Cowling then consulted the Mayo Association concerning a contribution. While those in charge were greatly in favor of the project, they considered it inappropriate to spend funds which had accrued from the Mayo Clinic toward a memorial to the Mayos. However, they proposed a gift of $500,000 to the University for the development of the Department of Public Health. This was accepted by the Board of Regents and used in part to endow the Mayo Professorship of Public Health and in part to provide facilities for the School of Public Health in the Mayo Memorial.

After Dr. Cowling and the members of the Committee of Founders had secured contributions and pledges of several hundred thousand dollars, they decided to request the legislature to make an appropriation of one million toward the Memorial on condition that the Committee raise an equal amount from private sources. This was recommended by the House Appropriations Committee but was postponed by the Finance Committee of the Senate. However, Senator Gerald Mullin

returned to the capital after an illness and insisted that the Finance Committee reconsider its actions. Whereupon the Senate Finance Committee recommended an appropriation of $250,000. Before the legislative session closed $500,000 was agreed upon and passed by the legislature.

As time passed, interest in the project waned and in order to revitalize it the Committee arranged a special invitation dinner held at the Coffman Memorial Union. To a full ballroom, Dr. Cowling explained the great importance of the future of medicine in Minnesota for which the facilities of the Mayo Memorial would provide. Dr. Thomas Parran, Surgeon General of the United States Public Health Service, Dr. Ross McIntyre, Surgeon General of the United States Navy, and Dr. J. L. Morrill, newly elected president of the University of Minnesota, delivered addresses. Interest rekindled and several months later the Committee of Founders decided to request the legislature for another $500,000. The Board of Regents of the University made this request at the next meeting of the legislature which was approved.

About the same time the United States Congress made appropriations for the construction of facilities for research on cancer and on heart diseases. From this, $600,000 was appropriated for the construction of a Mayo Memorial Building. The Minnesota Division of the American Cancer Society then agreed to provide $300,000 over a four-year period.

By the time architects' plans were approved for the Mayo Building, the lowest estimated cost proved to be approximately five and one-half million dollars in excess of the funds already made available or in prospect. It appeared that the State Legislature was the only possible source of the additional necessary funds. To promote this idea, a dinner meeting of the Committee of Founders was arranged at the Minnesota Club in St. Paul and with officials of the University and representation from the House of Representatives and the State Senate as guests. When Dr. Cowling explained the purpose of the meeting and Dean Diehl presented the problem pointing out that: 1) this was the first time that we were justified in realistically appraising the needs of the College of Medical Sciences over the next decade; 2) that to fail to provide these facilities at this time would mean that the Medical School and the University Hospitals would be handicapped for many years to come in developing the type of medical center which Minnesota should have

and which should be an honor to the Doctors Mayo; 3) that increasing prices over the several years since this project was first discussed had resulted in substantial increases in costs. This was confirmed by Mr. Howard Johnson, the architect for the building. Following Dr. Diehl's presentation, Dr. Cowling asked each person around the table to express his opinion as to whether the Committee of Founders should request the legislature for the funds needed to carry out this project as planned. He first called upon Archbishop Murray who enthusiastically supported the idea of making the request of the legislature and to do everything possible to assure its approval. The same enthusiasm was manifested by all present. Thus, the legislative request for 5.5 million dollars was made and after appropriate consideration was approved by both the Senate and the House of Representatives.

The Committee of Founders then proceeded to solicit funds from all other possible sources and authorized the architect to proceed with working plans and drawings. Because this required such a long time the contract was let in two stages—first, for the excavation and footings, and second, for the construction above ground. The former proceeded on schedule. However, the architects and engineers spent more than a year completing the planned specifications for the remainder of the building. When completed in the spring of 1950 and bids submitted by the first of July, the final plans called for a tower portion of 22 stories, 17 of which were to be above ground. However, during the period of delay, the Korean War broke out and prices of materials and labor increased from 20 to 25 per cent. Thus, the bids exceeded available funds by approximately two million dollars. Because of this, it was necessary to revise plans with reduction of the tower portion of the building from 22 to 14 stories. The space originally designed for the Medical-Biological Library and the Department of Pathology were both eliminated. Facilities to be provided for cancer and heart research were transferred to a different location and the areas originally intended for the Department of Continuation Education and the School of Public Health were reduced. Only three elevators were provided for instead of six, and other areas of the building were left unfinished. The building was dedicated in 1954. (see Chapter XXVII).

Special attention is called to the fact that from the beginning of planning for the Memorial, Dr. Donald Cowling, as president of Carleton

College, devoted much time. After retirement as president in 1945, he spent most of his time in promotion of the welfare of the University of Minnesota Medical School. Firm in his belief that each Minnesota citizen is responsible for the other, he set out to practice and convince others to evidence this responsibility. Between the years 1945 and 1950, he talked to boards of directors and private citizens. The gifts began to pour in. The Mayo Memorial began to be something other than a dream. Dr. Cowling, with his long experience of raising funds, found many donors from Minnesota and throughout the United States who were pleased to contribute to the memory of the pioneer Doctors Mayo.

The Mayo Memorial as envisioned by Dr. Cowling, the Founders Committee and the University staff, was approved by the Board of Regents of the University. It was not only a fitting memorial to the Doctors Mayo, but the facilities raised the Medical School standard and helped to retain renowned faculty and provide adequate hospital areas. The Minnesota Legislature added its approval by providing funds to aid in the erection of the memorial. Through grants, gifts from corporations and individuals, $12,300,000 for the construction of the Mayo Memorial Building became available. This not only illustrates the magnanimous support the Medical School, and indeed the entire University, has received from the legislators, but it also was a sincere manifestation of the confidence the members of the legislature had in Dr. Cowling and the University administration. Perhaps no other individual could have made the project succeed!

The present Mayo Memorial 14-story tower section and the three 6-story wings that connect the existing hospitals and Medical School buildings almost doubled the capacity of the Medical School. Better facilities now included classrooms, clinical and administrative offices, research laboratories, operating rooms, patient care areas, service departments, an auditorium and a 2-level underground garage with parking space for 250 cars. With connection to the existing medical facilities, the Mayo Memorial brought the complete University of Minnesota Medical Center under one roof (Chapter XXVII).

Dean Diehl wrote of his association with Dr. Cowling: "To me the privilege of working with Dr. Cowling during the vicissitudes of this endeavor was an inspiring and gratifying experience. His complete

Original and Present Medical School Complexes

selfless dedication to the responsibilities which he had accepted, his wise and resourceful leadership of the committee, and his untiring work in its behalf, constituted a magnificant and unique contribution not only to the memory of his friends, Dr. Will and Dr. Charlie, but to the future of medicine in this area."

During the dedication dinner, October, 1954, on conferring the Regents Award, President Morrill said: "Donald J. Cowling, for 36 years distinguished president of Carleton College, lifelong exponent of progress and freedom in higher education, unstinting worker for the advancement of the arts and sciences, religion and international understanding, and chairman of the Mayo Memorial Committee of Founders, has converted the dream of a medical research center into an actuality."

The appreciation of Dr. Cowling's efforts in the building of the Mayo Memorial has also been expressed by Dr. Charles W. Mayo, chairman of the Board of Regents of the University. "The Mayo family, past and present, would feel slighted not to be given the privilege of paying trib-

ute to a great and good friend of long standing. This feeling is not only because he was the spark plug for the Mayo Memorial Building, which stands on the campus of our great University of Minnesota in service to the health of our citizens, but also because of his own persistent and unlimited efforts on behalf of his fellowmen."

Chapter XVII

Affiliation of University of Seoul, Korea, and Our School of Medicine*

In 1954, the Office of Economic Cooperation, now known as the International Cooperation Administration, approached the University of Minnesota to undertake an educational aid project at Seoul National University, Korea. Representatives of the University including Dr. Gaylord W. Anderson, surveyed the conditions at Seoul and reported the practicability of the proposal.

In this way, our College of Medicine entered into a "sister relationship" with a medical school in a foreign land. The Federal government financed the program; our faculty in cooperation with the Korean faculty designed the program to meet the educational objectives to sustain Seoul National University College of Medicine as the leading center of medical education in Korea.

Our objective was to provide technical advice and assistance in the development and strengthening of the educational, research, and extension programs and of the organization, administration and basic operating facilities of Seoul National University in the fields of medicine, nursing and public health. The program began on September 28, 1954, and was terminated on June 30, 1961.

Our faculty contributions were many; members of the Graduate School faculty had the opportunity to advise one or more of the 77 Korean faculty members who journeyed to study at Minnesota under the terms of the contract. Dr. Gaylord W. Anderson, coordinator of the project in this college, received from many of our faculty members assistance that contributed greatly to the success of the program.

From March 1956, to the termination of the contract, our college dispatched 11 advisers to Korea for various lengths of time. Dr. William F. Maloney and Dr. N. L. Gault were primarily interested in the ad-

*Abstraction of an article entitled, "Korea—A New Venture in International Medical Education," by N. L. Gault, Jr., *University of Minnesota Medical Bulletin, 33*:73, 1961 (see Chapter XV).

ministration of the medical college, although all advisers were drawn into this area when it required their attention. Dr. Eldon Berglund in pediatrics, Dr. E. B. Brown, Jr., in physiology, Dr. Edmund B. Flink in internal medicine, Dr. James H. Matthews in anesthesiology, Dr. George Schimert in surgery, Miss Margery S. Low in nursing education, Miss D. Joan Williams and Miss Florence J. Julian in nursing services and Mr. Glenn R. Mitchell in hospital administration provided advisory services over a period of four and one-half years.

Special technical information and skills possessed by our advisers were transmitted to the Korean staff in such a way as not to displace any Korean faculty member. A major role of every adviser was to stimulate the faculty and students to accept new values, upon which the principles of modern medical education and medical care could be established.

Through this, project advisers both in Minnesota and in Korea undoubtedly became more aware of the international scope of our profession. Those who participated actively in the project are better equipped, in turn, to prepare our students for the increasing responsibilities they have tomorrow in international health and medical education.

That phase of the contract which provided for the rehabilitation and improvement of the physical plant and for equipment and supplies for teaching, research and hospital operation required the closest cooperation between the faculties. In 1954, Seoul National University returned to its campus in Seoul from Pusan, whence it had fled ahead of the Communist drive southward during 1950. The buildings were standing, but the classrooms, laboratories, and hospital rooms were devoid of all furnishings. The rehabilitation of this large campus progressed slowly because of logistical problems in obtaining supplies and shortages of Korean funds to pay local labor. The expenditure of $786,200 and hwan 1,089,376,000 (hwan 1,300 = $1) provided the college and hospital with essential repairs to permit operation. A new School of Nursing building, a nurses' dormitory, and extra floors for the library and the School of Public Health were the only major new constructions.

Teaching, research and hospital equipment costing $741,300 was procured after the requests of the Korean faculty were screened by their own committee, the adviser, and the appropriate department at Minnesota. As a result of the project, sufficient equipment was restored to permit teaching, research, and patient care to be carried out in accord with modern scientific methods.

During the Korean War, many Seoul National University faculty members were killed or kidnapped by the Communists, and others had their scientific pursuits interrupted. The all-important need was to acquaint the staff with the recent advances in medical sciences and to demonstrate the teaching methods in our universities. The first Korean faculty member came to our campus in February, 1955. Thereafter, 50 spent up to a full year on our campus, 22 spent two years here; three came for three years each, and two for four years. Eleven were awarded master's degrees; four earned doctor of philosophy degrees; and additional advanced degrees are contemplated by several faculty members who are continuing their studies. The senior faculty members were not encouraged to pursue a degree program, since many already had advanced degrees from Asian universities. But it seemed important to bring them to our campus to observe and participate where possible, so that they, being responsible for the college and hospital policies, might have more understanding and security in the changing scene at their college. In fact, a number of these faculty members demonstrated leadership in adopting significant changes after they returned.

In general, the younger faculty members were most effective in introducing the teaching methods and some of the administrative concepts prevalent in our American universities. The students, who reported such progress to the dean, were outspokenly critical of faculty members who failed to abandon their traditional teaching methods for newer ones. This represented a significant change in the Korean student-faculty relationship, a change occurring in all levels of education—the liberation of the student's mind to observe, evaluate and judge for himself. The young person of Korea was better informed through books, newspapers, magazines and radio.

As a result of the faculty's training, significant changes were made in the curriculum and in teaching methods. The basic science departments offered more laboratory experiences to the students. Previously, demonstration experiments conducted by the staff sufficed. Now the students, singly or in small groups, actually conducted classical experiments.

Use of patients in the teaching of clinical subjects increased, with some departments programming their ward rounds and conferences as effectively as our own departments do. The Korean clinical curriculum now provides only two hours of lecture a day rather than the seven that were scheduled before. Students are responsible for recording clinical workups

on both inpatients and outpatients and for presenting histories and physical examinations. The clerkships incorporate clinical conferences, such as the clinicopathological conference, x-ray conference, grand rounds and the interdepartmental conference.

The administration of the Seoul National University College of Medicine was greatly improved; in fact, some faculty members regard what has taken place as an "administrative revolution." The administration was dedicated to the objective of our project and has sincerely tried to make improvements as rapidly as possible.

Not only the equipment and the curriculum and administration were improved, but access to medical knowledge also has increased greatly. The college library, a new addition to the basic science building became the finest and most extensive medical library in Korea. Both students and faculty read English texts and journals. About twenty-five medical journals, but few textbooks, are published in Korean. The library currently receives 227 scientific journals and contains 20,000 volumes. In addition, 4,500 volumes of texts and monographs are catalogued.

Another essential factor in strengthening an educational program is the student. Fortunately, the Korean students who are successful in the competitive examinations and interviews for admission to the university are students of high ability. More than 600 usually apply for the 120 positions in each class of the six-year medical course. The first two years are taught in the College of Liberal Arts. Today faculty members of the College of Liberal Arts and of the College of Medicine serve as the pre-medicine course committee and are responsible to the academic dean of the University. This committee establishes the curriculum and admits students to the course. Successful completion of the two-year course automatically admits the student to the freshman class in medicine.

The Seoul National University Attached Hospital expanded its services and teaching opportunities. Rehabilitation of the hospital began with basic repairs such as new flooring and roofing, rewiring of electrical circuits, installing water and steam systems, and screening of windows.

Other major changes occurred as a result of the improvement in the administration of the hospital. Housekeeping was made much easier since the interior painting brightened up the rooms and halls. The nurses found it easier to keep the wards clean since families are no longer permitted to live in with the patients.

Visit regulations—a notion entirely new to Koreans—were difficult to enforce. The administration finally succeeded in prohibiting the

families from cooking meals over charcoal stoves in the patients' rooms; the central kitchen then served all meals for patients.

In the past, the importance of necropsy and the pathologic examination of surgical specimens was not sufficiently appreciated by the staff. American advisers stressed the principle that these examinations form the foundation of scientific medicine; they repeatedly demonstrated that all the equipment for teaching and rendering modern medical care would be of little value unless recognized scientific procedures were adopted. A response on the part of the house staff during the last half of 1960 brought the total number of autopsies to 46, which was two and one-half times the number performed in 1959. By May 15, 1961, 608 surgical specimens had reached the pathologist, as compared to 358 during the same period a year before.

The organization and operation of a central supply room demonstrated efficiency both in service and in the care of instruments and equipment. The post-anesthesia room planned and supervised by the anesthesiologist trained in our center offered for the first time intensive care in the post-anesthesia period. In fact, the care so impressed the doctors that they requested to use the facilities and nursing staff for the care of seriously ill, nonsurgical patients.

The faculty in Korea traditionally stressed research as a major responsibility of the scholar. The poor facilities and weak financial support available limited the research output. But now, thanks to a newly remodeled clinical research laboratory, the faculty and graduate students have opportunities to apply in their research the newest techniques—such as the use of radio-isotopes. As a result, several investigators have had papers accepted for publication in American and British scientific journals. The faculty, of course, contributes a major portion of the articles published in Korean medical journals.

At the end of the project, the College of Medicine at Seoul National University is a different institution from what it was before. Its faculty members, returned from studies abroad, worked diligently to improve the quality of medical education, medical care and research. The record made by the graduating class of Seoul National University on the qualifying examination in medicine given by the Educational Council for Foreign Medical Graduates illustrates vividly the real progress our Korean colleagues have made in upgrading medical education. The certification of more than 90% of the graduates who took this examination is a truly outstanding accomplishment.

Chapter XVIII

Robert B. Howard Appointed Third Dean of the College of Medical Sciences and Sixth Dean of the School of Medicine

DR. ROBERT B. HOWARD was especially well qualified to assume the office when Harold S. Diehl retired as dean of Medical Sciences. He was born in St. Paul where his father was a surgeon and was on the fracture service of the Ancker Hospital. After graduating from Central High School in 1938, Robert entered the University of Minnesota where he won the degree of doctor of medicine in 1945 after which he was a teaching fellow in medicine in 1945-1946. He then served as captain in the Medical Corps of the United States Army until 1948. On his return to the University, he became instructor in medicine and in 1951 he was certified by the American Board of Internal Medicine. Award of the degree of doctor of philosophy in 1952 resulted in pro-

Robert B. Howard

motion to an associate professorship the following year. In 1952, he became director of Continuation Medical Education and did excellent work until he was appointed associate dean of Medical Sciences in the fall of 1957.

Dr. Howard was acting dean of the School of Medicine from the time Dean Diehl assumed his duties with the American Cancer Society in November 1957. He had the counsel of Dean Diehl who returned for brief periods from time to time.

Knowing that Dean Diehl would retire on June 30, 1958, President Morrill appointed a committee with Dr. Gaylord Anderson as chairman and seven other heads of departments, schools and hospitals. In due time, this advisory committee recommended Robert B. Howard in the following report to President Morrill:

"As director of postgraduate medical education for several years, Dr. Howard demonstrated a capacity for leadership in medical education and has earned the respect of his University colleagues and of the medical profession throughout Minnesota. During the past year as acting dean of the College of Medical Sciences, he has gained increased respect and confidence within the faculty and has demonstrated a good understanding of the problems of medical and nursing education and fine qualities of constructive leadership."

President Morrill said, "We are fortunate to have had within our own staff an administrator meriting so clearly the confidence of his College of Medical Sciences colleagues and the central administration of the University. . . . The deanship is a position of leadership which Dr. Harold S. Diehl has dignified and developed to the highest degree of responsibility and of professional influence. To the challenge of its future, Dr. Howard will respond with devotion and competence, I am fully confident."

At the meeting of the Administrative Committee on September 25, 1958, Dean Howard pointed out that on May 12, with approval of the Administrative Committee he had proposed to the University Honors Committee that Dean Diehl be considered for appropriate recognition. The Honors Committee proposed that the building to house the new Biological-Medical Library and Animal Research Facilities be named in honor of Harold S. Diehl. The Administrative Committee of the Senate subsequently approved and proposed that the building be designated Diehl Hall.

On September 25, 1958, Dean Howard announced that he had appointed a committee to plan and coordinate a proposed symposium on medical education to be held in honor of Dr. Harold S. Diehl, Dean Emeritus, on January 22, 1959. On that date, while Diehl Hall was under construction the symposium was presented. Following an all day session, a dinner meeting was held in the Coffman Memorial Union with elaborate ceremony dedicating the new building and affixing the name Diehl Hall.

Doctors Gault, Cavert, Magraw, Fleeson and McCollister are Assistant Deans. Dr. *N. L. Gault, Jr.* continued as assistant dean under Dr. Howard's administration. Under the University of Minnesota's exchange program with the Seoul National University Medical College, he and his family spent 21 months in Seoul, Korea, 1959-1961. His interest in international medical education and experience in the Far East found him back in the Far East as a consultant for the China Medical Board of New York Inc. during the summer of 1963 and as a consultant for the Agency for International Development in the University of Saigon, South Vietnam, during the summer of 1964. (See Chapter XVII.)

Dr. Gault was appointed associate professor of medicine in 1959. In 1965, he became associate dean of the College of Medical Sciences, with primary responsibility for professional and hospital relationships. Late in 1966, he announced his acceptance of a post as professor of medicine with the University of Hawaii School of Medicine, effective July 1, 1967.

Dr. *H. Mead Cavert* also continued as assistant dean after Dean Diehl's retirement. In 1959, he became associate professor of physiology. The National Heart Institute, United States Public Health Service, awarded him a special research fellowship for the year 1961 to 1962 while on sabbatical leave for study and research as a visiting professor in the Department of Biochemistry at the University of Edinburgh, Scotland. In 1964, Dr. Cavert was promoted to associate dean of the Medical School in charge of Medical Student Affairs. His office serves as the center for all Medical School activities.

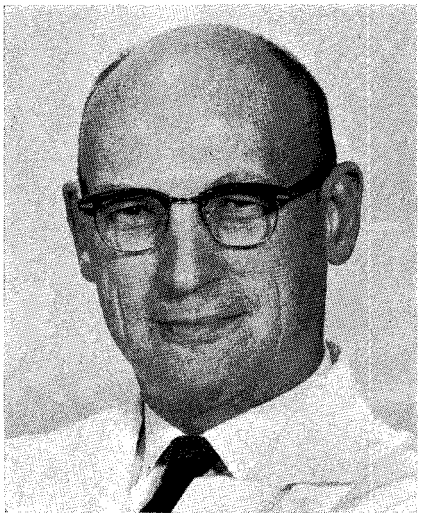
Dr. Cavert's primary scientific interests and fields of investigation have been related to intermediary metabolism in cardiac and skeletal muscle, mechanisms of transport of water and sugar in isolated, perfused organs, and effects of repetitive contraction on these processes in muscle.

He co-authored the fifth edition of a textbook in physiology, Carlson and Johnson's *Machinery of the Body,* University of Chicago Press, 1961.

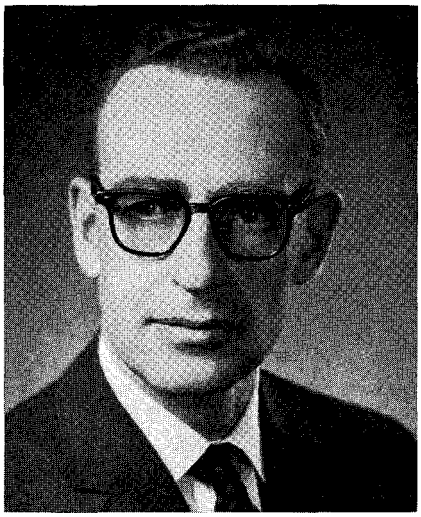
On September 17, 1959, Dean Howard appointed Dr. *Richard Magraw,* associate professor of medicine and psychiatry, as assistant dean effective September 1, to serve on the same percentage of time basis as had Dr. Gault.

On April 21, 1960, Dean Howard stated that Dr. *William Fleeson,* assistant professor of psychiatry, was appointed assistant dean on half-time in the dean's office succeeding Dr. Richard Magraw who had assumed full-time direction of the new Comprehensive Clinic Program in the Medical School. Dr. Fleeson was born in 1915 in Sterling, Kansas. He was awarded the degree of doctor of medicine by Yale University in 1942. From 1943 to 1946 he was in the United States Army Medical Corps. In 1957, he became assistant professor of psychiatry and physical medicine and rehabilitation, University of Minnesota, and assistant dean, College of Medical Sciences from 1960 to 1963. In 1963 he was appointed associate dean and professor of psychiatry in the new University of Connecticut School of Medicine.

On July 1, 1964, Dr. *Robert J. McCollister* was appointed assistant dean. He was born on July 27, 1928 in Iowa City and received the doctor of medicine degree in 1953 from the University of Iowa. He served as flight surgeon in the United States Air Force from 1953 to



Richard M. Magraw

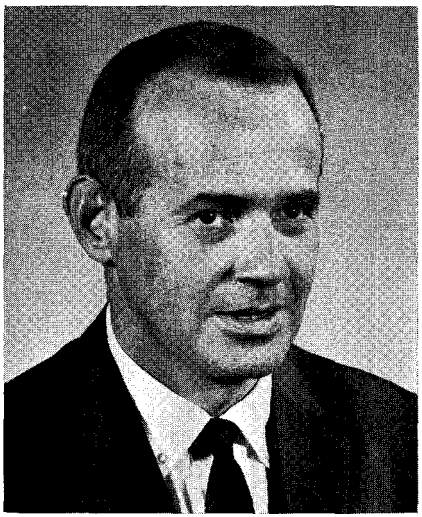


William Fleeson

1955. For the next three years, he was resident in medicine at the Veterans Administration Hospital in Minneapolis. From 1958 through 1959, he continued residency training in the Department of Laboratory Medicine, University of Minnesota. For the year 1960-61, he was chief resident in medicine at the University Hospital after which he was appointed instructor in medicine. Through the school year 1961-1962, he engaged in research at Duke University. Dr. McCollister's special interest is in hematology.

Dr. *Robert A. Ulstrom* was appointed associate dean of the College of Medical Sciences on December 1, 1966. He was born in Minneapolis in February of 1923. At the University of Minnesota, he earned the degree of doctor of medicine in 1946. From 1948 to 1950, he was in the Army Medical Corps. From 1950 to 1953, he was instructor and assistant professor at the University of Minnesota and from 1953-56 assistant professor, University of California at Los Angeles. In 1956, he returned to the University of Minnesota as associate professor and was advanced to full professorship of pediatrics in 1961, and was acting chairman of the Department of Pediatrics for a time. In 1964, he became professor and chairman of the Department of Pediatrics of California, Los Angeles, but he returned to the University of Minnesota

Robert McCollister



Robert A. Ulstrom

to become associate dean with special responsibilities arising from the new Federal Regional Medical Center Program.

Dr. Ulstrom was a member of the editorial board of the *Journal of Pediatrics* from 1961 to 1965, and has been a member of the National Research Council, Division of Medical Sciences. He is a member of the General Medicine Study Section of the National Institutes of Health. His research interests include the developmental biochemistry of infants and children with special emphasis on metabolic and endocrinologic aspects of early postnatal life. Dr. Ulstrom as professor of pediatrics will assist in the teaching program of the Department.

Two years after Robert Howard was appointed dean, President Morrill retired[1, 7] and O. Meredith Wilson, who became president of the University in 1960,[8, 17] continued with outstanding support of the College of Medical Sciences.

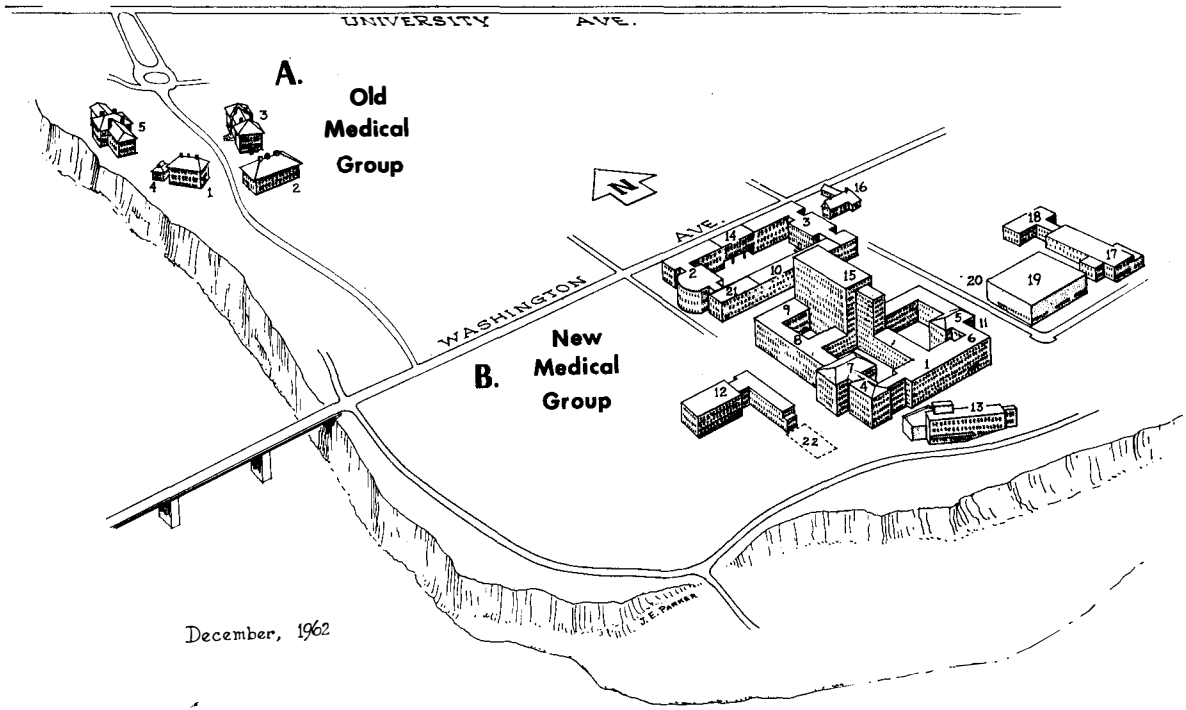
Accreditation Survey Gives Full Approval of School of Medicine. Early in 1961, a liaison committee on medical education representing the American Medical Association and the Association of American Medical Colleges made a meticulous survey of the University of Minnesota Medical School. After detailed observation of the entire school, the committee granted full accreditation of the institution.

Dean Howard has played an important part in the growth and development of the Minnesota Medical Foundation including the acquisition of a full-time executive director in the person of Mr. Eivind Hoff who was appointed in 1959. Dean Howard is a trustee and former secretary-treasurer of the Foundation. (see Chapter XXXVI.)

Building Projects in the Medical School. When Dr. Howard was appointed associate dean, a number of building projects were under way. This was true of the Masonic Hospital which was completed and enlarged during his administration (Chapter XXVII).

Veterans of Foreign Wars Cancer Research Center. In 1944, Dr. Fred Kolouch of the Department of Surgery urged friends in the Minnesota Veterans of Foreign Wars to raise funds for a unit for cancer research to cost approximately $500,000 half of which would be supplied by the federal administration. The building was dedicated in 1959 and is a valuable unit for clinical research. It is physically and functionally associated with the Masonic Memorial Hospital.

New Fifth Floor on Variety Club Hospital and a New Wing. These



Original and present medical school complex. (A) Old medical school complex west and north of Washington Avenue: (1) Medical Hall (1892), now Wulling Hall; (2) medical chemistry building (1893), razed in 1924; (3) medical sciences laboratory (1986), now Wesbrook Hall; (4) anatomy building (1900), now the pharmacy greenhouse; and (5) public health and pathology building (1907), now part of the psychology building. (B) New medical group east and south of Washington Avenue: (1) Elliot Hospital (1911); (2) institute of anatomy (1912), now Jackson Hall; (3) Millard Hall (1912); (4) Elliot Hospital service building (1915); 5) Todd Hospital (1924); (6) George Chase Christian wing of hospital (1925); (7) Eustis Hospital (1928); (8) Outpatient Clinic (1928); (9) Old health service (1929); (10) medical sciences (1932), now Owre Hall; (11) Psychopathic Hospital (1936); (12) new students' health clinic (1950); (13) Variety Club Heart Hospital (1951); (14) Lyon Laboratories (1954); (15) Mayo Hospital, clinical research laboratories (1954); (16) surgical research laboratories (1958); (17) Masonic Cancer Hospital (1958); (18) Veterans of Foreign Wars cancer research laboratories (1959); (19) and (20) medical library and clinical research facilities (1961), now Diehl Hall; (21) Jackson- Owre addition to anatomy and medical science building (1961); and (22) children's rehabilitation center (unfinished).

TABLE I

ACCUMULATIVE TOTALS

		Year	Original Amount	1936	1940	1950	1957	1959	1960	1964	1965
29	Elliott Memorial Hospital	1911	154,000	442,688	451,572	550,461	673,559	684,501	684,501		
29	Todd Memorial Hospital	1924	162,520	164,209	164,630	165,517	165,517	165,517	165,517		
29	Cancer Institute	1925	186,995	187,060	187,472	188,144	188,144	188,144	188,144	1,945,898	
29	Health Service (Old)	1928	297,475	297,475	298,117	300,044	300,044	300,044	300,044		
29	Out-Patient Department	1928	173,862	173,862	173,890	174,732	174,732	174,732	174,732		
29	Psychopathic Hospitals	(39) 1936	43,281	43,281	135,738	146,304	146,304	146,304	146,304		
29	Meditation Chapel	**1965	182,783								182,783
29	S.W. Court Addition	**1965	1,428,236								1,428,236
32	Jackson Hall	1912	244,345	244,345	244,374	261,847	283,041	494,682	542,452	739,349	
33	Millard Hall	1912	262,000	278,601	282,694	305,960	317,661	1,092,151	1,350,427	1,598,385	
54	Owre Hall	1930	416,077	416,077	417,139	513,178	522,374	552,374	553,015	676,350	
55	Powell Hall	1931	325,552	325,552	326,741	326,741	326,741	326,741	326,741	734,058	734,058
55	Nurses Cadet Training School	1943	386,134			386,136	386,136	386,136	386,136		
69	Variety Club Heart Hospital	1949	226,880			753,693	1,367,847	1,800,835	1,860,045	1,913,411	
74	Mayo Memorial	1950	370,880			932,508	12,202,453	12,595,062	12,735,837	13,025,911	
79	Lyon Laboratory	1951	626,525				864,183	940,923	945,468	959,845	
82	Cardio Vascular Laboratory	1960	94,998						94,998	94,998	
107	Masonic Memorial Hospital	1957	711,758				711,158	891,929	996,584	1,020,769	
108/111	Diehl Hall	1958	735,093					735,093	1,864,634	4,172,828	
109	Veterans of Foreign Wars Cancer Research	1958	296,717					296,717	430,417	495,462	550,823
114	Jackson Owre Addition	1958	155,452					155,452	881,888	1,313,029	1,329,466
115	Children's Rehabilitation Center	*1964	1,710,436							1,710,436	2,092,943

* Original funds of $250,000 (1928) also since still show construction. The figures are construction costs to date.

** Since still under construction, figures are construction costs to date.

Note: Old Health Service is part of Hospitals. New Health Service (1948) is not part of the above information. Also, all of Bldg. 29 figures are now under one figure (see 1964 entry) (1957 Addition) Health Service (70) has 1964 total of $2,051,479.

were completed in 1959 and 1966 respectively (see Chapter XXVII).

Table I shows the date of construction and cost of each building south of Washington Avenue. The total cost as of June 30, 1966 was $34,-612,434.60. The cost of construction of the entire original medical school complex north of Washington Avenue was $438,736.46 (not included in this Table) (Figure 1).

On July 20, 1960, it was recommended the new Jackson-Owre Addition be designated as *Bell Laboratories.*

Growth of Medical Library Demanded Separate Building. The overcrowded space in the central library building and the small staff are some of the reasons that Dean Diehl urged a separate building to house the library on the medical campus. When the new building was occupied in January 1961, it consisted of three levels. The building was designed so that two additional floors could be added to the existing structure, making a total of six floors, four of which were to be occupied by the library. During the Christmas Holidays 1960, the biomedical library consisting of a 145,000 volume collection was moved the half-mile distance to its new quarters. Measurements revealed that the collection occupied nearly 20,000 linear feet of shelving—nearly four miles of books.

The new biomedical library opened in January 1961. The building was described briefly by Matson, December 1, 1961, in an article entitled, "Classroom, Laboratory, Library," as follows: "It is a multipurpose building, housing the library, extensive animal research laboratories and a scientific apparatus shop. These are below the ground level. The library is separated from the laboratory, not only physically, but also administratively. The extensive animal laboratories are in the subbasement. It contains a study room with 48 seats which is kept open on a 24-hour basis."

Dr. Wangensteen Raises Funds to Complete Medical Library. It was because of lack of completion of Diehl Hall that Dr. O. H. Wangensteen put forth special effort to obtain private contributions for that purpose. He has long been one of the most extensive users of and contributors to the library. On December 17, 1961, he wrote: "Generous help toward our medical library has come recently from two sources, Mr. I. A. O'Shaughnessy of St. Paul came forward with a gift of $225,000 and a donor who chose to be anonymous gave us $300,000 toward our medical library." "Since fruition of the plans for the clinical

research facilities, I have directed considerable effort to getting support for our library. Mr. John S. Pillsbury, Sr. gave us $100,000 for the purpose of purchasing books of historical interest in the broad field of medicine. However, our great need now is to forge ahead to complete the library building. I cannot think of anything which will add stature to our Medical School in the same manner as completion of this venture."

Dr. Wangensteen's 1961 appraisal of a great library follows: "A Library and a great collection of books stimulates the love of learning in an institution, which influence, in the final analysis, characterizes the atmosphere of a true University. A great Library, I am very certain, will lend great impetus to research and scholarship and to the cultivation, nurture and quickening of the entire learning process. For me, it has been a revelation to have the opportunity of observing how students grow and mature in an atmosphere friendly to learning, surpassing the accomplishments of their teachers. It is a thrilling and rewarding experience to enjoy the wonderful privilege of studying in the presence of great books, whose pages preserve the permanent legacy of great ideas. Many a medical student and graduate student in the many disciplines of the School have found their sights lifted and the nature of their dedication increased by their contact with a fine library. The atmosphere of the library works silently upon the mind, uplifting the spirit and enlarging the student's vision. Sometimes I like to believe it is like the stirring urge of the Divine at work within the student's mind."

In an editorial in *Minnesota Medicine,* April 1964, librarian Vera M. Clausen[18] writing about book collection gifts said: "In addition, the library has had a special friend in Dr. O. H. Wangensteen, who has been responsible for securing funds for the purchase of materials on the history of medicine."

Dr. Cowling Continues on Medical School Promotion Scene—A 25-year Effort. Dr. Cowling's efforts in behalf of the Medical School had not ceased since they began approximately a quarter of a century ago. He was a strong supporter of the biological medical library from the beginning and continued until all aspects of the building were completed. His keen interest and support were abiding. He played an important role in cooperation with Dr. Wangensteen and Dr. Howard in raising funds for the completion of Diehl Hall. Dr. Wangensteen, together with Dr. Cowling, was instrumental in raising funds for the completion and furnishing of the building. More than $1,000,000 from

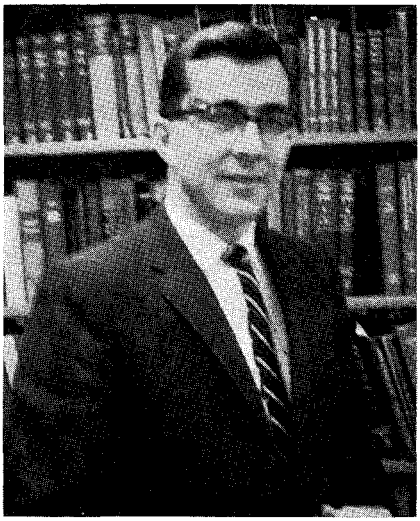
private donors was raised which together with a United States Public Health Service grant were used to complete and furnish the library and the sixth floor research facility.

In 1964, Dr. Wangensteen said, "A great cause has no better ally than a good friend. Certainly, Dr. Cowling is one of the best friends the school has had. Principles and ideals are items that come to the surface quickly in discussions with him. Considerations of opportunism and expedience fail to reach him, but when persuaded of the soundness and worth of an enterprise, Dr. Cowling brings to its development the wisdom and counsel of a wealth of experience and spirit of dedication . . . Any enterprise which receives Dr. Cowling's full support is already earmarked for success. It has been my great privilege and pleasure to have come to know Dr. Cowling well over the years he has played this unique role in our school. With neither official title nor emolument, Dr. Cowling has worked diligently and continuously these many years for the betterment and enlargement of influence of the Medical School. The impress he leaves upon us is one of a discerning, wise, and kindly man with a spiritual mission.

"One cannot have known Dr. Cowling, as it has been my privilege these many years, without appreciating one who has talked with greatness—yes, and with goodness, too. May the forward looking, buoyant, and life-giving spirit of Donald J. Cowling dwell in the halls of our Medical School forever!" [21]

Library Personnel Show a Devoted Interest in the School of Medicine. Beginning with Miss *Evelyn Lyon* in 1910, the medical library has had a splendid succession of librarians who have played a dominant role in promoting the educational activities of the Medical School. Miss Lyon was succeeded by Miss *Izella M. Dart,* the first biomedical librarian after the joint unit was created in the new Walter Library in 1924. She was followed by Miss *Dorothy Ruble* who was librarian until 1945. In 1946, James M. Kingsley, Jr. became the biomedical librarian. He was librarian until 1951 and was replaced in 1952 by Miss *Vera Makivirta* who was born in Finland in 1912. At the age of 11 years, she emigrated to Virginia, Minnesota. After graduating from high school in 1931 and Junior College in 1933, she was awarded the degree of bachelor of science with a major in library science, University of Minnesota 1935, and a bachelor of arts degree in 1948. She began working as a junior librarian in the University of Minnesota Library in

Vera M. Clausen



Glenn L. Brudvig

1936 and was promoted through the various grades to principal librarian. She was biomedical librarian from January 1952 through September 1964. On March 22, 1952, she was married to Mr. Donald F. Clausen. Their present home is in Menomonie, Wisconsin.

When Mrs. Clausen resigned, Mr. *Glenn L. Brudvig* was appointed assistant professor and librarian of the biomedical library. He was born in Kenosha, Wisconsin, in 1931. During the Korean conflict he served as an Army medic in 1951-1952. In 1954, he graduated from the University of North Dakota. For several years, he taught in high schools of Minnesota before entering the library profession. He holds a masters degree in history from the University of North Dakota and a masters degree in library science from the University of Minnesota. From 1958-1963, Mr. Brudvig was assistant librarian, University of North Dakota. That year he was elected to the presidency of the North Dakota Library Association. On January 1, 1964, he became supervisor of Departmental Libraries, University of Minnesota and was made biomedical librarian on October 1, 1964.

Children's Rehabilitation Center Constructed 1964. Early in 1962, application was made for Hill-Burton matching funds for construction of a rehabilitation unit to be located south of the Health Service where a temporary building stood. Construction began in the fall of 1962 and the six story Children's Rehabilitation Center was completed at a cost

of $2,069,000. Dedication ceremonies were conducted on November 7, 1964. This building provides beds for 20 adults and 20 children. It supplements the facilities of the Department of Physical Medicine and Rehabilitation. (see Chapters XXVII and XXXIX.)

In 1962-1964, the Medical Alumni Association raised $80,000 for conversion of the storage space on the first floor of the Mayo Building to a medical student center. Construction started on September 1962, and the unit was dedicated under the name *Medical Alumni Student Adytum.*

Among the alumni who have played important leadership roles in strengthening alumni relations for the Medical School is Dr. *Virgil J. P. Lundquist,* a 1942 graduate. He headed the alumni fund appeal which resulted in building of the Medical Alumni Student Adytum. Dr. Lundquist was born in Kandiyohi, Minnesota in 1919. He was awarded the degree of doctor of medicine by the University of Minnesota in 1942. After a year of internship with the United States Navy, he was on active duty from 1943-1947. The following three years were devoted to postgraduate surgical training in the United States Veterans Administration Hospital in Minneapolis. Since 1950, he has been engaged in private practice of surgery. Throughout the years he has manifested invincible loyalty to the College of Medical Sciences. In addition to his leading role in procurement of the adytum, he has also served as president of the Medical Alumni Association, the parent Minnesota Alumni Association, and is now devoting much time and energy in promotion of building a new alumni center on the West bank of the University of Minnesota campus.

On May 28, 1958, Dr. Howard suggested reorganization of Hospital Laboratory units then headed by Dr. G. T. Evans:

I. Department of Laboratory Medicine
  A. Division of Medical Technology
  B. Division of Clinical Pathology
  C. Division of Hospital Laboratories

This won full approval of the Administrative Committee.

On January 19, 1961, Dr. Thal, representing Dr. Wangensteen, discussed the need for the establishment of a *Chair of Medical History.* and some possible sources of outside financial support; no formal action was taken but all members of the Administrative Committee were favor-

able. On September 2, 1961, Dean Howard proposed establishment of a Division of Special Educational Services and a Division of Medical History directly under the dean's office.

Division of Medical History. In the early years of the school, teaching of Medical History consisted mainly of an occasional elective course. At a meeting of the Administrative Committee in 1939, Dean Diehl requested all heads of departments to prepare brief histories of their own departments for the archives. On January 11, it was announced that Dr. C. M. Jackson[19] had prepared and submitted a History of the Department of Anatomy which was published in the Bulletin of the Minnesota Medical Foundation. Historical sketches of other departments were written later.[20, 21]

As chairman of a committee on Medical History, Dr. Wangensteen foresaw a Medical History Department. To this end through his encouragement, friends were providing endowment funds. A History of Medicine professorship was endowed by one of Dr. Wangensteen's patients, Miss Grace Polk. A search was under way for a strong person to fill this vital chair whose interest and personality would be such that he will make the knowledge found between bindings a living and essential part of each student's training. Mr. Leonard G. Wilson of Yale was appointed to this professorship beginning July 1, 1967.

James E. Moore Society Established. It was thought that the students might organize a voluntary seminar group. The *James E. Moore* Society was founded in 1961 under the sponsorship of the Department of Surgery. Its membership is composed of 25 junior and senior medical students. Eleven new members are selected each year from the sophomore class on the basis of scholarship, research interest or specialized talents. Each student during his senior year has the opportunity to present an original paper or lead a discussion of medical interest at one of the meetings. Students have made presentations of Hippocratic and Islamic Medicine, Life of Rene Laennec, Russian Medical Education, History of Syphilis, History of Medical Illustration, Life and Work of James E. Moore,[22] etc. In 1964, the senior members were presented at the Medical School Recognition Ceremonies, establishing the James E. Moore Society as an honored society of the Medical School.

Number of Students Increased. On November 15, 1957, it was announced that President Morrill had recommended increasing the

number of students admitted to the freshman class to 140 in 1958, and 150 in 1959. However, because of shortage of facilities it was not feasible to accommodate 150 entering students regularly until 1962.

Curriculum for the First Two Years. The present academic year for the first and second year students consists of: 34 weeks divided into three trimesters of 11 weeks each plus a week for final examinations.

First Year Medical Studies.

Anatomy	657 hours	Neuropsychiatry	33 lecture hours
Biochemistry	276 hours		
Physiology	121 hours	Biophysics	11 lecture hours

The total clock hours of assignment during the freshman year is 1,098 hours. Of this amount, 442 hours are devoted to lecture and 636 hours to laboratory exercise.

Second Year Medical Studies.

The second year consists of 1,144 hours of which 574 are devoted to lecture and 581 are devoted to laboratory exercises.

The subjects of the second year are:

Microbiology	196 hours	Pharmacology	154 hours
Pathology	299 hours	Neuropsychiatry	44 hours
Physiology	132 hours	Intro. to Obst.	11 hours
Orientation to Clinical Medicine (Physical Diagnosis)	66 hours	Public Health (Statistics)	44 hours
Laboratory Medicine	99 hours	Public Health (Preventive Medicine)	66 hours
Surgery	33 hours		

During the meeting of the general faculty on November 13, 1958, Dean Howard announced a careful review of the Medical School curriculum, and he invited comments and suggestions of faculty members. Early in December 1958, the heads of the various teaching departments assembled at Lowell Inn in Stillwater and devoted two days to a consideration of curricular matters. At this meeting, it was felt that careful scrutiny of the curriculum was most desirable, and that the senior year of the Medical School curriculum was most in need of revision. The project was considered of such importance that a staff member was assigned to devote at least half of his time to it.

Financial support for the project was sought and granted by the Hill

Family Foundation of St. Paul. Dr. James B. Carey, Jr., then assistant professor of medicine, was appointed curriculum coordinator to begin work on January 15, 1959. The heads of the Medical School teaching departments were constituted formally as the Curriculum Committee and a consultant subcommittee of four members was appointed to provide a readily available source of advice and counsel for the coordinator.

The Curriculum Committee met at Lowell Inn early in June 1959, when Dr. Carey presented the first results of the study. On November 11, 1959, recommendations were adopted for a revised Medical School curriculum.

In December 1959, Dean Howard described the plan in more detail and summarized the newly recommended Comprehensive Clinic Program, to include the following features:

1. Assignment of students to new patients in Pediatrics, Medicine in North Clinic.

2. Students to be responsible for their patients throughout the duration of their out-patient care.

3. Wherever practicable, students to have continuing responsibility for such patients who may be admitted to the hospital.

4. As each student finishes his clerkship, his patients are to be transferred to another entering student.

5. During periods when they are not involved in these exercises with their own patients, assignment of students to ward rounds (e.g., Dermatology, Ophthalmology, Otolaryngology); special diagnostic procedures (e.g. Cystoscopy); various conferences (e.g., Radiologic conferences in the various areas of interest); seminars; and all similar educational exercises.

The Comprehensive Clinic program was installed June 20, 1960, and the first segment of students completed the new course of study on December 30, 1960. Dr. Magraw[25] then made a report on these first 47 students who had completed the program and who had taken care of approximately 2,700 patients at the University Hospital Outpatient Clinic. He stated that, "During the program each student assumed the role of a physician in the Outpatient Department. He was generally referred to as 'Dr. ————————,' or as a 'student doctor' instead of a 'medical clerk.' Each patient is assigned a staff physician as well as a student doctor, the two doctors then work as copilot and pilot respec-

tively in directing the patients care. In assuming significant medical responsibility for the diagnosis and treatment of 55 or more patients each student has an increased clinical exposure." Dr. Magraw has continued to direct the Comprehensive Clinic admirably.

The students report their pleasure at being treated more like doctors than lowly apprentices as they were earlier as general ward clerks. Most of them have left the impression that the experience in the Comprehensive Clinic is very helpful to them in restoring motivation to the study of medicine, which had been known to lag notoriously in the latter phases of the senior medical year.

The elective quarter is a required period of study for which the students must register and pay full tuition if in attendance at the University of Minnesota. The students may choose an elective out of a lengthy list of experiences made available to them, either at the University of Minnesota Medical Center, one of the Medical School's major affiliated teaching hospitals, or another medical school elsewhere in the United States or abroad.

Required Paper in Public Health for Seniors. In addition to the clinical experiences described above, the senior students assigned to the Comprehensive Clinic Program are required to write a paper in the general field of public health. Students may select their own topics, but a long list of suggested topics is available to each student for his selection if he chooses.

Increased Number of Medical Students Proposed. On September 19, 1963, Dean Howard announced a need for increase of the entering class to 200 freshman medical students within the next few years. He said that, "The faculty of the University of Minnesota Medical School is mindful of the nation's serious need for an increasing number of physicians and of the fact that Minnesota shares this need in a most tangible way. In an attempt to serve this need, we have, in the past five years, increased the size of our Medical School classes by 20%, and we have done so with no substantial addition to our physical facilities for teaching and with only very modest additional appropriated funds for staffing. We believe that an entering class size of 150 students represents the maximum that can be effectively taught in present facilities and by a faculty limited to its current size.

On March 12, 1964, Dr. Cavert presented data showing the increase

in student applicants for entering classes from year to year beginning with 252 in 1958 to 319 (1959), 337 (1960), 392 (1961), 504 (1962), 612 (1963), 689 (1964), 798 (1965), and 639 (1966).

Financial Assistance for Students. Prizes, awards and special honors along with students' loans and scholarships had been available to medical students for many years.[26] In 1964, there were eight prizes, awards, and special honors for students in the Medical School. The University of Minnesota Student Loans have long been available to medical students. In 1964, nine other individuals and organizations made available loan funds for students of medicine, notably the Minnesota Medical Foundation, which now provides the major share of all private resources for scholarships and loans.

Dr. Donald Cowling played such a dominant role in scholarship assistance that in 1964 Dean Howard[27] expressed his appreciation and evaluation of him: "To Dr. Donald Cowling the University of Minnesota and its Medical School owe a debt of gratitude that cannot be measured, or even described, with any real accuracy. We can, of course, point to those units that have come into being because of his willingness to devote his remarkable energy and talents to their realization: the Mayo Memorial, the Masonic Hospital, the Diehl Hall Laboratories, the addition to the Library, and the forthcoming hospital reverence room—but no mere compilation of his tangible accomplishments on our behalf can reflect accurately the impact that he has had on the development of our school. Even more important has been the basic philosophy that has made him such an effective advocate. His unswerving dedication to selfless service has been an inspiration to all who have worked with him. Such devotion as his can only have strengthened our own purposes by its noble example.

"I count as one of the real privileges and compensations of my post the opportunity I have had to become closely associated with Dr. Cowling. His friendship has come to mean much to me and my wife. This expression of gratitude and admiration, therefore, is both personal and official but above all, it is heartfelt." Dr. Cowling died on November 27, 1965, having lived, worked, and contributed to justify the designation of one of America's great citizens of all time.

In the spring of 1958, the first *Alumni Luncheon for the Senior Class* was held in the Coffman Memorial Union. On this occasion, graduat-

ing senior medical students are sponsored as guests of the Minnesota Medical Alumni Association. This has become an outstanding annual event during the month of May.

Informational Programs for Outstanding Students Begins. In 1958, a Health Careers Committee was appointed and on September 24, 1959, this committee recommended arrangements be made for University approval to proceed with preparation of a series of brochures aimed at attracting to the Health Science fields, students of quality and capability. On February 16, 1961, the committee recommended and urged the appointment of a Health Careers coordinator as soon as possible. To increase the quality and number of applicants for the College of Medical Sciences, he would visit colleges and high schools throughout the state, work with alumni groups, etc. Health Careers Days for interested high school seniors became regular events at the Medical School.

Examination Requirements Established. In 1927, the Minnesota Legislature enacted a law which required that every person who intended to practice medicine (or the healing arts) in Minnesota must pass an examination in basic medical sciences before taking the examination for license to practice in the state. The law provided for a State Board of Examiners in the Basic Sciences. On this Board, the presidents and secretary-treasurers have been prominent members of the School of Medicine faculty as follows:

Presidents—Richard E. Scammon—June 13, 1927 to October, 1930.
Clarence M. Jackson—October 1930 to April 1943.
J. S. McCartney—April 19, 1943 to August 30, 1959.
John A. Johnson—January 12, 1959 to present.

Secretary-Treasurers—E. T. Bell—June 13, 1927 to April 1931.
J. C. McKinley—April 1, 1931 to December 31, 1945.
Raymond N. Bieter—January 1, 1946 to present.

University of Minnesota medical students usually take the Basic Science Examination in the spring of the sophomore year when they have completed most of these subjects. A certificate of having passed this examination by the Board of Examiners in the Basic Sciences is required by the State Board of Medical Examiners.

When the National Board of Medical Examiners was established and a law was enacted by the Minnesota Legislature whereby the Minnesota Board of Examiners recognized the National Board, a few Minnesota medical students took the National examination in lieu of that of the State Board of Medical Examiners.

On February 11, 1960, the following proposals were unanimously approved by the Administrative Committee of the Medical School: (1) Examination period for lecture in junior-senior biennium will be limited to regular examination period in June. (2) Fourth year students will take National Board Examinations, Part II (clinical subjects), in April and a passing grade will be required for graduation. (3) Departments may excuse fourth year students from examinations in June depending upon their performance in the National Board Examination. (4) Examinations for clerkships be held, at, or near the end of the clerkship period, the exact time to be at the discretion of the departments.

Health of Medical Students Carefully Supervised. The *health* of students in the College of Medical Sciences and personnel continued to receive careful consideration. The School's basic policy is:

1. An examination, recorded on the Health Service form, is required of all new University of Minnesota medical students.
   a. For those transferring from other schools to our Medical School, this entrance examination is to be performed by an outside physician.
   b. For those enrolled at the University of Minnesota for their pre-medical work, the entrance examination may be obtained at the Health Service.
2. Following the required entrance examinations, an annual, complete examination at the Health Service is offered and recommended, but not required.
3. An annual Mantoux test and/or chest x-ray is required. These are to be done, read, and recorded at the Health Service.
4. Smallpox vaccination, diphtheria-tetanus immunization, and poliomyelitis immunization are required as before.
5. Typhoid-paratyphoid immunization is strongly recommended.

On May 16, 1963, the Administrative Committee strongly recommended rabies immunization for all personnel dealing with large laboratory animals.

CELEBRATION OF SEVENTY-FIFTH ANNIVERSARY OF MEDICAL SCHOOL

The 75th Anniversary of the Medical School was celebrated in 1965 via several related activities as follows:

Masonic Memorial Hospital. During the afternoon of March 17, a "roof-raising" ceremony was held preparatory to construction of two additional floors of the Masonic Memorial Hospital. The ceremony was held by Masonic and University officials to symbolize the start of construction of two additional floors. Later, more than 650 Masons from most of the State's 288 lodges toured the Hospital and attended a reception in the Campus Club and a dinner in the Union Main Ballroom. Mr. Laurence R. Lunden, vice president of Business Administration and secretary of the University Board of Regents was master of ceremonies. Speakers included Mr. Paul M. Olstad, past grand master of the Masons in Minnesota and Dr. B. J. Kennedy, associate professor of medicine and chairman of the Masonic Memorial Hospital Committee who narrated a film taken in the Hospital. Dr. Kennedy emphasized the importance of continuous research to determine causes of cancer and methods of treatment now in vogue. He said since the Masonic Hospital was opened and the first patients were admitted on October 15, 1958; 6,100 patients had received care at the Hospital (Chapter XXVII)

The Claude Bernard Memorial Symposium. This notable symposium was arranged by Dr. Maurice Visscher, Distinguished Service Professor and head of the Department of Physiology, with a grant from the Hill Family Foundation. The program was presented on April 15, 16, and 17, 1965. On April 15, President O. Meredith Wilson extended the welcome and Dr. F. Grande introduced the symposium.

Dedication of Rare Books and History of Medicine Unit. On May 24, 1965, this unit was dedicated by President O. Meredith Wilson in a ceremony attended by University officials, friends and many of the donors who had contributed funds for the construction and furnishing of the facility. Dr. O. H. Wangensteen and Dr. Donald Cowling played an important role in acquiring this unit. The collection is housed on one floor of Diehl Hall with a classroom and offices for a professor of medical history and a curator, display area, conference rooms, book stack area and a staff work room with a vault for the rarer books. An extremely valuable part of the collection consists of books printed before

the 16th Century along with early handwritten manuscripts. Dating back to 1483 and 1555, works of Ambroise Parè, the father of surgery, and Andreas Visalius, the father of anatomy, respectively, are included in the collection. An exhibition of books illustrating the history of surgery from Imhotep to John Hunter is currently on display. There are other exceedingly valuable collections, including that of Edward P. Burch which is considered one of the finest in the world in ophthalmology.

The formal *Symposium of the Diamond Anniversary* was presented November 4, 5, and 6, 1965 at the Mayo Memorial Auditorium. The program entitled "Demands on Medicine in the Modern World" began with a foreword by Dr. Robert B. Howard, Dean of the College of Medical Sciences on the evening of November 4. This was followed by an address entitled "Medicine in the United States: The Road from Yesterday to Today" by Dr. William S. Middleton, Emeritus Dean and Professor of Medicine, University of Wisconsin Medical School.

In his foreword to the symposium, Dean Howard said: "We must keep in mind, however, that the past and its traditions are still a very important vital link to the future. As we look ahead to anticipated innovations and the developments in medicine, we cannot close the door to the rich medical heritage of the past nor to the community which has enabled us to grow and develop to our present position. Yesterday's, today's, and tomorrow's prime obligation still depends upon the people who receive our services. Indeed, these very people, the public, have stimulated us to a continuing evaluation of our procedures, our methods, and our goals in order that we might best serve them. Our prime considerations are neither the magnitude, nor the cost, nor the type of medical treatment we can offer, but its quality and its solid scientific basis. We are confident that the people of this institution will continue their avid pursuit of these goals."

Meditation Chapel Fills a Personal Need.[28] (see Chapter XXVII)

New Constitution and By-Laws. In 1964, Dean Howard appointed a committee to review the constitution of the College of Medical Sciences. Thereafter, he appointed a subcommittee to prepare a draft constitution. Copies were sent to the members of the faculty. The constitution was adopted by the general faculty on December 3, 1965 and approved by the Board of Regents on March 11, 1966.

Throughout his deanship, Dr. Howard has stressed that the College

of Medical Sciences is not the same as the Medical School, but is in reality a much larger unit including vast programs in research, in service to sick patients, and in teaching students other than under graduate medical students. Accordingly, he has strengthened administrative functions of both the College as a whole, and of the Medical School and has detached the administration of many Medical School activities, especially related to students, under Dr. H. M. Cavert's direction. The administration of the College, on the other hand, has been strengthened by the presence of Associate Dean Dr. Gault and by the establishment of the position of administrative assistant to the Dean, a position most capably filled by Mr. Gerald H. Gillman, who supervises the business affairs of the College.

On July 27, 1966, President Wilson announced his resignation to become effective July 1, 1967 [29] (see Chapter VI).

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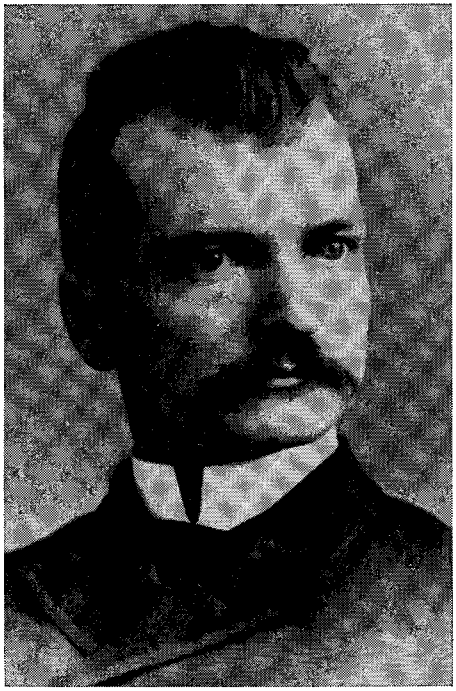
Chapter XIX

Department of Anatomy

THE EARLY PERIOD (1888-1912)

When the College of Medicine and Surgery opened in the fall of 1888, Dr. *Arthur F. Ritchie* served as professor of anatomy. Dr. *George A. Hendricks* was professor of anatomy at Minnesota for 11 years (1888-1899) having previously served (1882-1888) as instructor in anatomy at Michigan. In addition to being an expert operator and a skillful surgical diagnostician, Dr. Hendricks was a born teacher and

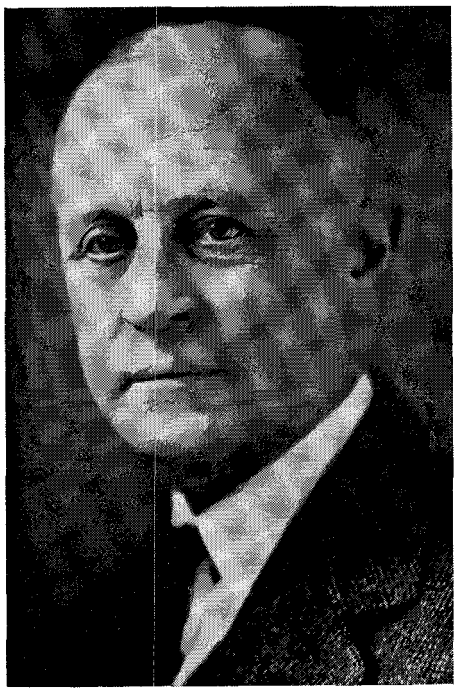


George A. Hendricks

was universally beloved by his students. He died at the age of 49 in September, 1899.

During the first few years of the College, Dr. E. C. Spencer served as professor of surgical anatomy, Burnside Foster as demonstrator, and J. Clark Stewart as professor of three subjects—histology, bacteriology and pathology. Dr. Charles L. Green was professor of surgical and applied anatomy (1891-1894) and Dr. Frank Burton was demonstrator.

Thomas G. Lee was appointed in 1891 as professor of histology, embryology, bacteriology and clinical microscopy, and he remained on the faculty for 38 years. He was born in Jacksonville, New York, November 27, 1860. He received the doctor of medicine degree (1886) from the University of Pennsylvania. He served as lecturer in histology-embryology (1888-1891) at Yale, and at Minnesota he was instructor (1891-1892) and professor of anatomy (1892-1913). When the Medical School was departmentalized in 1909, Dr. Lee became the first head of anatomy. When the School of Medicine was reorganized in

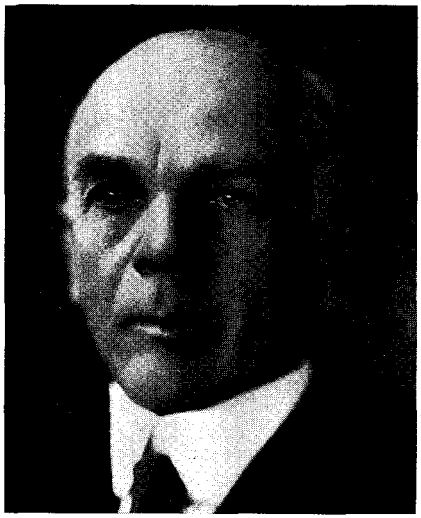


Thomas G. Lee

1913, Dr. Lee became professor of comparative anatomy (1913-1929). He established a research laboratory in histology and embryology, and was responsible for developing the plans for the new Anatomy Building, south of Washington Avenue, which was completed in 1912. He also served as secretary of the medical faculty and as faculty librarian, devoting much time to establishing and developing the medical library. Dr. Lee was a member of many scientific organizations in both biology and medicine. He was a most active research contributor, publishing a series of papers on the early development, implantation and placentation in rodents. He retired in 1929 and died September 1, 1932, following an automobile accident.

Charles A. Erdmann served on the faculty from 1893 to 1936. He received the doctor of medicine degree (1893) from the University of Minnesota. He served as demonstrator (1893-1898), assistant professor (1898-1900) and professor of gross anatomy (1900-1913) and later as associate professor of applied anatomy (1913-1936). Dr. Erdmann devoted most of his professional efforts to teaching, and he was exceedingly popular with the students. Dr. Erdmann retired after forty-three years of service. He died in February, 1941 at the age of 74.

John B. Johnston was a member of the anatomy staff between 1907 and 1922. He was born October 3, 1868, in Belle Center, Ohio. He received his doctor of philosophy (1899) degree from the University



Charles A. Erdmann

of Michigan. He served as assistant and instructor in anatomy at Michigan (1893-1899), and as professor of zoology at the University of West Virginia (1899-1906). He studied at Naples Zoological Station and at Freiberg during the year 1904-1905. At Minnesota, he served as assistant professor of anatomy (1907-1908), and professor of comparative neurology (1909-1922). He became dean of the College of Science, Literature and the Arts in 1914, retaining his professorship in comparative neurology and continuing research in this field until 1922. He retired in 1937 and died in 1939 at the age of 71.

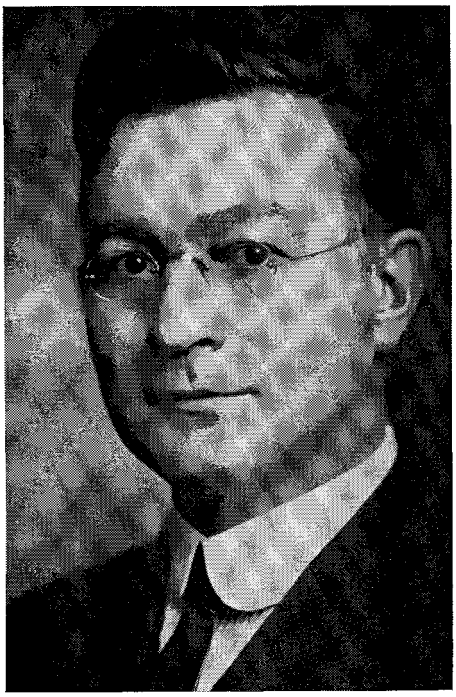
E. T. Bell served as assistant professor of anatomy (1910-1911) prior to the time he transferred to pathology where he became professor and head of that department in 1920. He had previously served as instructor (1903-1907) and assistant professor (1907-1910) of anatomy at Missouri (see Chapter XXIII).

THE JACKSON PERIOD (1912-1941)

Clarence M. Jackson. When President George Vincent reorganized the School of Medicine in 1912 (see Chapter X), he invited Dr. Jackson to become head of the Department of Anatomy. Dr. Jackson was born in What Cheer, Iowa, April 12, 1875. He received the bachelor of science (1898), master of science and doctor of medicine (1899) (1900) degrees from the University of Missouri. Immediately following graduation from the Medical School, he became instructor in anatomy at Missouri, and in 1902, he was appointed professor and head of that department. He served as dean of the Medical School (1909-1912) at Missouri.

Dr. Jackson developed a strong graduate training program in anatomy, and in his capacity as chairman of the Medical Graduate Committee (1915-1941) he fostered the development of strong graduate programs throughout the Medical School. During periods when Guy Stanton Ford, Dean of the Graduate School, was on leave in 1917-1918 and in 1925, Dr. Jackson served as acting dean of the Graduate School (Chapter XII).

He was an active participant at the annual meetings of the American Association of Anatomists, and served as its president (1922-1924). He attended the International Medical Congress in Madrid (1903) and the International Congress of Anatomy which met in Amsterdam (1930) and Milan (1936). He was a member of the Advisory Board of the



Clarence M. Jackson.

Wistar Institute of Anatomy, chairman of the American Committee on Anatomical Nomenclature and the American member of the International Commission. He was a long-term associate editor of the *American Journal of Anatomy.* In 1933, the Phi Beta Pi medical fraternity, of which he was a member, established an annual Clarence Martin Jackson lectureship.

Dr. Jackson published numerous scientific articles on the effect of inanition and refeeding on the growth and development of the various organ systems. He edited Morris' *Human Anatomy* from the fifth through the ninth editions, prepared a monograph, *Effects of Inanition Upon Growth and Structure* and contributed numerous book chapters. The research contribution of the Department of Anatomy during the Jackson period is represented by sixteen biennial volumes which appeared under the title, *Contributions from the Department of Anatomy, University of Minnesota.*

In 1941, Dr. Jackson was totally incapacitated with Parkinson's disease, and although he was unable to continue regular work, he main-

tained great interest in the Department of Anatomy until he died January 17, 1947 at the age of 72. His contributions to the University were so many, regard for him so high, and his memory so cherished that, in 1954, on recommendation of the faculty, the Board of Regents changed the name of the Institute of Anatomy to Jackson Hall.

Richard E. Scammon served as professor of anatomy during the periods 1914-1930 and 1935-1947. He was born in Kansas City, Missouri, on July 9, 1883. He received the bachelor of arts (1904) and master of arts (1906) degrees from the University of Kansas and the doctor of science degree (1909) from the newly established Division of Medical Sciences at Harvard, being the first person to receive a doctorate degree in medical sciences in this country. He served as instructor (1909-1910) and as assistant professor (1911-1912) at Harvard, and associate professor (1912-1913) of anatomy at the University of Kansas, and as professor of anatomy (1913-1930) at Minnesota. On retirement in 1949, he moved to Branson, Missouri, where he died September 12, 1952.

Dr. Scammon was a most outstanding teacher; his superb drawing ability, utilizing both hands simultaneously, made his lectures a unique experience. He had extremely broad interests which included anatomy, embryology, the history of science, logic, mathematics, the population of the world, history, philosophy and his particular love, the growth of man. (See Chapters XI and XV).

Hal Downey was born in State College, Pennsylvania, October 4, 1877, and as a boy he spent six years in Hanover, Germany. He received the bachelor of science (1903) master of science (1904) and doctor of philosophy (1909) degrees in zoology from the University of Minnesota. From 1903 through 1929, he was a staff member of the Department of Zoology, serving as assistant professor (1903-1913), associate professor (1913-1917) and professor (1917-1929). In 1929, he transferred to the Department of Anatomy where he served as professor of anatomy (1929-1946) until the time of his retirement.

Dr. Downey was a patient, diligent scholar who always sought the truth and gave generously of his time and skills to graduate students and physicians alike who sought his counsel. He received the outstanding achievement award of the University of Minnesota (1951) and the Sigma Xi Distinguished Service Award (1957). From 1913 to 1959 (except for the war years), he served as the American editor of *Folia*

Haematologica. When the four-volume *Handbook of Haematology,* which he edited, was published in 1939, it was the first volume of its kind in hematology.

Of his many research contributions to hematology, Dr. Downey is best known for his pioneer studies on infectious mononucleosis, carried out in collaboration with Dr. C. A. McKinlay. Dr. Downey's color plates illustrating the various cell types in mononucleosis provide the finer hematologic features which characterize this disease, and these have become the criteria for the clinical diagnosis of infectious mononucleosis. Following his retirement in 1946, Dr. Downey lectured at the Mayo Clinic during the subsequent two-year period, after which time he returned to his laboratory at the University. He continued working here until shortly before his death on January 9, 1959, at the age of 82.

Dr. *R. Dorothy Sundberg,* who worked closely with Dr. Downey for many years, portrayed another side of Downey, the man. She writes: "The world will correctly say that he was a scholar, but it is doubtful that the world can ever find in Dr. Downey's publications the essence of the man. Perhaps that essence was gentleness, personal humility, intellectuality, humor, and a certain horror of poor histologic technic—'histologic garbage' and slipshod scientific contributions of any type."

Andrew T. Rasmussen was a member of the Department between 1915 and 1952. He was born in Spring City, Utah, August 10, 1883. He received the bachelor of science degree from Brigham Young University (1909) and served as head of the Biology Department there for two years (1911-1913). He was awarded the doctor of philosophy degree in anatomy and physiology by Cornell University (1916). At Minnesota, he served as instructor (1916-1918), assistant professor (1918-1919), associate professor (1919-1925), and professor (1925-1952) of anatomy.

Dr. Rasmussen's collection of neuroanatomical demonstrations and associated case histories was the most comprehensive ever assembled. His *Laboratory Directions in Neuroanatomy, Outlines of Neuroanatomy* and *Principal Nervous Pathways* were originally prepared for his own classes, but these texts were widely used in many medical schools. After his retirement in 1957, he served as visiting professor at the University of Southern California (1954) and the Montreal Neurological Institute, McGill University (1955).

Dr. Rasmussen was also one of the most popular members of the Graduate School faculty. He continued to work with uninterrupted enthusiasm and vigor until the time of his death on October 15, 1955 at the age of 72.

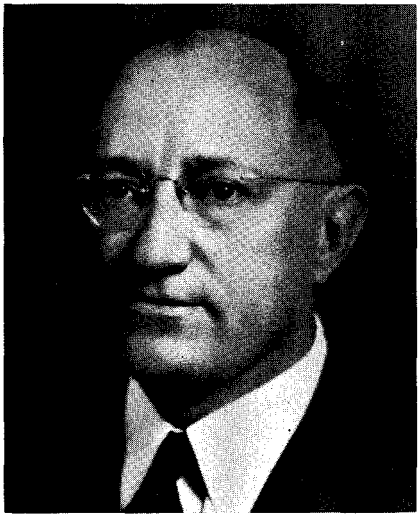
Shirley Miller was a member of the Department from 1924 to 1946. He was born in Rockwell, Iowa, June 17, 1878. He received the bachelor of science degree (1903) from South Dakota State College, the master of science degree in zoology, bacteriology and pathology (1904) from the University of Minnesota. He received the degree of doctor of philosophy in anatomy from the University of Minnesota in 1922. He served as instructor (1922-1927) and assistant professor (1927-1946) of anatomy at Minnesota. In the five-year period following retirement from the University in 1946, he taught general biology and zoology at Augsburg, Macalester and Hamline. He served as abstracter for *Medica Acta,* as secretary of the Minnesota Academy of Sciences (1947-1950) and on the Council of the American Association for the Advancement of Science (1947-1950).

Raymond F. Blount was a member of the Anatomy staff between 1931 and 1942. He was born in La Grange, Illinois, October 24, 1900. He received the bachelor of science degree (1924) and master of science degree (1926) from the University of Arizona and the degree of doctor of philosophy (1931) from Yale. At Minneapolis, he served as instructor (1931-1936) and assistant professor of anatomy (1936-1942). He left Minnesota for the University of Texas where he served as assistant professor (1942-1943) and associate professor (1943-) of anatomy.

Edith Boyd was a member of the department between 1934 and 1941. She was born in Edgerton, Kansas, November 5, 1895 and received her doctor of medicine degree (1921) from Johns Hopkins University. She served as fellow at the Mayo Clinic (1924) instructor in pediatrics (1925-1926) and instructor at the Institute of Child Welfare, (1927-1934), and at Minnesota as associate professor of anatomy (1934-1941). She worked closely with Dr. Scammon and together they assembled all available studies on growth and development and projected the series of volumes on *The Major Patterns of Human Growth and Development.* Since Dr. Scammon's death, Dr. Boyd has served as assistant professor (1946-1948), associate professor (1948-1952), professor (1952-1959) and professor emeritus (1959-) at the University of Colorado School of Medicine.

THE BOYDEN PERIOD (1941-1954)

When Dr. Jackson retired in 1941, the administrative responsibility of the department was placed in the hands of a committee of professors with Dr. Boyden serving as chairman. Dr. Boyden was appointed head of the department in 1949. Born in Bridgewater, Massachusetts, March 20, 1886, he received the bachelor of science (1908) and master of science (1911) degrees from Harvard, and after spending a year at the Institute of Anatomy in Freiberg, Germany, he returned to Harvard and received the doctor of philosophy degree (1916). He served as instructor (1916-1919) and assistant professor (1919-1926) of anatomy at Harvard and as professor of anatomy at the University of Illinois (1926-1929) and Alabama (1929-1931). Dr. Boyden came to Minnesota in 1931 as professor of anatomy where he stayed until retirement in 1954. Since his "so-called" retirement, Dr. Boyden has served as



E. Allen Boyden

visiting professor of anatomy at the University of Washington in Seattle for more than a dozen years where he continued his academic pursuits with the vigor of a young man embarking upon his first academic appointment. This is documented by the fact that more than 25 of his 130 published papers were written since his retirement.

He served as managing editor of the *Anatomical Record* (1928-1948) supervising the preparation of 62 volumes, and as the American editor

of *Acta Anatomica.* He was honored by a special series of issues of the *Anatomical Record,* designated the Boyden Birthday Volume published in 1954. The article entitled "In Honor of Edward Allen Boyden" contains a full account of his life and work.

His research investigations have found important application to medical practice. His work, begun in 1920, on the bile ducts and bile sphincters (one of which bears his name) is important to our understanding of the function of the liver. His studies on the emptying of the gall bladder are the basis of an everyday radiologic diagnostic procedure.

Dr. Boyden's work on bronchopulmonary segments began in 1945. These studies provided a better anatomical basis for pulmonary surgery, indicating that diseased lung segments could be removed without sacrificing a lobe or an entire lung. His monograph on the *Segmental Anatomy of the Lungs, A Study on the Patterns of the Segmental Bronchi and Related Pulmonary Vessels,* published in 1955, was the first book to appear on this subject. Since his retirement, Dr. Boyden has studied the postnatal growth of the lung.

While at Harvard, Dr. Boyden examined over 10,000 mammalian livers at the Boston abattoirs, and in conversations with the "kosher cutters" from a local synagogue he discovered that many anomalies had been described in the Babylonian Talmud and its codifications. After coming to Minnesota, he translated—with the cooperation of Rabbi S. I. Levine—the anatomical portions of the sixteenth century codification, the *Shulchran 'Aruch* and this work was published by the University of Minnesota Press in 1940.

Dr. Boyden continues to work actively at the University of Washington and though he is over 80, he demonstrates the energy and vitality of a young man.

Arthur Kirschbaum was born in New York in 1910. He was a member of the department between 1936 and 1951. He received the bachelor of science degree (1931) from New York University and all of his subsequent degrees, master of science in zoology (1933), doctor of philosophy (1936) and doctor of medicine (1943) from the University of Minnesota. He served as instructor of anatomy (1937-1941) at Yale, and at Minnesota as assistant professor (1942-1945) and associate professor (1946-1951) of anatomy. He became professor and chairman of anatomy at the University of Illinois (1951-1954) and served in a

similar capacity at Baylor University (1954-1958). He was a consultant to the National Institutes of Health, and the American Cancer Society, and a member of the President's National Health Advisory Council. Dr. Kirschbaum's major research investigations were concerned with the factors (genetic, environmental and chemical) that influence the experimental production of leukemia in mice. He also studied the experimental induction of cancer, with particular reference to carcinogens and the "Bittner Milk Factor." Dr. Kirschbaum's premature death at the age of 48 (1959) was a great loss to the basic medical sciences.

Barry Campbell was born March 21, 1912, in St. Paul, Minnesota. He was a member of the Department of Anatomy between 1943 and 1958. He received the bachelor of science degree from the University of California (1933) and the doctor of philosophy degree from Johns Hopkins University in 1935. He served as National Research Council fellow at Western Reserve (1935-1937) and as assistant professor of anatomy at the University of Oklahoma (1937-1942). At Minnesota, he was an assistant professor (1943-1945), associate professor (1945-1958) and professor of anatomy (1958). He left Minnesota in 1958 to become professor of neurology at Loma Linda University, Los Angeles, California. His early work, carried out jointly with Robert A. Good while the latter was a doctor of philosophy candidate, demonstrated for the first time the interrelationship between lymphocytes and plasma cells and their role in antibody production.

J. Francis Hartmann was born October 4, 1910, in Rochester, New York. He was a member of the Department of Anatomy from 1945 to 1964. He received the bachelor of science degree from Holy Cross College (1932) and the doctor of philosophy degree from Cornell (1943). He was instructor in anatomy at Albany Medical College (1943-1945) and came to Minnesota in 1945, serving as assistant professor (1945-1951), associate professor (1951-1957) and professor of anatomy (1957-1964). In 1964, Dr. Hartmann was appointed research professor in the Department of Neurology at the University of Illinois.

Dr. Hartmann worked in electron microscopy almost from the time the electron microscope became commercially available. While serving as visiting scientist at the Massachusetts Institute of Technology (1950), Dr. Hartmann, in collaboration with Dr. Harrison Latta, developed a method of preparing glass knives and using them for cutting ultra-thin tissue sections. Since the penetrating power of the electron beam is

limited by the tissue thickness, the optimal section thickness for electron microscopy is approximately 200 angstrom units (less than a millionth of an inch). By providing a routine method of cutting sections, these investigators were largely responsible for extending the use of the electron microscope to biology.

Dr. Hartmann made a major contribution to our knowledge of the morphology and the glial components of the nervous tissue. Dr. Hartmann was responsible for training many clinical investigators in the use of the electron microscope, and the present ultrastructural research programs at Minnesota in Neurology, Dermatology and Laboratory Medicine had their origins in Anatomy.

W. Lane Williams was a member of the department from 1945 to 1958. He was born December 23, 1914, in Rock Hill, South Carolina. After receiving the bachelor of science degree from Wofford College (1935) and the doctor of philosophy degree from Yale (1941), he served as assistant professor of anatomy at Louisiana State University (1943-1945). At Minnesota, he was assistant professor (1948-1949) and associate professor of anatomy (1949-1958). He left Minnesota in 1958 to become professor and chairman of anatomy at the University of Mississippi. Dr. Williams' many research contributions relate to the use of vital and *in vitro* staining methods for the liver, connective tissue and blood vessels, and to the role of nutritional and hormonal factors in the experimental production of hepatic and cardiac lesions.

Dr. *Olaf Larsell* was appointed for a two-year period in 1952 immediately following Dr. Rasmussen's retirement. He was born in Sweden, March 13, 1886, and he received the doctor of philosophy degree from Northwestern University (1918). He served as instructor in zoology at Northwestern (1915-1918), assistant professor of anatomy at Wisconsin (1918-1920), associate professor of zoology at Northwestern (1920-1921) and as professor and head of the Anatomy Department at the University of Oregon (1921-1952). Dr. Larsell was the author of the text book, *Anatomy of the Nervous System,* the chapter on the nervous system in Morris' *Anatomy* and a monograph on medical history, *The Doctor in Oregon.* While at Minnesota, he brought together all his research investigations on the *Anatomy of the Cerebellum* and this was published in monograph form by the University of Minnesota Press. His contributions on the cerebellum brought him international acclaim. Dr. Larsell died April 8, 1964, at the age of 78.

THE LAZAROW PERIOD (1954 -)

Arnold Lazarow was appointed professor and head of the Department of Anatomy in 1954 when Dr. Boyden retired. (See page (236) for an account of his contributions to the department.)

Lemen J. Wells has been in the department since 1940. He was born in Mt. Vernon, Illinois, December 6, 1907. He received the bachelor of education degree from Southern Illinois State Teachers College (1927), the master of science degree from Northwestern (1928) and the doctor of philosophy in zoology degree from the University of Chicago (1934). At the University of Missouri, he served as instructor (1935-1937) and as assistant professor of anatomy (1937-1940). At Minnesota, he has served as associate professor (1940-1949) and professor of anatomy (1949-).

Dr. Wells was responsible for the medical embryology course for many years, and recently he developed an excellent series of prosection demonstrations for gross anatomy; these are recorded on video tape and televised over the departmental CCTV.

Dr. Wells is widely recognized for his research contributions to embryology and fetal endocrinology. His investigations in embryology relate to a study of the development of the diaphragm and the mechanism of the descent of the testes. Many of his contributions to fetal endocrinology stem from his development of a method for transposing developing embryos (with their placental connections intact) from the uterus to the maternal body cavity. This made the embryos more accessable to experimental manipulation, permitting the removal of fetal endocrine glands as well as the administration of exogenous hormones directly to the fetus. Dr. Wells demonstrated that the thyroid, adrenal and pituitary glands begin to function during embryonic life. His studies on the effect of maternal diabetes demonstrated that the experimental production of diabetes in the rat prolonged the length of gestation and retarded fetal development. Thus, the fetal birth weight might be increased or decreased, depending upon the time of delivery. Maternal diabetes likewise affects the fetal islets, producing hypertrophy and degranulation of the beta cells. Currently, Dr. Wells is following the growth and differentiation of the fetal islet tissue in organ culture. He has shown that the beta cells degranulate in response to increased glucose levels in the medium and that fetal transplants from diabetic mothers become

regranulated (synthesize insulin) when they are grown in media containing normal glucose levels.

R. Dorothy Sundberg was born July 29, 1915, in Austin, Illinois. She has been on the staff of the department since 1937, when she began working as a technician for Dr. Hal Downey. She received all her degrees from the University of Minnesota, including a bachelor of science (1937), master of arts (1939), doctor of philosophy (1943), and doctor of medicine (1953). Dr. Sundberg was appointed instructor at Minnesota in 1943 and served as assistant professor (1946-1953), associate professor (1953-1960), and professor of anatomy (1960-). She also serves as hematologist at University Hospital (since 1945) and was certified by the American Board of Pathology (Hematology) in 1960. She currently holds a joint appointment in Anatomy and Laboratory Medicine, and is director of the Hematology Laboratories. She gives lectures on blood and bone marrow to the freshmen medical students and follows this with the clinical hematology lectures given in subsequent years. She also gives special courses in hematology attended primarily by students in Medical Technology, graduate students and resident physicians.

Her research investigations relate to cytological changes in the blood and bone marrow associated with abnormal iron metabolism and with the development of the granulomatous lesions of the lymphoid-reticuloemdothelio system. Recently, she has studied the relationship between fatty acid deficiency and abnormal hematopoiesis.

Anna-Mary Carpenter, born January 14, 1916, in Ambridge, Pennsylvania, has been a member of the department since 1954. Dr. Carpenter received the bachelor of arts degree (1936) from Geneva College, master of science degree (1937) and doctor of philosophy degree from the University of Pittsburgh (1940) and doctor of medicine (1958) from Minnesota. She served as instructor (1954-1957), assistant professor (1957-1959), associate professor (1959-1965) and professor (1965-) of anatomy at Minnesota.

Having major responsibility for teaching the medical histology course, and as a consequence of her interest in photomicrography, she prepared over 2,000 colored photomicrographs to supplement the laboratory instruction. Some of these were assembled and published as *A Color Atlas of Histology.* Her research investigations relate to the development of

quantitative scanning methods in histochemistry and to their use in biomedical research. Dr. Carpenter pioneered the use of these methods in her studies on the changes in the Islets of Langerhans in experimental and human diabetes. She demonstrated that juvenile-onset (human) diabetes is associated with a marked reduction in beta cell mass and that beta cell alterations can be detected in non-diabetic siblings of the spontaneously diabetic Chinese hamsters. Her quantitative studies on the glomerular basement membrane alterations in the kidney and the number of vessels (and mural cells) in the retina are providing basic information which will lead to a better understanding of the complications of diabetes and the factors which influence their development.

William J. L. Felts has been a member of the department since 1955. He was born in Saginaw, Michigan, December 29, 1924, and received the bachelor of arts degree (1948), master of arts degree (1951) and doctor of philosophy degree (1952) from the University of Michigan. He served as instructor in anatomy at both Indiana (1951-1952) and Tulane (1952-1955). At Minnesota, he was an assistant professor (1955-1960), associate professor (1960-1966) and professor of anatomy (1966- —). Dr. Felts has major teaching responsibility for dental gross anatomy. He is co-editor of the *International Review of General and Experimental Embryology.* His research investigations relate to the broad aspects of bone biology with special emphasis on the aging of bone and the skeletal response of bone and dental tissues to changes in the physical environment. He has made important contributions to our knowledge of bio-mechanics of bone, and his studies on tooth transplantation have important implications for dentistry. His long-term studies on the effects of aging on the skeletal system will provide a frame of reference for evaluating many clinical problems that involve skeletal changes in man.

Charles F. Morgan was a member of the department from 1959 to 1964. He was born November 30, 1911, in Cherokee, Oklahoma. He received the bachelor of arts degree from the University of Wichita (1933) and the doctor of philosophy degree in zoology from the University of Chicago (1942). He served as instructor (1942-1943), assistant professor (1943-1946) and associate professor (1946-1947) of pharmacology at Georgetown University. He was professor and director of the Department of Physiology at Georgetown (1947-1958). He came to Minnesota in 1958 as professor of anatomy and coordinator of graduate studies. Dr. Morgan was an excellent teacher and a wonderful

friend; he developed close personal relationships with both graduate and medical students. He listened to their problems and helped them find solutions in ways that transcended the usual classroom relationship. While at Minnesota, he investigated the effects of estrogens and other steroid hormones on the mucopolysaccharide and collagen contents of the skin. He carried out a number of experimental studies which utilized autoradiography to follow the endocrine control of lactation and the development of the uterus and secondary reproductive structures. Dr. Morgan's sudden death March 10, 1964, at the age of 53 left a great void in the department.

Dr. *P. K. Dixit* was born August 7, 1921, in Calcutta, India. He has been a member of the Department of Anatomy since 1959. He received the bachelor of science degree from the Royal Institute of Science, Bombay (1942), the master of science degree (1946), and the doctor of philosophy degree in biochemistry (1948) from the Medical College of Bombay. Dr. Dixit served as assistant research officer in the Nutritional Research Laboratory, India (1949-1959). During the two-year period 1952-1954, he was a United States and Republic of India fellow at Western Reserve University in Cleveland. At Minnesota, he served as research fellow in anatomy (1959-1961), research associate (1961-1964), assistant professor (1964-1966) and associate professor (1966-). Dr. Dixit has major teaching responsibility in the medical and dental histology courses. Because of his primary research training in biochemistry, graduate students and departmental staff members alike have sought his counsel. He has made a major contribution to the chemical methodology of numerous papers published from the Department.

Dr. Dixit's research investigations are in the fields of cytochemistry, microchemistry, mineral metabolism and experimental diabetes. He has carried out exacting studies in which the insulin content and enzyme characteristics of individually microdissected rat islets were determined before and at various times after selective destruction of the beta cell by alloxan. These have provided supporting evidence for the theory that diabetogenic agents destroy the insulin producing cells by selectively altering the permeability of the beta cells. They have also provided a basis for distinguishing between the metabolic specialization of the alpha and beta cells. These studies have an important bearing on the etiology of human diabetes.

Carl B. Heggestad was born July 19, 1930, in Starbuck, Minnesota He has been a full-time member of the department since 1958. He received all his training at Minnesota, earning the bachelor of arts degree (1952), the doctor of medicine degree (1957), and the doctor of philosophy degree (1960). He served as intern in pediatrics at University Hospitals (1957-1958) and as instructor (1958-1960), assistant professor (1960-1964) and associate professor of anatomy (1964-). Dr. Heggestad has major teaching responsibility for the embryology course, and he coordinates the fall quarter of medical gross anatomy. In 1962, he received the first Distinguished Teaching Award which was given by the Minnesota Medical Foundation. His research contributions relate to fetal endocrinology and placental physiology. His earlier work dealt with the influence of growth hormone upon prenatal development in the rat. In later studies, he demonstrated that exposure of developing fetal rat islet tissue to hyperglycemia (produced by the induction of maternal diabetes during pregnancy) resulted in an alteration that can be detected in later life by the presence of an abnormal glucose tolerance. Although this abnormality in tolerance persists throughout the first year of post-natal life, none of the offspring of pregnant diabetic mothers developed manifest signs of diabetes.

In autoradiographic studies using tritium labeled thymidine, Dr. Heggestad demonstrated that fully differentiated beta cells (with a full complement of insulin-containing secretion granules) are capable of dividing. His turnover studies on the pancreatic beta cells in which he is simultaneously measuring the rate of new beta cell formation and the rate of beta cell replacement have important implications in the etiology of human diabetes.

Morris Smithberg was born August 28, 1924, in New York City, New York. He has been in the department since 1960. He received the bachelor of arts degree (biology) from Brooklyn College (1948) and the doctor of philosophy degree (zoology-embryology) from the University of Rochester (1953). He served as research fellow and staff member at the R. B. Jackson Memorial Laboratory (1952-1957) and as interim assistant professor of anatomy at the University of Florida (1957-1960). At Minnesota, he served as assistant professor (1960-1964) and associate professor of anatomy (1964-). Dr. Smithberg has major teaching responsibility for the medical neuroanatomy course

and for coordinating the second quarter of medical gross anatomy. He received the 1966 Distinguished Teaching Award of the Minnesota Medical Foundation. Dr. Smithberg's research interests are in the fields of teratology and embryology. He has been concerned with the interplay of both genetic and chemical agents on the development of congenital (skeletal) abnormalities in the mouse. His present studies on the biochemical and metabolic alterations in the embryo following exposure to teratogenic agents will provide a better understanding of factors which produce congenital anomalies.

Richard L. Wood was born January 2, 1929, in Allamore, Texas. He received the bachelor of arts degree from Linfield College (1950) and the doctor of philosophy degree from the University of Washington (1957). He served as instructor (1959-1961) and assistant professor (1961-1964) of anatomy at the University of Washington and was appointed associate professor of anatomy at Minnesota in 1964. Dr. Wood has major teaching responsibility for electron microscopy and histology. He supervises the four anatomy electron microscopes, and, with his pride in electron microscopy and his desire to share his technical ability, he is most generous in helping others. Dr. Wood takes personal interest in the quality of all electron micrographs emanating from the Department. His research investigations at Minnesota relate to the effects of experimental injury on the fine structure of the liver as induced by Ethionene and on the fine structure of differentiating cells and their products. In later studies, he is combining histochemical and autoradiographic technics with electron microscopy.

Dr. *Eric Bauer* was born January 26, 1935 in New York City, New York. He received the bachelor of science degree (chemistry) from Queens College, New York, (1957), the master of science degree (biology) from Western Reserve University (1959) the doctor of philosophy degree from Minnesota (1963). After graduation, he served as instructor (1963-1965) and assistant professor of anatomy (1965-) at Minnesota. During the year 1965-1966, he was a special United States Public Health Service fellow (biochemistry) at the Wenner-Gren Institute in Stockholm. Dr. Bauer has major teaching responsibility in dental histology. His research interests relate to the mechanism of insulin biosynthesis. Using the goosefish, with its anatomically segregated islet tissue, Dr. Bauer was one of the first to conclusively demonstrate

that insulin can be synthesized *in vitro.* He further was able to localize the subcellular sites involved in insulin synthesis and storage and to demonstrate the biosynthesis of insulin in cell-free systems.

David Kvistberg was born July 2, 1937, in Detroit, Michigan. He was trained at Minnesota, receiving the bachelor of science degree in chemistry (1959) and the doctor of philosophy degree in biochemistry (1964), although his thesis research was carried out in the Department of Anatomy. He served as post-doctoral trainee (1964-1967) supported by the United States Public Health Service and as assistant professor of anatomy (1967-). Dr. Kvistberg's research in histochemistry developed as an outgrowth of his strong undergraduate background in organic chemistry. He has applied infrared spectrophotometry, a method of the organic chemists, to the study of the aldehyde fuchsin staining reaction—a histochemical method used for the localization of insulin with in the beta cell. Using the infrared microscope, he is extending these studies to reactions within tissue sections, thus adding a new dimension to histochemistry.

Arnold W. Lindall was born July 11, 1934 in Duluth, Minnesota. He received all his professional training at the University of Minnesota, earning the bachelor of science degree (1956) the master of science and the doctor of philosophy degrees simultaneously in 1962. After graduation, he was appointed as special United States Public Health Service fellow (National Institute for Neurological Diseases and Blindness, 1962-1964), and he received two years of post-doctoral research training in anatomy at Minnesota. He interned at Mount Sinai Hospital in Minneapolis (1965) and served as assistant professor of anatomy (1965-). He was designated as a Markle scholar in 1965. Dr. Lindall has major teaching responsibility for neuroanatomy. His earlier research contributions relate to pyridine nucleotide chemistry and to the separation and characterization of the insulin-containing secretion granule; these latter studies, which he is continuing, are of great current interest because they relate to the mechanism of insulin storage and to the physical state of insulin in blood. He is also carrying out biochemical studies on preparations of nerve endings, (synaptosomes) separated by differential centrifugation technics. In addition to his neurochemistry studies, Dr. Lindall is also interested in biomathematics and biomedical instrumentation.

Leonard R. Murrell was born June 17, 1933, in Stamford Centre, Ontario. He received both the bachelor of science (1957) and master

of science (1958) degrees in biology from McMaster University and the doctor of philosophy degree from the University of Minnesota (1964). He was appointed a fellow of the American Diabetes Association (1964-1966), and during this period he also served as instructor (1964-1965) in anatomy at the University of Minnesota. He was promoted to assistant professor in 1966. Dr. Murrell has major teaching responsibility for the dental gross anatomy course. His research interest relates to the cultivation of pancreatic islets in organ culture; he has demonstrated that the addition of steroid hormone (cortisone) to the culture media facilitates selective differentiation of the pancreatic beta (insulin producing) cells.

Research Academic Staff. In addition to the regular academic teaching staff supported by the State Legislature, the Department of Anatomy has a number of research fellows and research associates who contribute immeasurably to both the graduate training and the various research programs of the department. All of these individuals are supported through various United States Public Health Service research and training grants.

Edna W. Speidel received the bachelor of science from Butler University and the doctor of philosophy degree in biochemistry from the University of Iowa. She joined the Department of Anatomy in 1958 serving as a research fellow (1958-1963) and research associate (1963-). She has been of inestimable help to numerous graduate students and staff members who utilize biochemical methods in their research investigations. Her studies on the chemical characterization and turnover of the glomerular basement membrane in normal and diabetic human subjects are most important in understanding the complications of diabetes. Using isolated glomerular basement membrane fractions, she demonstrated that the basement membrane is composed of a collagen-type glycoprotein containing four different sugars. Although the diabetic glomerular basement membrane is thicker than the normal, the chemical composition of the diabetic does not differ from the normal. However, she demonstrated that the basement membrane turnover is decreased in experimentally induced diabetes (alloxan-diabetic rats); this was determined by following the incorporation and turnover of tritium labeled proline which is in turn converted to hydroxyproline. Dr. Speidel's findings were the first studies to indicate that the vascular complications of diabetes (involving small blood vessels) may be a direct result of an altered basement membrane turnover.

Jovita B. Baker was born January 13, 1929, in Melrose, Minnesota. She was awarded the bachelor of arts degree in chemistry by the College of St. Benedict (1951) and the master of science degree in physiological chemistry from the University of Minnesota (1958). She served as junior scientist in the Department of Obstetrics and Gynecology (1953-1959) and as research fellow in anatomy (1959-). Mrs. Baker has major responsibility for our long-term studies that deal with the development and progression of experimental diabetes. She also supervises the departmental clinical laboratory where thousands of blood sugar determinations and insulin assays are carried out each month.

Margaret Turner was born in Lucknow, India. She received the bachelor of arts degree from the University of California (1942). She served as research fellow in chemistry (1960-1964) and in anatomy (1964-). Mrs. Turner's research activities relate to the mechanism of reactions between diabetogenic compounds (alloxan) and glutathione and to the possible role of endogenous diabetogenic agents in the development of spontaneous diabetes in man and animals.

Stuart Heald was born April 2, 1931 in Chicago, Illinois. He served as an engineer with Northern States Power Company for nine years prior to his appointment as a research fellow in anatomy. He has responsibility for maintaining the departmental electron microscopes and for training graduate students and post-doctoral fellows in its use. He also supervises the Department's instrument laboratory, where a number of specialized instruments used for quantitative histochemistry were designed and constructed. Instrumentation has become a major factor in biomedical research, and the current departmental investment in equipment is in excess of $400,000. The equivalent of four full-time electronic, mechanical and optics personnel are employed in the development and maintenance of the departmental instrument needs.

Information Retrieval Project. This research study represents an annual expenditure in excess of a quarter of a million dollars, and it has brought a variety of disciplines to the Department of Anatomy; these include systems engineers, programmers, information specialists, librarians and business administration personnel.

Elmo Brekhus was born February 14, 1921 in Dunseith, North Dakota. After receiving the bachelors degree in philosophy (1957) and gaining considerable electronics experience during World War II, he served as research fellow (1957-1961) and research associate (1961-1962) in

the Linear Accelerator Laboratory in the Department of Physics at Minnesota. A developing interest in information retrieval led to his enrollment as a graduate student in library science, and he joined the Diabetes Literature Retrieval Project at the time it was initiated (1962). Mr. Brekhus received the master of science degree in library science (1966) and has served as research associate (1962-1966) in anatomy. He now holds a joint appointment in anatomy and as assistant professor in the Library School (1966-). He serves as coordinator of the Diabetes Literature Retrieval Project, and in this capacity Mr. Brekhus has demonstrated an unusual talent for bringing together varied groups of individuals with differing technical skills and catalyzing their constructive interaction. His ingenuity in creating a number of optical and mechanical devices has facilitated the development of the unit-document-record system, a computer-controlled document handling method. The unit-document-record system, developed at Minnesota has been adopted by the National Library of Medicine, and it will become National Library of Medicine's standard format for distributing copies of scientific publications to the regional branches of the National Library of Medicine and to other libraries.

Donald Norris was born May 7, 1924 in Minneapolis, Minnesota. He received his bachelor of arts degree from Minnesota (1957). He served as a systems engineer at Univac (1960-1963) and as research associate in anatomy (1964-). His interest in information retrieval emerged during a Univac contract study related to the Diabetes Literature Project. He is responsible for the systems design used to generate the *Diabetes Literature Index* and for writing and implementing a variety of computer programs that are used in our comparative study of different methods of information retrieval, including the analysis of full English text in natural language.

Dr. Katherine Goodman was born in Alberta, Canada, and she received the doctor of medicine degree from the University of Alberta. She has served as research associate in anatomy since 1963. Dr. Goodman has major responsibility for those phases of the Diabetes Literature Retrieval Project that relate to the development of hierachical classification systems used in literature searching and for the coordination of a personalized alerting service that automatically provides research investigators with the current publications that reflect their research interest profiles.

Combined Dentistry-Anatomy Staff. Two members of the dental clinical faculty—*Robert J. Isaacson* and *Richard Stallard*—hold joint appointments in anatomy as lecturers. These individuals received their doctor of philosophy degrees in anatomy at Minnesota, after graduating from the Dental School. They contribute to clinical dentistry by serving as division heads of orthodontics and periodontics. However, because of their research interests in the basic anatomical sciences they also make a major contribution to the graduate training program in anatomy. They serve as major advisers for graduate students pursuing a combined doctor of dental science and doctor of philosophy degree, and they contribute to the undergraduate instruction in the dental anatomy course.

Visiting Professors in Anatomy. During the past 11 years, a deliberate effort has been made to bring visiting professors into the Department on a rotating basis. Because of language limitations, most of these individuals have come from Great Britain, and they have contributed immeasurably to both the teaching and research activities of the Department. All of our British colleagues have been outstanding teachers, and they have introduced a refreshing new point of view in our teaching program. The visiting professors have come from departments of anatomy, pathology and medicine. They have also participated in various departmental research programs, and with the multiplicity of methods and instruments available, they have broadened their own research horizons. Upon returning home, they have introduced a new point of view into their respective departments.

Dr. Rex Coupland, from the University of Leeds, spent the 1954-1955 academic year in Minnesota, and several years after his return to England, he was appointed professor and head of the Department of Anatomy at Dundee, Scotland.

Dr. Robert Sinclair Patrick, from the Department of Pathology of the University of Glasgow, spent 1957-1958 at Minnesota.

Dr. Walter Runge, from the Department of Anatomy at Hamburg University, Germany, was in the Department from 1958 to 1959. He returned to Germany for an interim period, then emigrated to Minnesota where he serves as assistant professor in the Department of Pathology.

Dr. George Hudson, from the Department of Anatomy, University of Bristol, was at Minnesota during 1959-1960. He presently serves as lecturer in the Department of Anatomy and associate dean of medicine at Bristol.

Dr. A. Douglas Hally, from the Department of Anatomy at the University of Glasgow, spent the academic year 1960-1961 at Minnesota. After his return to Glasgow, he was appointed lecturer in anatomy at the University of New Castle on Thyme.

Dr. Frederick Walker, from the Department of Pathology at the University of Glasgow, spent the academic year 1964-1965 at Minnesota.

Seoul National University: University of Minnesota Association. Under the sponsorship of the Foreign Operations Administration, all of the senior members in the Department of Anatomy at the Seoul National University, Korea, spent extended periods ranging between one and four years at Minnesota. They include: *Sae Jin Rha* (1958-1959), professor and head of anatomy and former dean of medical school (1960-1964); Dr. Shim Yo Chang (1956-1957); Dr. Jae Nam Kim (1955-1959) (now at the Department of Anatomy, University of Louisville); Dr. Mung Bok Lee (1958-1959), professor of anatomy; and Dr. Key June Seoung (1959-1960).

Special Fellows and Visiting Scientists. A number of individuals have spent a year or more in the department, receiving special research training. These include: Dr. Knud Mitdgaard (1963-1964) International Fellow, United States Public Health Service, Department of Medicine, University of Copenhagen; Dr. Tata Chand Garg (1958-1959), Indore Medical College, Indore, India; Dr. Louis Molineaux (1958-1959) Universite de Louvain, Belgium (now at the Public Health College in Gondar, Ethiopia); Dr. Hisao Fujita (1959-1960), Kyoto Prefectural Medical College (now professor and head, Department of Anatomy of Hiroshima University School of Medicine); Dr. Maria Piera Ceas (1962-1963), University of Rome; Dr. Oscar Tangco (1963-1965) University of Manila, Philippines; and Dr. Masayuki Miyoshi (1966-) Niigata University, Japan.

CURRENT RESEARCH AND TEACHING PROGRAMS IN ANATOMY AT MINNESOTA

When the American Association of Anatomists held its annual meeting in Minneapolis in 1962, a special issue of the March *Journal-Lancet* was prepared for distribution at that meeting. This volume included six papers dealing with the role of anatomy in various clinical and related fields; these were written by anatomists who had taken their doctor of philosophy degrees at Minnesota. It also included two related

papers by Leo Rigler and Stewart Thomson. The present article supplements the material previously presented on the activities of the Department and it updates the list of Minnesota trained anatomists.

UNDERGRADUATE INSTRUCTION

The department has responsibility for teaching four separate courses—gross anatomy, histology, embryology and neuroanatomy to 165 medical students, three courses to 110 dental students and a number of elementary anatomy courses to more than 600 students in the paramedical fields, including nursing, pharmacy, medical technology, physiotherapy, occupational therapy and mortuary science. The faculty takes these undergraduate teaching responsibilities most seriously, and none of the present department members has slighted his teaching commitments because of preoccupation with research. The department is proud that two present staff members received the Minnesota Medical Foundation's Distinguished Teaching Award, given annually since 1962 by the State Medical Association; the award consists of a citation and a $1,000 cash prize.

A closed circuit television unit (CCTV) was installed in the department in 1964, and monitors are distributed throughout the dissecting and microscopic anatomy teaching laboratories. Light microscope demonstrations and electron micrographs are televised in histology and neuroanatomy. Prosection demonstrations are televised in the dissecting rooms. A series of x-rays selected by the Radiology Department are projected and reviewed over the CCTV and multiple copies of these x-rays are available in the laboratory for direct study. We believe that many clinical applications of anatomy can be effectively correlated with the material taught during the first year and that this should become a part of the regular laboratory work in gross anatomy.

GRADUATE TRAINING

Minnesota's Department of Anatomy has been an active training center for anatomists for more than fifty years. Over 87 doctor of philosophy and 130 master of science degrees have been awarded by the Department to date, making Minnesota one of the major sources of professional anatomists in the United States. Dr. C. M. Jackson initiated an active graduate training program in 1913, and during his 28-year tenure, through 1941, 34 anatomists received degrees of doctor of philosophy. During the subsequent 25-year period (1941-1966), an additional

53 degrees of doctor of philosophy were awarded. Twenty-six of this group completed a masters degree prior to receiving the degree of doctor of philosophy and 72 additional students received a masters degree only.

For the 35-year period (1924-1959) in which comparative national figures are available, only three universities—Minnesota, Michigan and Chicago—trained more than a total of 50 anatomists. A second survey covering a more recent five-year period (1951-1955) showed that Minnesota awarded almost 10% (13 out of 136) of all anatomy degrees of doctor of philosophy in the United States (18). Thus, Minnesota has been, and continues to be, a most active national training center for professional anatomists (see Appendix C).

The past few years, especially since 1959, have been characterized by a major expansion of our training program. This is reflected in our present graduate student enrollment, which includes 28 students in the current year (1966-1967); this increase is largely due to the availability of federal support for graduate training. Most of our present graduate students are doctor of philosophy candidates and few of them take an interim masters degree.

There is an acute shortage of anatomists which is growing even more critical because of the establishment of more than twenty new medical schools (19). Our graduate students are usually supported by one of several National Institute of Health training grants. The Anatomical Sciences Training Grant from the National Institute of General Medical Sciences provides annual stipends for approximately sixteen graduate students. An experimental diabetes departmental training grant from the National Institute for Arthritis and Metabolic Diseases provides research training for four predoctoral and one post-doctoral trainee and six summer fellowship awards for medical students. A medical school training grant from the National Institute of General Medical Sciences provides stipends for highly qualified students enrolled in any of the basic science departments and pursuing a combined doctor of medicine-doctor of philosophy program. A dental school training grant from the National Institute of Dental Sciences provides stipends for students pursuing the combined doctor of dental surgery-doctor of philosophy degree. The two latter training programs were designed to provide staff members for both the basic science and clinical depart-

ments. These broadly trained staff members will bring the viewpoints of both basic and clinical science to their teaching and research programs.

Many of our graduates have brought honor to Minnesota through their professional accomplishments. Although most of our doctors of philosophy have held positions in anatomy departments in various medical schools, some have entered related fields, and many have assumed administrative responsibilities after an extended period of teaching and research. Eleven Minnesota anatomists have served as departmental chairmen; two have been medical school deans, one a university vice president for medical affairs and one a university chancellor. Our graduates are currently serving as faculty members in 15 medical schools. Some of our Minnesota trained anatomists have also become distinguished research investigators and teachers in clinical fields, including neurosurgery, obstetrics and pediatrics. A list of the doctor of philosophy degrees awarded by the department and the current activities of our graduates is included in Appendix A.

RESEARCH FACILITIES

When Dr. Thomas G. Lee arrived in Minnesota in 1891, he made an effort to develop facilities for scientific research, but adequate laboratories became available only after the Legislature appropriated funds for the present Anatomy Building, south of Washington Avenue. In developing these research facilities, Dr. Lee visited laboratories in Europe and America, and the versatile laboratories which were developed for anatomy were well adapted to the changing research methods that were to evolve during the next 50 years. When the Institute of Anatomy was completed in 1912, Minnesota provided one of the finest research facilities in this country.

When Dr. C. M. Jackson arrived in 1913, research was given great emphasis, and in 1954 in recognition of his many contributions, the name of the "Institute of Anatomy" was changed to "Jackson Hall." During the past decade, these physical facilities have been completely remodeled and refurnished. The departmental research laboratories were enlarged by the addition of a new wing, the Bell-Brekhus Laboratories, which completed the enclosure of the basic science quadrangle and also provided additional research facilities for Pathology and an expanded dental clinic.

The present departmental research facilities reflect the great emphasis

on instrumentation that characterizes biomedical research today. A number of specialized research facilities have been developed for electron microscopy, histochemistry, cytochemistry, ultracentrifugation, radioisotope handling and tissue-organ culture.

STAFF

In 1888, the Anatomy Department staff included two part-time professors of gross anatomy and one interdepartmental, part-time professor who taugh histology, bacteriology and pathology. Today, there are over 100 staff members and graduate students on the departmental payroll; 28 of these hold academic appointments. There are five full professors, four associate professors, three assistant professors, two lecturers, four instructors, five research associates, and five research fellows. The latter group, completely supported by the National Institute of Health, includes individuals who are trained as biochemists, bioengineers, mathematicians, computer programmers, librarians, and information specialists. The reader is referred to an article for the detailed history of the department, both past and present. (see Appendix J.)

THE NEW ANATOMY; CURRENT RESEARCH INTERESTS

The concept of anatomy as a research discipline has changed markedly in the past three decades, and in order to emphasize this "new look," some departments have gone so far as to change their name to the "Department of Cell Biology" or the "Department of Biologic Structure." It is of interest that a number of unrelated disciplines have been attracted to the term "Anatomy" and have used it frequently, i.e., *Anatomy of a Murder, The Anatomy of Virtue, Anatomy of Terror,* and *Anatomy of the Anecdote.*

Rather than change the name of the department, we believe that it is more appropriate to change the image of anatomy which both the general public and many of our professional colleagues share. Anatomy deals with the study of structure at all levels, from the whole organism to molecular structure. The structural relationships of the lipid, protein and nucleic acid molecules within the subcellular organelles are as much a problem of anatomy (at the electron microscope level) as is the structural relationship of the head of the pancreas, the duodenum and the posterior body wall. It is of interest that the field of chemistry has a diversity similar to that of anatomy, and although some chemists

could appropriately be classified as physicists or biologists, all chemists have a professional pride in their identity as chemists. This feeling of pride and identity is often lacking among some anatomists who do not appreciate the scope of the "New Anatomy." Many a professional anatomist is considered to be an endocrinologist, neurophysiologist, biochemist or cytochemist by his scientific colleagues. However, we must remember that they are anatomists who have an interest in the "fourth dimension of anatomy."

The modern anatomist is concerned with functional anatomy: the study of how structure varies with time, physiological state and pathological alteration. Anatomy, like physics, has its fourth dimension—time, and some of the most exciting unsolved problems in modern biology relate to the fourth dimension of anatomy.

Anatomical research is characterized largely by the research tools that are used. At the time of Leonardo da Vinci (1452-1519) and Andreas Vesalius (1514-1564), the study of anatomy was limited to those gross structures and organs that could be dissected with a scalpel and examined with a magnifying glass. The invention of the microscope by Zacharias Zanser in 1590 broadened the anatomists' horizons, for it permitted them to examine the tissues and the cells. Von Leeuwenhoek (1632-1723) started this evolution in the seventeenth century, but it has continued into the present with the more recent invention of the ultraviolet microscope, the phase microscope and the interference microscope.

The availability of the electron microscope during the past two decades has added a new dimension to anatomy. With the electron microscope, subcellular structures and organelles can be magnified to the point where individual protein molecules can be seen and photographed. Improvements in resolution as well as the use of electron diffraction (and x-ray diffraction) permits one to study the interrelationship of protein and lipid molecules, to see monomolecular arrays of lipid molecules and to observe the associated chains of nucleic acid. Because of these new tools, the modern anatomist is concerned with the localization of enzymes within the component membrane structures of the subcellular organelles, such as the mitochondria. He continues to disssect the structures he studies, but often he dissects these structures under the microscope, using a razor blade fragment as a scalpel; thus individual renal glomeruli, pancreatic islets or the motor

neurons are obtained for study. The modern anatomist also dissects the cell into its component parts by using the ultracentrifuge; thus various subcellular fractions, i.e., nuclei, mitochondria, or ribosome are obtained for study. It is significant that many present-day biochemists and physiologists are finding it increasingly necessary to borrow the anatomists' methods. Biochemists are using the electron microscope to characterize the morphology of the preparations they analyze; physiologists are following the structural alterations of the processes they study. It is noteworthy that although the biochemists and anatomists started at opposite ends of the size spectrum, they have now reached a common meeting ground. Although their research methodology differs somewhat, they are both concerned with two sides of the same coin.

Electron Microscopy. It is not generally appreciated that the first electron microscope used in the United States was built by a Minnesota-trained professor of anatomy. Working at Washington University, St. Louis, Mo., Gordon H. Scott, utilizing the detailed circuit design published in German literature, assembled an emission-type electron microscope which he used in 1934. With his associates, he wound the magnetic lenses by hand and machined and assembled the instrument components. The first published electron micrographs of cells were prepared by placing the specimen on the cathode and heating to the specific temperature at which selected elements emit electrons. These were focused by the magnetic lenses, and the image obtained represented the subcellular localization of the emitting element. Scott thus demonstrated that calcium plus magnesium (the two elements are considered together, since it was not possible to differentiate between them) was localized in the cell membrane and nucleus, whereas sodium plus potassium was widely distributed in the cytoplasm, but concentrated in the mucous secretion granules.

Present-day electron microscopes focus a beam of electrons analogous to the way light is focused by the conventional microscope, and the image obtained results from the differential absorption (or scattering) of electrons by the component structures of the cell. The Minnesota Graduate School purchased the first electron microscope installed at the University in 1945, and it was housed in anatomy in the basement of Jackson Hall. It was available to any qualified faculty member or graduate student. Today, there are four electron microscopes in the Anatomy Department and approximately twelve in the College of Medical Sciences.

The new research vistas opened by the increased resolving power of the electron microscope will provide exciting areas of research for many decades, and the current anatomy staff has a major commitment in electron microscopy.

Cytochemistry: Cell Biology. Cytochemistry and cell biology are concerned with the chemical organization of the cells and the localization of cell function at the subcellular level. A number of disciplines have contributed to these developments. Many important advances have been made during the past two decades, and many new concepts have emerged. Thus, it has been established that DNA is synthesized (gene replication) in the chromatin of the nucleus whereas RNA is synthesized (transcription) in the nucleus and transported to the cytoplasm. Although proteins are biosynthesized by cytoplasmic ribosomes which are associated with the membranous components of the endoplasmic reticulum, this process is under nuclear control through the action of messenger RNA. Mitochondria are the major sites of metabolic activity and energy production (ATP synthesis) within the cell. The present anatomy staff has a major research commitment in cytochemistry, and this is discussed under a number of topics that follow and under the individual research contributions made by the staff listed in the article on the history of the Department written by Dr. Myers.

Histochemistry. Histochemistry deals with localization at the cellular level and numerous methods have been developed to visualize the various chemical constituents and enzymes present in cells and tissues. These can be seen under the microscope when a colored reaction product is formed.

Minnesota has played a major role in developing a number of instruments that have made histochemistry a more quantitative science. Scanning instruments were designed and constructed for use with both the light and the electron microscope. The integrated volume of each component cell type within a complex tissue section is determined by the linear scan method using the light microscope component quantitator; the integrated volume of the component subcellular organelles are determined by scanning electron micrographs with the electron microscope component quantitator.

We have interfaced a microspectrophotometer (composed of a microscope, a monochrometer and a light measuring photocell) with a computer and developed an instrument which measures the amount (ab-

sorbance) of a chemical constituent or enzyme reaction product within cells. In addition, we have combined the microspectrophotometric and scanning methods into a single instrument that measures the integrated absorbance for each component cell type in the tissue section. It is thus possible to quantitate the biochemical and enzymatic differences between the pancreatic beta, alpha and acinar cells, even though they are intermixed in a single tissue section. Histochemistry thus passes from the descriptive to the quantitative phase and this will greatly facilitate its application to biological problems.

Our department was one of the first to use infrared spectrophotometry in the study of the histochemical reaction mechanism. Infrared analysis has been of great value to the organic chemist because it characterizes specific chemical groups within molecules as well as providing a positive identification (fingerprinting) for the complete molecule. Infrared analysis was used to determine the mechanism by which aldehyde fuchsin selectively reacts with oxidized insulin to form a reaction product which represents the histochemical localization of insulin within a beta cell secretion granule. The use of the infrared microscope in histochemistry provides an important new research tool.

Microdissection of Tissues; Dissection of Subcellular Components by Ultracentrifugation. Individual cells or organized groups of cells, such as pancreatic islets or renal glomeruli (contained in frozen-dried tissue sections) can be dissected under the microscope using a razor blade fragment. Structures weighing only a tenth of a microgram (.0000001 gm) can be weighed to an accuracy of 1% using a quartz-fiber "fishpole" microbalance (Lowry). These ultramicroscopic samples can then be analyzed by conventional biochemical procedures adapted to a micro scale. Thus, we have determined the insulin content and enzyme "fingerprint" of individual islets microdissected from the rat pancreas; we have compared these values with the results obtained using islets depleted of beta cells (obtained from rats previously injected with a diabetogenic dose of alloxan that destroyed the beta cells). By comparing normal and "chemically dissected" islets, we have been able to characterize the enzymatic specialization of the beta cell as contrasted to that of the alpha cell.

Nature has also thoughtfully provided us with a variety of experimental animals that are ideally suited for specific research investigations. For example, the toadfish and goosefish which are only distantly related

to man are uniquely adapted to our needs because the islet tissue is anatomically separated from the acinar pancreas. This is in contrast to the arrangement in mammalian species where more than a million islets are scattered throughout the pancreas. The component organelles in the islet cells are "dissected" using a density gradient sedementation technic after the cell membranes are broken (by mechanical means) and the organelles are liberated into the suspending medium. The subcellular fractions thus obtained and consisting of nuclei, mitochondria, insulin containing secretion granules, and microsomes were studied by the more conventional analytical biochemical methods.

We have separated and characterized an insulin containing secretion granule, which represents the stored form of this hormone. We have demonstrated that insulin is biosynthesized within the microsome fraction of the cell, and that the newly synthesized insulin is presumably transferred to (or converted into) the beta cell secretion granules. We have studied the physical state of the insulin that is stored within the beta granules and compared this with that of insulin in the blood. We have followed the release of insulin from the isolated granule and from the intact beta cell as it is modulated by the glucose level in the medium and by other factors. These studies on the mechanism of insulin synthesis, storage and release are important in understanding the etiology and treatment of human diabetes.

Using glomeruli isolated from both normal and diabetic kidneys, we separated the basement membrane fraction and demonstrated that it is composed of glycoprotein. Determination of the amino acid composition showed that the basement membrane "fingerprint" is identical with that of collagen and that the component carbohydrates were similar to those found in reticulin. We found that the diabetic contained more glycoprotein per glomerulus because of basement membrane thickening and that there was a linear correlation between the duration of diabetes and the degree of thickening as measured by electron microscopy. However, the diabetic glycoprotein fraction did not differ chemically in its amino acid or carbohydrate composition from that in the normal. Radioisotope studies using tritium labeled proline demonstrated that the basement membrane turnover rate is decreased in diabetic rats and that this turnover rate can be restored toward normal by insulin treatment. Our studies were the first to suggest that changes in basement

membrane turnover may play a primary role in the development of the complications of diabetes.

Tissue-organ Culture. Individual cells, organized tissue components, and complete organs can be grown outside the body under proper environmental and nutritional conditions. Departmental studies have demonstrated that with pancreatic transplants, islet cultures continue to synthesize and secrete insulin into the culture medium and that they respond to "hyperglycemia" by degranulation of the beta cells. The growth and development of islet tissue was followed by transplanting embryonic pancreas; the islets continued their development in organ culture and fully differentiated beta cells develop. Cortisone addition to the medium favors the selective development of beta cells. The continued secretion of insulin by the transplant was demonstrated by analyzing the culture medium for insulin using the two antibody immunoassay method which was likewise developed at Minnesota as a doctor of philosophy thesis. Our immunoassay procedure is sufficiently simple that the determination of blood insulin level has become a routine clinical procedure in many laboratories throughout the world.

Autoradiography. This is a technic which was developed at both McGill and Rockefeller Universities whereby radioactive constituents can be visualized under the microscope at their cellular or subcellular sites of localization. Radioactive components containing tritium (an isotope of hydrogen) have been particularly useful for following specific chemical precursors that are selectively incorporated and localized within certain cells or subcellular components. The site of tritium localization can be subsequently visualized under the light or electron microscopes by applying a thin layer of photographic emulsion to the surface of the tissue section and then developing the film after an appropriate period of exposure. The beta particles released as a consequence of isotope decay activate the silver grains in the overlying emulsion; since the energy of the beta particles emitted by tritium are low, they activate the overlying silver grains only over a very limited range (a micron or less). When the emulsion is developed, black-silver grains overlay the radioactive sites, and they can be visualized and counted; their number per unit area is proportional to the radioactivity. In studies carried out at Rockefeller University, autoradiography has been used to follow the intracellular sites of protein biosynthesis. They have demonstrated that

radioactive proteins are synthesized in the microsomes, subsequently packaged in the Golgi apparatus, stored in the secretion granule and released from the cell by droplet expulsion.

Studies carried out at Minnesota have utilized labeled thymidine^{3}H to follow the turnover of the pancreatic beta cells. They demonstrated that differentiated beta cells (with a full complement of secretion granules) are capable of mitotic division. The rate of new beta cell formation is accessed by following the rate at which label disappears from the beta cells. The capacity of the pancreas to secrete insulin in response to a maximal stimulus is limited by the total beta cell mass, i.e., total number of beta cells in all of the islets in the pancreas. The beta cell mass is in turn determined by the dynamic balance between beta cell destruction and new beta cell formation, and we believe that an imbalance in these rates can lead to the progressive net disappearance of beta cells and the onset of clinical diabetes.

Experimental Teratogenesis. In studies carried out in the department on the effect of teratogenic agents on embryonic development, another "exotic animal," the Japanese Medaka, has been used to great advantage. The female of this species conveniently lays an egg on her tail fin each morning. These are collected and subsequent development and differentiation is followed *in vitro.* Developmental anomalies appear when the environment of the developing embryo is altered, and these can be related to the underlying biochemical changes brought about by the teratogenic agents. These studies have a direct bearing on the problem of human development and congenital malformation.

Information Retrieval Studies. During the past five years the department has had a major research commitment in the field of information retrieval, and although the diabetes literature was the major focus of study, the methods and technics developed have wide application to all fields of knowledge, especially biology and medicine. The department has assumed primary responsibility for publishing the *Diabetes Literature Index,* a monthly current awareness bulletin for diabetes research investigators and practitioners.

This publication, prepared under contract between the University of Minnesota and the National Institute for Arthritis and Metabolic Diseases, depends upon three computers "talking to each other" and it requires the cooperation of three universities (Minnesota, Rochester and Western Reserve), a professional society (American Diabetes Associa-

tion) and three government agencies (National Institute for Arthritis and Metabolic Diseases, National Library of Medicine and the Government Printing Office). This monthly publication is distributed without charge to all research investigators receiving support from the NIH, to all members of the American Diabetes Association, to libraries and to other interested individuals. We are now planning to institute a personalized alerting service for diabetes research investigators which will automatically provide each user with all selected unit document records that are identified by the computer on the basis of his research interest profile. These unit document records (Mil-D aperture cards) will be generated by computer. In addition to the bibliographic citation, they contain the corresponding abstract (xeroxed on the face of the card) eight pages of the full text (reproduced in microimage format in the aperture window) and the NLM accession number (key punched in the first seven columns of the card). In addition to providing the documents themselves, our computer-based Information Retrieval system can identify the pertinent documents and even the pertinent sentences or paragraphs within these documents that answer specific questions. These are communicated to the user through a CRT terminal, a device which combines the features of a television screen with a typewriter. The CRT terminal will become as much a part of the scientist as the typewriter has of the secretary, and it will provide a direct means of communicating with the computer.

The computer programs and methods of document handling developed at Minnesota can be readily adapted to other fields of biomedical sciences, and other professional groups are planning to develop similar information services. Minnesota will thus become a national diabetes information center, and will ultimately become part of a national network of information centers.

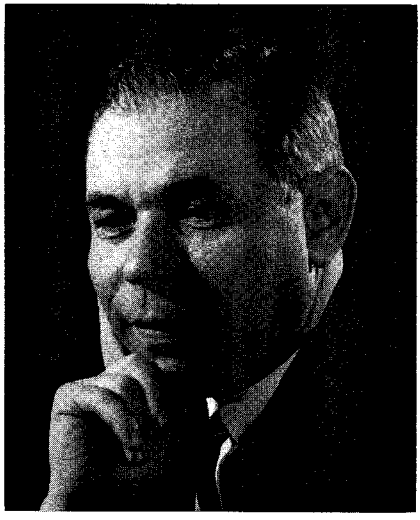
SUMMARY

In contrast to the "monolithic" concept held by many—that anatomy is a study of dried bones and cadavers—the present research frontiers of anatomy are most exciting. The anatomist may still dissect the body as part of his teaching responsibilities, but he also utilizes a variety of research technics which are heavily dependent on the methods and instrumentation of chemistry and physics. He dissects tissues into their component structures under the binocular microscope and cells into their

subcellular organelles by means of the ultracentrifuge. Although the modern anatomist is still studying bones, he is concerned with the dynamic aspects of bone, i.e., with the fourth dimension of structure—time. The new vistas of anatomy are developing as rapidly as are those in other fields of biomedical research.

The Department of Anatomy at Minnesota is unusual in its breadth of research interests. It has, within the confines of a single department, the trained technical personnel and most of the instrumentation required to study all phases of anatomy. The Department has reached the "critical mass" stage where research progress is accelerated through the interaction of alert young men who are utilizing several different research technics to study a common problem. Anatomy can be an exciting research field and especially for those who have an interest in applying new developments in the physical sciences to biology and to medicine.

Dr. *Arnold Lazarow* who wrote the above historical sketch of the department since 1954 was born in Detroit, Michigan, August 3, 1916, and he attended the University of Chicago, where he received all of his professional training, being awarded the bachelor of science degree (biochemistry) in 1937, the doctor of medicine and the doctor of philosophy degrees simultaneously in 1941. After interning at Woodlawn Hospital in Chicago (1942), and participating in a research project sponsored by the Office of Scientific Research Development at the Uni-



Arnold Lazarow

versity of Southern California (1943), he went to Western Reserve University where he served as instructor (1943-1946), assistant professor (1946-1948) and associate professor of anatomy (1948-1954).

Dr. Lazarow lectures extensively to both medical and dental students, and he participates in the teaching of gross anatomy as well as histology. He has an unusually high rating with the students as a teacher and enjoys the respect and confidence of the faculty.

Dr. Lazarow has received national recognition for his scientific and professional accomplishments, as evidenced by the following: He served as trustee of the Cleveland Diabetes Society (1953-1954); president (1955-1956) and board member (1954-1966) of the Twin Cities Diabetes Association; councilor of the American Diabetes Association (1956-1962); president (1965-1966) and councilor (1952-1956) of the Histochemistry Society; member of the executive committee of the American Association of Anatomists (1963-1967); trustee of the Marine Biological Laboratory (1961-1969). While serving as president (1960-1962) and board member (1957-1963) of the Minnesota Medical Foundation, he contributed to the revitalization of this non-profit organization that provides major financial support for the Medical School.

He has served on the following national committees and advisory groups: Committee on Research and Pathogenesis, American Cancer Society (1956-1958); Metabolism Study Section (1957-1960) and Cell Biology Study Section (1960-1961) of the National Institutes of Health; Advisory Committee on Scientific Publications, National Library of Medicine (1965-1969); National Advisory Council of the National Institute for Arthritis and Metabolic Diseases (1961-1965).

He served as advisory editor on *Cytochemistry, Journal of the National Cancer Institute* (1950-1952); on the editorial board of the *Journal of Histo-Cytochemistry* (1960-1963) and *Diabetes* (1962-1968); and as editor of the *Diabetes Literature Index*. He has been the prime mover in the establishment of a National Diabetes Information Center.

Dr. Lazarow was an invited participant in more than 20 national and four international symposia. His research contributions are in the fields of histochemistry, cytochemistry, experimental diabetes and information retrieval. His diabetes studies, carried out in collaboration with many graduate students and professional colleagues, include the following: The mechanism by which diabetogenic agents (alloxan, dehydroascorbic

acid) selectively kill the insulin producing beta cells; the factors which influence the development and progression of experimental diabetes; the factors which control insulin synthesis, storage and release from the beta cell; the role of the basement membrane in the development of the vascular complications of diabetes; the development of an immunoassay method for insulin, which has become a standard clinical laboratory diagnostic procedure.

His studies in histochemistry relate to the development of quantitative physical methods (scanning-microspectrophotometry and infrared spectroscopy) and their use in histochemistry. His studies in information retrieval have contributed to the development of new methods of document handling and the use of hierarchical and statistical methods in information retrieval. These have broad application in biology and medicine.

He developed the *Diabetes Literature Index,* a computer-produced monthly publication, which is distributed by the National Institutes of Health to all diabetes research investigators and to all members of the American Diabetes Association.

The developing National Diabetes Information Center is a direct outgrowth of these studies, and this new concept of information handling will better serve the needs of the research investigators as well as the practicing physician. It will permit the research scientist to cope with the explosive growth of published information that was threatening to inundate him with paper. The National Diabetes Information Center is pacing the development of a national network of specialized information centers which will be part of the computer revolution that is completely reshaping the practice of medicine.

Chapter XX

Department of Eye, Ear, Nose and Throat

THE EARLY YEARS

DR. *John R. Fulton,* who graduated from the University of Pennsylvania in 1880, attended a meeting of the American Medical Association in St. Paul in 1882 and decided to locate there. He was one of the organizers of the original St. Paul Medical School. When that school, together with others, offered its property and charter to the University of Minnesota for the organization of the College of Medicine and Surgery, Dr. Fulton was appointed professor of ophthalmology and otology. He was a member of the American Academy of Ophthalmology and Otolaryngology and a fellow of the American College of Surgeons. Dr. Fulton became emeritus professor at Minnesota and died in 1932 at the age of 73 years.

John R. Fulton

Dr. *Frank Allport,* a graduate of Chicago Medical College, came to Minneapolis in 1888 and was named clinical professor of ophthalmology and otolaryngology with Dr. Fulton. He served on the faculty until 1897, when he moved to Chicago. There, he also became professor of clinical ophthalmology and otolaryngology at Northwestern University. His later years were spent in Nice, France, where he died in 1935, at the age of 78 years.

Dr. *W. S. Laton* was appointed professor of nose and throat in 1891. He had graduated from Long Island College Hospital. He taught at the University of Minnesota until 1905 when he resigned. He died in 1907 at the age of 52 years.

Dr. *J. E. Schadle,* who had graduated from the Jefferson Medical College in 1881, was appointed clinical instructor in diseases of the nose and throat, physiology and laryngology in 1898. He died in 1908.

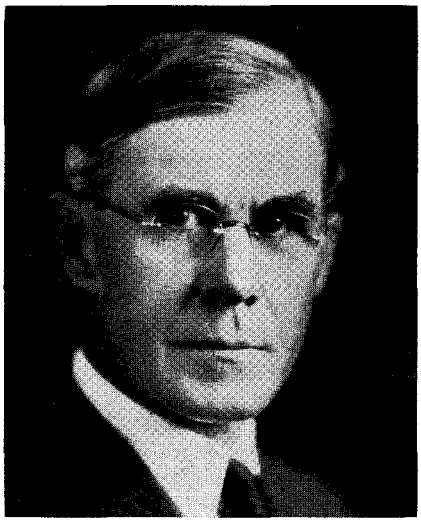
ENTER DR. TODD

In 1896, the legendary Dr. *Frank C. Todd* was appointed to the dispensary staff as clinical instructor in eye and ear with the title of clinical instructor. He was born in Minneapolis in 1869 and received the degree of doctor of dental science from the University in 1891. He then entered the College of Physicians and Surgeons and won the degree of doctor of medicine in 1892. He later engaged in graduate work in the United States and in Europe. In 1898, Dr. Todd was promoted from rank of instructor to that of clinical professor. In 1902-1903, he was listed as professor of ophthalmology and otolaryngology.

With the departmentalization of the medical school in 1909, Dr. Todd became chief of the University's Department of Eye, Ear, Nose and Throat with Dr. W. R. Murray as alternate. Many important faculty committees included him, so he was instrumental in the growth and development of the school.

Dr. Todd found time to record his observations and published articles, which were surprisingly numerous. Several of his papers were concerned with school sanitation and relation to sight and hearing and systematic examination of sight and hearing of school children in Minneapolis. Two of the latter papers were written in 1898, and in the same year one on ophthalmia neonatorum prophylaxis; the physiological and pathological pupil; and his first paper on eye muscle surgery, for which he developed a new tendon tucker.

Frank C. Todd



William R. Murray

Dr. Todd was among the first Minneapolis medical men to volunteer their services when the United States entered the World War I in 1917. He was given the rank of major but soon was promoted to lieutenant colonel, and assigned to the Camp Hospital at Camp Dodge, Iowa. After a brief service as assistant commandant of the hospital, he became its chief, and soon gained the reputation of having one of the most perfectly organized hospitals of its kind in this country. It was during an assignment of inspecting cantonment hospitals for the government, that he contracted a heavy cold. While in Chicago, he developed pneumonia and died in Presbyterian Hospital on July 4, 1918, at the age of 49 years. (see Chapters XI and XXVII.)

Dr. Richard Olding Beard, for many years secretary of the medical faculty, paid the following tribute to Dr. Todd: "No man of the medical faculty of Minnesota was ever more beloved than was the late Frank Chisholm Todd. None brought to the faculty councils a more nicely balanced mind, a keener judgment, a surer sense of educational values, than he did. He was at once a great teacher, an excellent clinician and a capable administrator."

After Dr. Todd's death, Dr. *William R. Murray* was made professor and head of the department. He was born in Marquette, Michigan in 1869. He received the degree of doctor of medicine from Rush Medical College in 1897 and came to Minneapolis in 1899 to enter

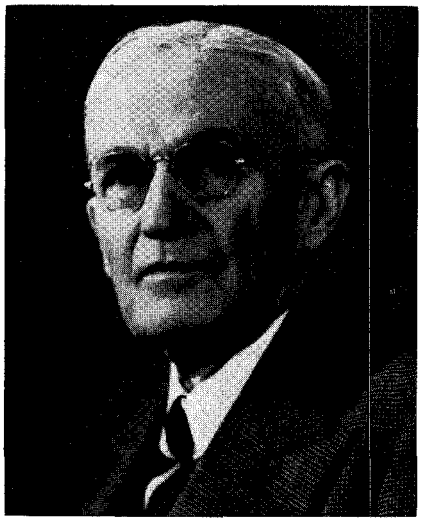
private practice. He was appointed instructor in ophthalmology and otolaryngology (1902) and advanced to rank of clinical professor, diseases of nose and throat (1905), and to clinical professor of rhinology and laryngology (1908). Dr. Murray's principal interest was in otolaryngology. He was far from a garrulous person, and was nicknamed "Silent Bill" by the students. He was also known for his habit of greeting one with "Good Morning," at any time of day.

He was a member of the sections of the American Medical Association pertaining to his chosen field and contributed to the program. He was also a member of the American Academy of Ophthalmology and Otolaryngology and one time a member of its council. He accumulated a fine library which was presented to the Department and was designated the Murray Library.

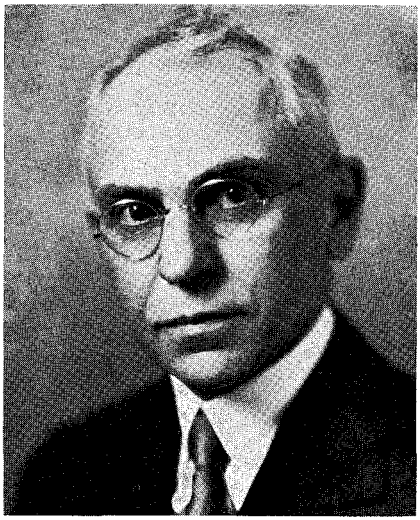
Again, the new department was to suffer loss of its head. Dr. Murray pricked his finger while doing a mastoid operation at Abbott Hospital in Minneapolis. Septicemia developed and in spite of heroic efforts to save his life, he died on December 27, 1926, at the age of 57 years.

Dr. Murray was succeeded by Dr. *Frank Earl Burch* of St. Paul, next of the ophthalmology "giants" in medical school annals. Dr. Burch was born on March 27, 1876, at Menomonie, Wisconsin, where he attended Stout Institute. He was awarded the degree of doctor of medicine by the University of Minnesota in 1897. After a year's internship in St. Luke's Hospital in St. Paul, he was in general practice in Glencoe, Minnesota. In 1903, he began two years of ophthalmology and otolaryngology study at Johns Hopkins University, Moorfields in London, and in the clinics in Vienna. In 1905, he opened an office in St. Paul for the practice of ophthalmology and otolaryngology. Dr. Burch received an appointment to the staff of the Medical School, and with Dr. Todd was much interested in the graduate training program. As major in the medical corps, he followed Dr. Todd to Camp Dodge on orders from the War Department and on Dr. Todd's death, he was made head of the hospital at that cantonment.

After the war, Dr. Burch returned to St. Paul and thereafter limited his practice to ophthalmology. He became much interested in surgery for retinal detachment following Gonin's report of his cautery puncture operation at the International Congress of Ophthalmology in 1929. He was also among the earlier men to do corneal transplantation. Among



Horace Newhart



Frank E. Burch

his more quoted papers was one on Marfan's disease and one co-authored with Dr. Walter Camp on melanotic tumor of the eye.

When Dr. Burch became head of the Department in 1930, he divided it into two divisions. He retained the Ophthalmology Division and Dr. *Horace Newhart* was placed in charge of the Otolaryngology Division.

Dr. Newhart was born in New Ulm, Minnesota, in 1872. He attended Carleton College from 1891 to 1893, and then transferred to Dartmouth College, where he received the bachelor of arts degree in 1895. He then attended the University of Michigan Medical School and obtained the degree of doctor of medicine in 1898. After a couple of years, he took a position on the staff of the Jackson Sanitorium in Danville, New York.

After conducting general practice in Minneapolis, and three trips to Vienna, Dr. Newhart limited his practice to ophthalmology and otolaryngology in 1908.

He was appointed to the staff of the Department of Ophthalmology and Otolaryngology in 1912. His major interest developed in otolaryngology to which he gradually limited his work. He became professor of otolaryngology and director of the Division of Otolaryngology in 1930.

Dr. Newhart was a pioneer in the promotion of periodic testing of the hearing of school children. He became consulting otologist for the

Minneapolis Public Schools in 1925, a position which he still held at the time of his death in 1945.

Dr. *Frank Burch* was handicapped for a time by radiation burns on his index fingers, incurred while holding a patient's lids everted for treatments. It finally required full thickness skin grafts on his fingers to effect healing.

During the Minnesota Centennial Celebration, he was named as one of 100 living greats of the State. Also, in 1952, he was recipient of the University's Outstanding Achievement Award.

He had an exceptional library of foreign journals of ophthalmology in British, French and German, which he donated to the Eye Department. Many of his other medical books were left to his son, Dr. Edward P. Burch. These, together with the son's own library, were given to the University on the latter's death, and form an important part of the Biomedical Library. Dr. Burch attained retirement age in 1943. Much of the time in his latter years was spent at his north shore home. He passed away on July 1, 1959, at the age of 81 years.

The above sketch was prepared by Dr. *Erling W. Hansen* who had worked in the Department from 1916 and Dr. *Lawrence R. Boies* who began in 1931. Both had held high ranking positions under Doctors Newhart and Burch and each was destined to head a new department. (see Appendix J for staff lists.)

DIVISION OF OPHTHALMOLOGY BECOMES A DEPARTMENT

When Dr. Burch retired in 1943, Dr. *Erling Hansen* became head of the Division of Ophthalmology and in 1955 his Division gained full status as a department, concurrent with establishment of the Department of Otolaryngology.

Undergraduate Teaching. Instruction in diseases of the eye and adnexa had traditionally been given to the medical students in their senior year. This had been in the form of lectures and in attendance at clinics in the out-patient department. Regular clinics were held at the University free dispensary at Seven Corners in Minneapolis. With the erection of Millard Hall and Elliot Hospital, the department was moved to the campus.

The number of lectures grew to 15 and 18 and eventually covered diseases of the lids, conjunctiva, cornea, uveal tract, lens, retina and

ocular motility, plus the important subject of glaucoma, eye injuries and principles of refraction.

The clinic numbers increased to a point where the attendance figures were among the largest of all of the clinics. This gave the students an opportunity to see many of the diseases covered in the lectures. From one week in the clinic, the student's time was increased to two weeks of one hour after lunch to three weeks of two to three hours, after the first hour lectures in the morning. Among the men who have helped in the teaching program in the clinics, not previously mentioned are Drs. Harry S. Friedman, Joseph L. Garten, Malcolm A. McCannel, Virgil J. Schwartz, Irving Shapiro and Howard J. Shaw. Assisting in the St. Paul clinics have been Drs. Edward P. Burch, Thomas Edwards, John A. McNeill, Thomas O'Kane, Bernard E. O'Reilley, Harry Plotke, and Donald C. Sterner.

In addition to the required courses, an elective course in ophthalmoscopy was offered. The first year, opportunity was given to four students to choose this elective. The next year there was such a demand that two sections of four were given this course. Following this, the number in each section was increased to five. From time to time, senior students became so interested in ophthalmology that they made applications for fellowships in the department after their internships. For them, an elective in surgery was set up in which they observed the work in the operating room and made ward rounds with the staff.

Refraction. The major portion of the average ophthalmological practice is taken up by the refraction of the eye. Necessarily, this has been a large segment of the training of eye men and a large part of the registration of patients in the eye clinic. Through the years, faculty members have been assigned to this service in the clinics. Some of the men who have had this special service were Drs. Stanley Merrick, Douglas Wood, John H. Morse, Earl Loomis, Charles Hymes, Bjourne Houkom, A. J. Herholsheimer, Robert Tract, Bruce Kantar, and George Tani.

Graduate School. Dr. Todd was interested in developing local graduates in the field of eye, ear, nose and throat and was instrumental in obtaining funds for the first fellows in 1914. (see Chapter XII.)

In addition to the medical fellowships established at the University Hospitals, similar training programs were started at Ancker Hospital

in St. Paul and at Minneapolis General Hospital. Though the fellows at the University Hospital had earlier been assigned to training in either ophthalmology or otolaryngology, combined training in the two were continued in the above hospitals until the mid-1940's. When the Minneapolis Veterans Administration Hospital was included in the University teaching program in 1946, appointments were also made to that institution. All of these graduate students took their basic didactic courses at the University while doing clinical work at the various hospitals. Some were rotated from one institution to another during their three years of training. It was optional with the individual whether he worked for an advanced degree or not. With a satisfactory thesis and successful passing examination, the degree of master of science in opthalmology was granted.

Much of the teaching in the graduate courses was done by members of the department faculty. During Dr. Burch's tenure, anatomy of the eye and adnexa was taught by Dr. John C. Brown of St. Paul, who had been an instructor in comparative anatomy previously. After his retirement, the Anatomy Department of the Medical School assigned personnel from that department to this teaching. Neuro-anatomy was given by the great teacher, Dr. Andrew Rasmussen. Eye pathology became a very specialized field and was originally taught by Dr. Walter E. Camp and Dr. E. T. Bell. When Dr. Camp could no longer carry on this work, there was a slump in this activity until Dr. Francis Walsh returned from service in World War II. Lack of funds and technical help handicapped the work, but with donated funds and the kind assistance of Dr. A. B. Baker's laboratory, it was continued. Two things then happened which made this a successful enterprise. Dr. Robert Hugh Monahan, who was one of the fellows in ophthalmology, evinced an interest in ocular pathology and spent a year in Boston with Dr. Parker Heath. About the same time, the department was the recipient of a bequest from the Dittman family in St. Paul. An equipped laboratory was set up in the new Mayo Memorial Building. Fortunately, too, we were able to secure the services of an outstanding technician, Miss Virginia Havener. With this equipment and personnel, the eye department obtained a much needed service, not only for itself, but for the benefit of this whole section of the country.

Physiology of the eye and physiological optics were taught for several years by Dr. Malcolm C. Pfunder, a student of Dr. A. J. Carlson at

the University of Chicago. After, Dr. Pfunder's death, this teaching was taken over by Dr. Bourne Jerome, who had his training under Drs. Adler and Scheie at the University of Pennsylvania. Clinical subjects were taught by various other members of the part-time faculty. Ocular motility and muscle imbalances were given emphasis especially during Dr. Burch's regime. Both Dr. Todd and Dr. Burch had developed instruments which did tucking of muscles which needed shortening. The first of those assigned to a "Muscle Clinic" was Dr. Walter Fink who was succeeded by Dr. Hendrie W. Grant. When Dr. Grant was no longer able to conduct this work, Dr. Richard C. Horns was given the assignment.

With the example and teaching of such able and skillful surgeons as Dr. Todd and Dr. Burch, it followed that training in eye surgery was of the highest quality. While earlier, the chiefs had done most of the operative work, during Dr. Burch's tenure, the service was divided. During much of this time, Dr. John S. Macnie, Dr. Howard Clark, Dr. W. E. Patterson and Dr. Erling W. Hansen served quarterly terms on this service. Later, younger men, all of them graduates of the department, took over these appointments. Among them were Drs. Charles Hymes, Walter L. Hoffman, Francis M. Walsh, Wilfred Bushard, John P. Wendland, and L. E. Christensen. While the fellows had always had some experience in actual operating, the practice was instituted of having them do the eye surgery with the assistance and guidance of a staff man. Except in complicated cases, then, they progressed from external operations to enucleations, to muscle surgery and finally, in the third year, to intraocular operations. With this experience, they were ready to go out into private practice well-prepared for eye surgery.

University staff-appointed men headed the clinical teaching at the three hospitals associated with the department, Minneapolis General, St. Paul Ancker, and Veteran's Hospital. At Ancker were such men as Drs. W. W. Lewis, Richard O. Leavenworth, and Gordon E. Strate. At Minneapolis General were Drs. Murray, J. D. Lewis, Fred J. Pratt, Malcolm C. Pfunder, Walter K. Haven, and Karl E. Sandt. With Dr. Hansen as consultant, Drs. A. F. Adair, John P. Wendland, Bruce Kantar, and L. E. Christensen were among those at Veterans Hospital. (see Appendix J.)

Erling W. Hansen, who prepared the above sketch, was born in Minneapolis in 1890. He attended Minneapolis public school, entered

Erling W. Hansen

the University of Minnesota, and was awarded the degree of doctor of medicine in 1915. Immediately after graduation, he launched upon advanced work at the Postgraduate Hospital in the Eye and Ear Infirmary in New York after which he continued graduate work at the University of Minnesota. He was interrupted by World War I, entering as first lieutenant and being discharged as captain for heroism and extraordinary devotion to the care of wounded. He was decorated with the Croix de Guerre, with the Bronze Star by France, and the Silver Star by the United States Army. In 1919, Dr. Hansen entered private practice in ophthalmology and otolaryngology in Minneapolis. He was certified by the American Board of Otolaryngology in 1920 and the American Board of Ophthalmology in 1926. After 1930, his practice was confined largely to ophthalmology. He retired from active practice in 1963. Academically, he started as a scholar in otology in 1916 and was advanced through all the ranks to clinical professor and director of the Division of Ophthalmology in 1944 and professor and head of the Department of Ophthalmology in 1955. Dr. Hansen retired in 1958 and became emeritus professor of ophthalmology. In addition to the usual medical organizations, he holds membership in all local, state and national specialty organizations in his field. He is held in high esteem in all of these organizations, having served as president of his County Medical Society, delegate of the American Medical Association,

and chairman of its Section of Ophthalmology. He was awarded the Honor Key by the American Academy of Ophthalmology and Otolaryngology, was president of both the Minnesota and the American Academies of Ophthalmology and Otolaryngology.

Dr. C. W. Rucker, Mayo Clinic, ended a splendid profile for Dr. Hansen as follows: "Few physicians in his community have earned from their colleagues a greater affection."

Shortly before retirement in 1958, Dr. Hansen wrote the following editorial for the University of Minnesota Medical Bulletin:

OPHTHALMOLOGY AT MINNESOTA

"The Ophthalmology Department has grown up. Beginning the next school year, the department will have a full-time head for the first time in its history. At one time, most of medicine and surgery in the eye field and in ear, nose and throat were combined. Often, these were included in the Department of Surgery. At Minnesota, there was separation of the two departments several years ago, although combined training in these fields was not given here for 30 years.

"There has been, in the past, too much feeling that ophthalmology was a highly specialized field that had little interest for the average medical student, general practitioner, or specialist in other areas. We are happy that this is being replaced by a realization that it is an integral part of medicine. The increasing popularity of elective courses in ophthalmoscopy, among our senior students, is evidence of the awareness. We are likewise grateful that there is increasing interest and cooperation from other departments of the Medical School, the basic sciences, internal medicine, neurology and neurosurgery, pediatrics and obstetrics, all sharing problems with ophthalmology.

"We have been proud of the quality of clinical work which has been done in our department and the excellent teaching in the under graduate and graduate schools. This has been due to the able and devoted work of our part-time faculty who have given freely and generously of their time."

John E. Harris, who succeeded Dr. Hansen was born in Toledo, Ohio in 1913. He was awarded the degree of doctor of philosophy in biochemistry by the University of Toledo in 1940. The next year he was appointed research fellow by the National Research Council and spent a year at the University of Pennsylvania working with Henry M. Jacobs on cation transport in the erythrocyte. After service in World War II,

John E. Harris

he joined the faculty of the Department of Ophthalmology at the University of Oregon at the invitation of Dr. Kenneth Swan, chief of the department. An arrangement was made whereby he could continue investigative work and take the course in medicine. He received the medical degree in 1950. During this period, he continued investigation on the mechanism of cation transport with special reference to the crystalline lens. Then and since, he employed basic science techniques to study the normal and diseased eye and in return contributed to the basic science field, lessons learned from the unique investigative opportunities offered by the highly specialized occular tissue. After completing an internship at the Walter Reed Army Hospital, he returned to the University of Oregon Medical School to continue research and complete clinical training in ophthalmology. As associate professor, he made important contributions to the establishment of the John E. Weeks Institute for the advancement of ophthalmology and the organization of the John E. Weeks Memorial Laboratory. On the basis of his work in that laboratory, he presented the first Jonas Friedenwald Memorial Lecture in Ophthalmology in June of 1957. He said, "The emphasis of clinical practice in ophthalmology must be built on a sound understanding of basic principles of physiology and biochemistry and their pathological alterations."

As Dr. Erling Hansen was approaching retirement age, a search committee was appointed to seek and choose the best possible replacement. Of all the persons considered, Dr. Harris was the unanimous choice and was appointed professor and head of the Department of Ophthalmology in 1958. At that time, Dr. Hansen said: "With his guidance, we are sure that the University of Minnesota's high position in clinical ophthalmology will have the added prestige of original work in research. We bespeak for Dr. Harris the continued cooperation of our fine faculty in ophthalmology, as well as that of the other departments of our medical school."

During Dr. Harris' years at the University of Minnesota, he has reorganized the department's teaching and patient care programs, established a research laboratory with excellent facilities, equipment and staff. He has completed a six-year term as a trustee of the Association for Research in Ophthalmology serving as chairman during his last year. He has been associate editor of the *Archives of Ophthalmology* and now is on the editorial board of *Investigative Ophthalmology.*

He continues to contribute to the scientific programs of the national societies and postgraduate meetings in ophthalmology.

At Minnesota, he has also been active in community services in such capacities as chairman of the preschool medical survey of vision and hearing, medical advisor and administrator of the Lyon's Eye Bank. In 1966, Dr. Kenneth Swan, his former chief said, "How did John Harris acquire the capabilities to do so much, so well? Many years dedicated to study is one of the answers."

DIVISION OF OTOLARYNGOLOGY BECOMES A DEPARTMENT

When Dr. *Horace Newhart* resigned as director of the Division of Otolaryngology in 1942, Dr. *Lawrence R. Boies* succeeded in the position. When Dr. Frank Burch resigned as chairman of the Department of Ophthalmology and Otolaryngology, Dr. Boies became head of the department, including both divisions.

Combined training in ophthalmology and otolaryngology had been discontinued in 1932. The length of the residency in the combined fields had been a total of two years, one year in each specialty. The separate residencies were now lengthened to two years in each specialty.

For more than a decade after the combined training in ophthalmology

and otolaryngology was discontinued in 1932, the undergraduate and graduate teaching responsibility was carried by several who made substantial contributions along the lines of their special interests.

Dr. *Fred A. Pratt, Jr.* had been appointed to the faculty in 1913 in the role of clinical assistant. His major interest was in the nose and in 1924 in collaboration with an uncle, John A. Pratt, M.D., he published a monograph on *Intranasal Surgery* (F. A. Davis Co.) that was well received by the profession. Dr. Pratt graduated from the University of Michigan Medical School in 1901, did general practice on the Iron Range in northern Minnesota, took his specialty training in Chicago and located in Minneapolis in 1905.

Dr. Pratt provided the lectures on rhinology to the undergraduates after the Division of Otolaryngology was established under Dr. Newhart. He was in charge of otolaryngology and the residency training at the Minneapolis General Hospital. He retired from the faculty in 1944 with the rank of clinical assistant professor.

Kenneth A. Phelps, a 1912 graduate of the University of Minnesota, was appointed to the faculty as an assistant in 1919. He had received his specialty training at the Manhattan Eye, Ear, Nose and Throat Hospital in New York City, at Johns Hopkins Hospital and in London.

When training in ophthalmology and otolaryngology separated at Minnesota, Dr. Phelps continued on the faculty in the Division of Otolaryngology, lecturing in laryngology to the undergraduates and consulting in broncho-esophagology at the University Hospital. He resigned in 1956 in the rank of clinical associate professor and retired in California.

Dr. *Charles E. Connor* who had been appointed to the faculty in the rank of an assistant in 1920, provided clinics in otolaryngology at the Wilder Dispensary in St. Paul and was a consultant in broncho-esophagology at the University Hospital. Dr. Connor graduated from the Johns Hopkins Medical School in 1914, had a two year internship which was unusual in that day, and then took graduate work at the University of Chicago, at Pennsylvania, Harvard, and in Vienna. He retired from the faculty at Minnesota in 1956 in the rank of clinical professor.

THE BEGINNING OF A NEW ERA IN OTOLARYNGOLOGY

The advent of the anti-microbial drugs (sulfanilamide in 1937 and

penicillin in 1942) probably effected otolaryngology more than any other medical specialty. The control of inflammation with these new drugs markedly reduced the use of surgical treatment of most of the suppuration in the upper respiratory tract. Consequently, otolaryngologists turned their attention to other problems. The one-stage fenestration operation for clinical otosclerosis became perfected. Better definition of hearing loss was possible with new tests and new electronic instruments, and hearing aids were improved for deafness problems not suitable for medical or surgical treatment.

World War II brought some new experiences in the maxillofacial surgery for trauma. Dr. Jerome A. Hilger had an extensive experience in this work as a member of the University Hospital group (Base Hospital 26) that saw service in England, Africa, and Italy.

In recent years, there has been a marked increase in maxillofacial injuries because of high speed transportation, industrial activity, and wider participation in such contact sports as football, basketball, hockey, and boxing.

Out of this new experience, the plastic reconstruction of the nasal pyramid became a new concept in the relief of obstructive nasal conditions, formerly commonly treated by the overworked operation known as "submucous resection."

The one-stage fenestration operation to improve hearing lost through otosclerosis was first performed at the University Hospital in 1945 and continued as a major activity until 1956 when stapes surgery began to replace the fenestration of the semi-circular canal. Using the operating microscope, it is possible to successfully free the stapes immobilized by otosclerosis in some cases or to remove it in most cases and substitute an artificial prothesis. The results are excellent after removal of the stapes in more than 90% of patients ideally suited for this, when it is performed by competent hands.

During this period, there were also great advances in the surgery that can be performed for chronic drumhead perforations and the sequelae of chronic middle ear disease. These tympanoplastic operations have become successful in properly selected cases through the use of the operating microscope, improvement in graft materials through research, and with antibiotic support.

Antibiotics have not lessened the activities with tumors of the upper respiratory tract or with broncho-esophagology. In fact, these activities

have increased because the antibiotic support as well as developments in anesthesiology have made possible more radical surgery and repair when indicated in certain malignancies. Likewise, the activities of the chest surgeon have made diagnostic procedures through the bronchoscope or esophagoscope more commonly performed.

Functional disorders in the upper respiratory tract have no doubt increased with the pace of modern living. This calls for more diagnostic acumen in the special examining procedures performed in the nasal space, pharynx and larynx.

LENGTHENED RESIDENCY PROGRAM

In 1950, the residency training program was lengthened to three years because the scope of otolaryngology had broadened. The program at Minnesota was making maximum use of the resources in clinical material at its affiliated services at the Minneapolis General Hospital, the Ancker Hospital in St. Paul and the Minneapolis Veterans Hospital at Fort Snelling.

On July 1, 1955, otolaryngology became fully established as a department with improved physical facilities and budget. Dr. Boies became its first full-time head.

In 1960, the residency program was lengthened to four years with the added year to be spent in an approved residency in general surgery.

In 1961, a training grant from the National Institutes of Health for a five-year period strengthened the teaching and research in the Department and allowed expansion of the total residency program. In 1966, this grant was renewed for another five years.

A special article in the *University of Minnesota Medical Bulletin* in 1964 (*36*:138, 1964) outlining the history and development of the Department, described the teaching programs.

THE UNDERGRADUATE TEACHING PROGRAM

Undergraduate medical students at Minnesota receive an elementary exposure to otolaryngology during their freshman year by doing anatomical dissections. A resident from the Department collaborates with the Department of Anatomy in this teaching experience.

Second year students receive a single two-hour demonstration of physical diagnosis related to the ears, nose and throat. In the senior year, each student gets a total of 24 hours of lectures and demonstra-

tions, and three weeks of 'ENT' assignments during the Comprehensive Clinic training period. His time there is spent in the afternoon outpatient clinic held four days a week. There is also a morning session of 90 minutes devoted to informal discussions, and operating room demonstrations held two days each week.

An elective period of 2 to 4 weeks is also offered but limited to three participants. Used in this teaching sequence is a textbook, *Fundamentals of Otolaryngology,* which is a product of the Minnesota program. Now in its 4th edition, the book is widely used in other medical schools. Royalties from its publication are placed in the Newhart Fund.

THE GRADUATE TRAINING PROGRAM

Residency training in otolaryngology at Minnesota now accommodates 16 residents. Four appointments are made annually in July to begin training on the following July 1. The first year is devoted to general surgery, and may be taken in any approved program. Most of the residents spend their first year at the Minneapolis Veterans Administration Hospital.

The year in general surgery is followed by three years in otolaryngology. Basic courses in anatomy, microbiology, physiology, pharmacology and pathology are covered during the first residency year. Special courses in clinical work are distributed through the other years.

Clinical experience is also gained by the student's rotation through at least two of the three other otolaryngology services that are affiliated with the University program. These are:

1. A St. Paul section serving (a) the St. Paul-Ramsey Hospital; (b) an Otolaryngology Research Laboratory at St. Joseph's Hospital, and (c) the ear, nose and throat needs of the St. Paul Medical Clinic.
2. The Minneapolis Veterans Administration Hospital.
3. The Hennepin County General Hospital.

A senior resident is in charge of each of the four services in otolaryngology under staff supervision.

THE FACULTY IN 1966

A small core of full-time faculty and a large group of part time (clinical) appointees combine to carry out the undergraduate and graduate teaching programs. Some brief summaries of the background and activities of those playing major roles in the Department are as follows:

Dr. *Jerome A. Hilger* was graduated from St. Thomas College in 1932, the University of Minnesota Medical School in 1936, and completed a residency in otolaryngology in the department in 1939 when he obtained a master of science degree. He was appointed to the faculty as a clinical instructor.

Dr. Hilger served as chief of the Section of Otolaryngology and Maxillofacial Surgery in the 26th General Hospital (the Minnesota group) in World War II and served for three years in England, Africa and Italy, attaining the rank of lieutenant colonel.

He directs the graduate teaching in the affiliated services of the St. Paul-Ramsey Hospital and the St. Paul Medical Clinic and in an Otolaryngological Research Laboratory at St. Joseph's Hospital in St. Paul.

Dr. Hilger has contributed substantially to the literature of the specialty. He was promoted to the rank of clinical professor in 1955.

Dr. *Robert E. Priest* attended the University of Minnesota receiving a bachelor's degree in 1930 and the doctor of medicine degree in 1932. After he completed an internship at Cincinnati General Hospital, he did general practice in Worthington, Minnesota until 1938. Then, he entered residency training in otolaryngology at Minnesota. He received a master of science degree in 1941 and was appointed a clinical instructor in the Department. September 1, 1942 to January 30, 1946 he served in the United States Army attaining the rank of major.

Following military service, Dr. Priest became the director of otolaryngology at the Minneapolis General Hospital in which position he served for 10 years, supervising the affiliated residency training program there. Since then, he has participated in the undergraduate teaching program and directed a graduate course in broncho-esophagology and in laryngology at the University Hospitals. He attained the rank of clinical professor in 1959.

Dr. *Henry Williams, Jr.,* who was formerly head of the Ear, Nose and Throat Section at the Mayo Clinic, was appointed to the faculty of the Department in the rank of professor in 1963. He had held a similar rank in the Graduate School when at the Mayo Clinic. He is in charge of the department's affiliated residency training program at the Minneapolis Veterans Hospital.

Dr. *Albert Hohmann* was appointed to the faculty in 1961 in the rank of assistant professor. He had received dental and medical degrees at the University of Marburg in Germany and completed a three-

year period of residency training in otolaryngology at Minnesota in 1958. This was followed by a year of additional training at Baylor University and 18 months at the Henry Ford Hospital under a special fellowship from the National Institutes of Health. On completion of this, he returned to Minnesota under a National Institutes of Health grant to engage in research and teaching in St. Paul at the Otolaryngological Laboratory at St. Joseph's Hospital and St. Paul Ramsey Hospital on a part-time basis.

Dr. *Arndt J. Duvall, III,* is a graduate of the University Medical School in 1955. Following his internship, he was in military service in Europe for two years, attaining the rank of captain and then entered a three-year period of residency training in otolaryngology at Minnesota in 1958. He was then awarded a special fellowship by the National Institutes of Health and studied at the University of Iowa for a year, acquiring a master of science degree there, and then followed a year at the Karolinska Institute in Sweden for training in electron microscopy.

Dr. Duvall was appointed to the full-time faculty at Minnesota in 1963 with the rank of assistant professor. He is devoting a major portion of his activities to research and teaching.

Dr. *Melvin E. Sigel* graduated from the Medical School at Minnesota in 1956. After an internship, he entered military service in the United States Army for two years with the rank of captain. Then followed a four year residency in otolaryngology at Minnesota. The next year he was the recipient of a special fellowship from the National Institutes of Health for study at the University of Zurich in Switzerland.

Dr. Sigel was appointed to the faculty in 1964 on a part-time basis.

Dr. *Frank M. Lassman,* was first appointed to the faculty in 1952 to develop the Audiology Clinic. He holds a joint appointment with the Department of Otolaryngology, the Department of Speech, and the Department of Physical Medicine and Rehabilitation, and has developed a graduate training program in audiology and speech. His service to the department is in providing audiologic consultation on hearing problems. Dr. Lassman received the doctor of philosophy degree at the University of Southern California in 1950. He was promoted to the rank of professor in 1963.

Dr. *W. Dixon Ward* was appointed to the faculty in 1962 in the rank of associate professor. He is engaged in full-time research in problems related to hearing. Dr. Ward did graduate work in physics at the

University of Minnesota in 1948-49 and received the degree of doctor of philosophy from Harvard University in 1953 majoring in psychology and psychoacoustics. He then went on in research serving in several institutions in sequence until brought to Minnesota under a National Institutes of Health career grant in 1962. Dr. Ward was promoted to the rank of professor in 1966.

The following former members of the faculty made substantial contributions to teaching during their periods of service: Henry V. Hanson, Anderson C. Hilding, John Hochfilzer, Benjamin Bofenkamp, and George M. Tangen.

For complete faculty list of professors, see Appendix J.

For otolaryngologists who have completed residency training at Minnesota July 1, 1932-June 30, 1966, see Appendix B.

SPECIAL FUNDS

In addition to funds received by the department from the National Institutes of Health of the United States Public Health Service for research, facilities and support, and its training program, private funds have also aided materially in the work of the department. In order of their establishment, these are:

The Newhart Fund

In 1941, when Dr. Horace Newhart retired, Dr. Boies created the Newhart Fund that has been used principally for certain benefits to residents in training, such as travel to meetings, etc. Several former residents made contributions and when Dr. Newhart died a surviving sister made a contribution.

The first $7,735 donated was invested. In 1949, when the first edition of the textbook *Fundamentals of Otolaryngology* was published, royalties from the sale of this book were added to the Fund and these have formed the principal source of further additions. This textbook is now in its fourth edition.

The Dittman Fund

In 1952, the University received approximately $340,000 from the estate of Miss Georgeanna Dittman to establish a fund in memory of her twin brother, George C. Dittman, M.D., who had been a practicing

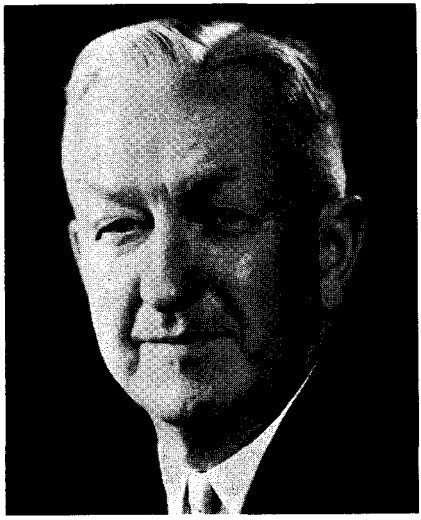
"Eye, Ear, Nose and Throat" specialist in St. Paul, Minnesota for many years before his death in 1948. The conditions of the bequest stipulated that the income from this was to be used for supporting lectures and research in the fields of ophthalmology and otolaryngology. It was further stipulated that of the income therefrom, "the sum of $200 is to be used annually to provide and pay for a lecture or lectures on medical subjects in the fields of ophthalmology and otolaryngology. The lectureship thus endowed is to be known as 'Joseph Bettingen Lectures in Ophthalmology and Otolaryngology' in honor of the memory of my uncle, the late Dr. Bettingen of St. Paul, Minnesota. The rest of the income therefrom is to be used for the acquisition of facilities and/or the conduct of research and/or to establish a professorship in the Department of Eye, Ear, Nose and Throat of the Medical School of said University of Minnesota."

When a separate Department of Ophthalmology and a Department of Otolaryngology were established in 1955, this fund was divided and assigned equally to the new departments.

The Swenson Fund

In 1962, the Department of Otolaryngology received a bequest of $46,189 from the estate of Lilian M. Swenson to establish a fund for research related to hearing. Mrs. Swenson was a graduate of the University of Minnesota in 1898 as was her husband, David Ferdinand Swenson, who became a professor in the Department of Philosophy and Kirkegard Scholar. He died in 1940.

Lawrence R. Boies, who prepared the above sketch, was born in Renville, Minnesota in 1898. He graduated from the St. Croix Falls, Wisconsin High School in 1915 and entered the University of Wisconsin. His study was interrupted by World War I when he served as a corpsman in the Medical Corps of the United States Army. Returning to the University of Wisconsin, he received a bachelor of arts degree in 1922 and master of arts degree in 1923 while the first two years of a medical course were being completed. In 1923-1924, he taught for a year in the high school in Pipestone, Minnesota and then entered the College of Physicians and Surgeons of Columbia University where he received the doctor of medicine degree in 1926. After internship and 19 months of practice as an assistant to a general surgeon in Minneapolis, he enrolled as a graduate student at Harvard Medical School. This



Lawrence R. Boies

study, including a residency at the Massachusetts Eye and Ear Infirmary, covered a period of 25 months.

Dr. Boies was first appointed to the Minnesota faculty in 1931. He continued in half-time private practice in Minneapolis until giving up the latter in 1955 to become the first full-time head of otolaryngology at Minnesota.

Dr. Boies is a member of a number of professional societies in most of which he has been honored with offices.

He is the author of more than 70 papers published in medical journals, textbooks, etc. He is also the author, along with faculty colleagues, of a textbook *Fundamentals of Otolaryngology.*

As Dr. Boies approached retirement age, a search committee recommended Dr. Michael Paparella as his successor. This recommendation was approved by the Board of Regents on November 18, 1966 to become effective July 1, 1967.

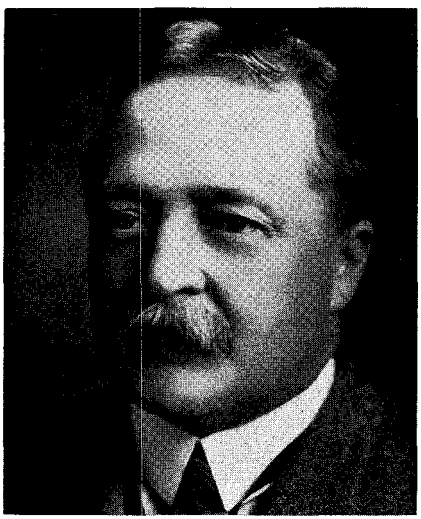
Chapter XXI

Department of Medicine

1888-1936

THOSE PHYSICIANS appointed to the original teaching faculty in various aspects of internal medicine in 1888 were: Albert E. Senkler, Professor of Theory and Practice of Medicine; Charles H. Hunter, Professor of Clinical Medicine and Pathology; C. Eugene Riggs, Professor of Diseases of the Nervous System; Charles H. Boardman, Professor of Medical Jurisprudence; Everton J. Abbott, Professor of Clinical Medicine; J. W. Bell, Professor of Physical Diagnosis and Diseases of the Chest.

Dr. *Charles Lyman Greene* of St. Paul had joined the faculty as an assistant, but by 1903 he headed Internal Medicine. Born in Maine (1862), he graduated from the University of Minnesota College of Medicine and Surgery in 1890. After postgraduate courses in Europe,



Charles L. Greene

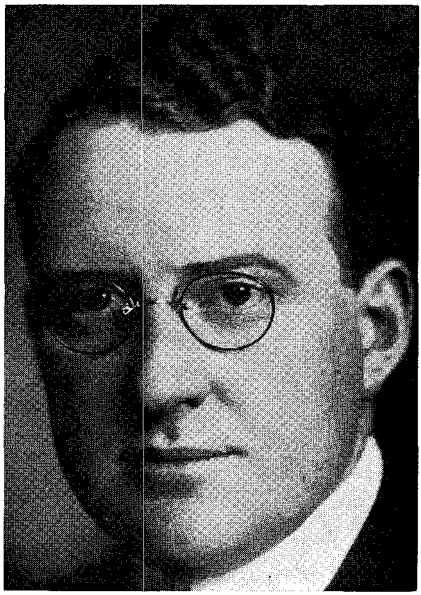
he served as intern in the City and St. Joseph's Hospitals in St. Paul, and then as he developed his practice, he was assistant city physician for a time.

In 1900, as medical director of the Minnesota Life Insurance Company he published *Medical Examination for Life Insurance.* His *Medical Diagnosis* (1907) reached its sixth edition (1925). As professor of Applied Anatomy at the University, he was remembered as an interesting lecturer. He later became professor of Clinical Medicine and Physical Diagnosis; professor of the Theory and Practice of Medicine (1903) and head of the Department of Medicine when it was established in 1909. Cardiovascular diseases were of particular interest to him and he developed a plan for rehabilitation of the cardiac patient. He resigned when the affiliation with the Mayo Foundation was established.

Dr. Greene's active and highly esteemed medical life continued until his invalidism two years before his death in 1929. He had practiced 37 of the 39 years since graduation from Medical School. Thirteen well-known physicians of St. Paul and of Minnesota had associated with him in practice through the years and had taken part in the revisions of his *Medical Diagnosis.*

Another of the foremost members of the Department in 1915 was Dr. George Douglas Head, Clinical Professor of Medicine. Head was a graduate of the University of Minnesota Medical School and had studied in Vienna and under Osler at Johns Hopkins in Baltimore. He was undoubtedly one of the best clinical teachers the department ever had, an unusually thorough, astute diagnostician and a man of very high ideals. He also resigned when the Mayo affiliation was approved.

In the next year (1916), the plump, red-haired and bright-eyed young *Leonard George Rowntree* was brought from Johns Hopkins to be head of the Department of Medicine. His work at Hopkins had been to a large extent in pharmacology, under Abel, and he was much more of an investigator than clinician. Rowntree's research with the phthalein compounds and their excretion in animals, in Abel's Department, led to the phenolsulfonphthalein renal function test first developed by him and Geraghty in 1910. He was elected to membership in the Association of American Physicians at the age of 30 and was chosen to head the Department of Medicine at Minnesota at 33 (1915). His

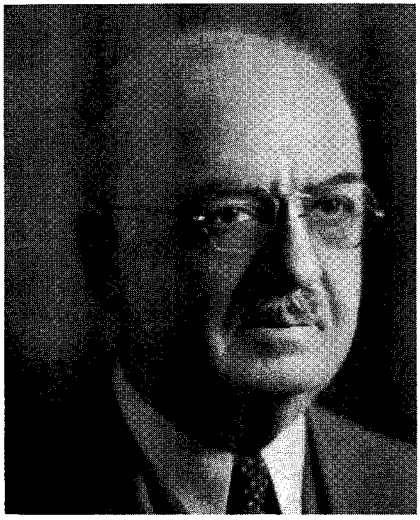


Leonard G. Rowntree

fame as an investigator, his winning personality and his infectious enthusiasm for research gave promise of an era of activity.

In 1920, Rowntree accepted the position as head of the Section of Medicine at the Mayo Clinic at Rochester, Minnesota. He went to Philadelphia as director of the Institute of Medical Research in 1932. Medical honors, appointments and offices on a national scale continued to accumulate until his death (1883-1959) at the age of 73. His bibliography lists 170 titles. One of the men who served briefly as an instructor under Rowntree at the University (1919) was Francis G. Blake who was destined to become one of the best known professors of medicine in the country, serving as head of the department at Yale for many years.

The tenure of Dr. *S. Marx White* as chief of the Department of Medicine (1919-1925) by no means measures his influence on medical education of the University, the state and the nation. Born in 1873, he received his doctor of medicine degree from Northwestern University in 1897 and came to the University of Minnesota in 1898 to teach bacteriology and pathology. Intending to go into the practice of internal medicine, he went to Vienna in 1904 for study with some of the great internists of that day. Upon his return, he resumed teaching in the



S. Marx White

Department of Pathology but was permitted to leave at 4:00 p.m., for two hours of practice downtown in the office of Dr. J. E. Moore, head of surgery at the University, and by 1908 was transferred to the Department of Medicine under Charles Lyman Greene. Dr. White is credited with an important part in planning Elliot Memorial Hospital and Millard Hall. In 1914, he again spent a year in Europe where he studied electrocardiography with Sir Thomas Lewis. He brought the first electrocardiograph to the University and the Twin Cities in 1915. In 1918, White organized the medical section of Base Hospital 26 and served overseas in the first World War. In 1921, he and other former medical officers from that unit formed the Nicollet Clinic in Minneapolis and were joined by other physicians who continued in part-time teaching at the University.

He was made professor of medicine in 1915 and chief of the department in 1919. As the University administrative work became more demanding, with membership on thirteen committees, Dr. White realized that a full-time chief was required, and so he resigned in 1925 but continued part-time teaching as clinical professor until his emeritus assignment in 1942. He viewed his 93 years of life (1873-1966) and 65 years (1897-1962) of medical practice with pride, tolerance and humor. He died on August 29, 1966.

After Dr. White's resignation (1925), Dr. *Hilding Berglund* (1889-

Hilding Berglund

1962) was brought from the Harvard Medical School, a Swedish medical scientist, highly reputed in research and teaching, and strongly recommended to Dean Lyon for the Chair of Medicine at Minnesota. He was born and educated in Sweden. His thesis for the doctor of medicine degree in 1920 was entitled "The Secretion of Urinary Tissues," and was inspired by the work of Volhard and Fahr. Under Otto Folin, he became a member of the Department of Clinical Chemistry at Harvard. During his years at Minnesota, he pursued research in uric acid metabolism, gastric juice secretion, pernicious anemia, and kidney function. He arranged an international symposium on "The Kidney," held in Minneapolis in June 1930, and collaborated with Folin, Addis, Grace Medes and Homer Smith in the publication of the proceedings of this symposium in 1932. In 1930, he went to the Peking Union Medical School as a visiting professor, sponsored by the Rockefeller Foundation.

Dr. Berglund was tall and rugged, immoderate in work demands on himself and on others. His temper was hot and often uncontrolled, and the many stories of his outbursts became well-known here and abroad. Personal difficulties led to his resignation after which he returned to Sweden in 1932, where he maintained a private practice. In addition, for many years he was head of the St. Erik Sjukebur where he trained many of Sweden's fine internists. He died at the age of 75 years in

1962 and was reported to have had a great interest in advances in psychiatry and in the psychological adjustment of the patient to his illness.

Soon after Leonard Rowntree left, Dr. George Fahr was invited to become the only full-time member of the department of senior rank. He had been for a short time on the staff of the University of Wisconsin, following a long sojourn in European clinics where he had worked under Friederich C. Mueller in Munich and Einthoven in Leyden. Dr. Fahr participated in some of Einthoven's earliest work on the electrocardiograph. When he came to Minnesota in 1923, he introduced the needed emphasis on the science of medicine. He was keenly interested in the basic aspects of disease of all types and fully shared the philosophy of his teacher, Friederich C. Mueller, that a professor of medicine should not be highly specialized except in his own personal research. George Fahr's early influence in the teaching of scientific medicine at the University of Minnesota was of major significance, especially during the two decades after he joined the faculty. In 1927, shortly after Hilding Berglund was appointed professor and chairman of the Department of Medicine, George Fahr was made chief of the medical service at the Minneapolis General Hospital and proceeded to establish an excellent professorial unit for teaching and research in that institution. He continued in this capacity until his retirement in 1949.

In 1932, the Department of Medicine at the University was composed of three Divisions: Internal Medicine, Neuropsychiatry and Dermatology. After the resignation of Dr. Berglund, Dr. *John Charnley McKinley,* the director of the Division of Neuropsychiatry, became acting head (1932) and later head (1934) of the Department and served in that capacity until the formation of the Department of Neurology and Psychiatry of which he became the chief in 1943. He was gentle and unassuming, a man of superior intelligence and deep human sympathy. He devoted himself to the pursuit of scientific knowledge, to teaching physicians and to building the University and the profession (see Chapter XXIV).

Dr. *Hobart Reimann,* whom Dr. Berglund had brought back to Minnesota from Peking, became Director of the Division of Internal Medicine in 1932 and served in that capacity until he left to become professor of medicine at Jefferson Medical College in 1936. Reimann had had extensive training and experience in infectious disease, especially

pneumonia. Before going to China, he had worked for a time at the Rockefeller Institute. As a result of this and subsequent work, he became a widely known authority on the pneumococcus.

Dr. *Moses Barron* made an important contribution to the clinical teaching of the Department over many years, serving as clinical professor until his retirement at age 68, in 1952. His class clinics were very popular and stimulating. His early training as a pathologist greatly enhanced his clinical pathological correlations as a clinical teacher. His work in pathology brought him fame and great credit for having given initial stimulus to Frederick Banting to attempt successfully the first preparation of insulin. Banting read Dr. Barron's description of a case of pancreatic duct obstruction with acinar atrophy and persistence of the islets of Langerhans. This gave him the idea which led to insulin, and Banting fully acknowledged the stimulus of Barron's report.

Olga Sophie Hansen who wrote the above sketch of the early history of the Department entered the University of Minnesota College of Medicine in 1911 and graduated in 1915. Immediately after graduation, she was chosen by Dr. S. Marx White as his associate in private practice. She was the first physician in Minneapolis to read electrocardiograms. In 1917, in addition to private practice, she was in charge of the Cardiac Clinic at the University Hospital, Outpatient Department, where she

Olga S. Hansen

served until 1927. This position involved examining patients, reading electrocardiograms, and teaching medical and graduate students. She was clinical instructor in medicine from 1917 to 1927. She became widely known in this area as a student of electrocardiography. In January 1934, she married Dr. J. C. Litzenberg, Chief of the Department of Obstetrics and Gynecology. Dr. Litzenberg died in 1948.

During her 14 years of married life and since, Dr. Hansen continued to practice internal medicine with the Nicollet Clinic with special emphasis on cardiovascular diseases and conditions. She is a member of 23 organizations and has published numerous articles in medical journals.

1936-1966

In 1936, the Department of Medicine had three divisions—Internal Medicine, Neuropsychiatry and Dermatology. Dr. *J. C. McKinley* was head of the department and Dr. *Henry Michelson* was director of the Division of Dermatology.

The Division of Internal Medicine then was responsible for clinical laboratory medicine or, as it was then called, Clinical Chemistry and Microscopy, in the undergraduate curriculum and, of course, clinical medicine in general. In 1936, there were about 40 beds on the medical service exclusive of those devoted to neurology and psychiatry, but including dermatology. The staff of the division at that time consisted of Doctors C. J. Watson and Richard Johnson who was shortly to accept a position in Long Beach, California. A third and most helpful individual was Dr. *Phillip Hallock* who was engaged in the part-time practice of medicine but who was keenly devoted to research. Dr. Hallock transferred his practice to Los Angeles, where he died prematurely.

Dr. John Layne was a resident in medicine and soon became an instructor. He later entered practice in Great Falls, Montana. At the time he was resident, there were only two or three interns and one other resident on the service. With special reference to the importance of infectious disease and the need for additional clinical teachers, Dr. Wesley Spink was invited to become an assistant professor in the division. Dr. Spink had just completed a period of internship and residency training at the Boston City Hospital, including research training under Dr. Chester Keefer at the Thorndike Memorial Laboratory. He joined the faculty of the Division in 1937, was promoted to associate pro-

fessor in 1941 and to full professor in 1946. Dr. Spink is a noted authority in the field of infectious diseases, and has made notable contributions on Brucellosis, bacterial shock and staphylococcal disease. In 1962-63, he served as President of the American College of Physicians. He has also served as President of The American Society of Clinical Investigation, and of The Central Society for Clinical Research.

In 1939, Dr. Thomas Lowry, whose home was Minneapolis, but who had been away for a number of years at school and in advanced training, returned to Minneapolis to enter private practice in internal medicine. He had had residency training at the Boston City Hospital and at Columbia-Bellevue. He devoted a considerable part of his time to clinical teaching at the University Hospital for a number of years. At the time Dr. George Fahr retired as chief at the Minneapolis General Hospital, he succeeded him (1949).

For a number of years after 1937, the expansion of the Department of Medicine was relatively slow, both in terms of facilities as well as full-time staff members. Additions of the latter were made largely by a selection of outstanding young men who had served as interns and residents on the medical service. Particular mention may be made of two men destined to become professors of medicine, Dr. Frederick W. Hoffbauer, who later became chief of the medical service at the Minneapolis General Hospital. Dr. Hoffbauer's outstanding contributions to teaching and research were terminated by his premature death on July 30, 1965. Another in this early period was Dr. Edmund B. Flink who was subsequently, as mentioned in the following, chief of the medical service at the Minneapolis Veterans Administration Hospital and later professor and head of the Department of Medicine at the University of West Virginia, the position which he now holds. During the World War II years, the activities of these men were of signal importance to the continuity of clinical teaching in the accelerated curriculum which was imposed for the duration of the war. Upon the specific request of Dean Diehl to the appropriate manpower agency in Washington, the members of the small full-time staff of the department were formally requested to remain at the University. Thus, the full-time members did not enter military service and the staff of the University Base Hospital Number 26 was composed entirely of clinical members of the faculty, including Doctors Joseph Borg and William Hollinshead of St. Paul, and Doctors Douglas Head and Phillip Hallock of Min-

neapolis. The full-time staff during the war thus consisted of but four members, Doctors Watson, Spink, Hoffbauer and Flink. In order to aid with the clinical teaching, several part-time clinical members of the faculty assisted to a very important extent, including Doctors T. Lowry, R. S. Ylvisaker and J. K. Moen. During the last two and a half years of the war, Dr. Watson spent on an average of one-fourth of each month as a Visiting Professor at the University of Chicago, working on the health aspects of the Manhattan Project. This, of course, required a type of commuting which necessarily entailed some interruption in the work in Minneapolis. Nevertheless, the excellent cooperation and diligent activity of the full-time and part-time staff effectively carried out the mission of the department during the war years, namely, the turning out of as many reasonably well-trained doctors and specialists in as short a time as feasible.

It was quite evident that with the end of the war there would be an enormous upsurge in the demand on the part of returning veterans and the facilities and clinical material at the University Hospital would scarcely satisfy the demand. At that time, there had been no regular University affiliation with Ancker Hospital for some years. There were various discussions of plans which would permit resumption of such an affiliation, at least at the graduate level, and as soon as possible at the undergraduate level as well, but this actually did not materialize until 1946.

In 1946, when the affiliation of the Minneapolis Veterans Administration Hospital was organized with the Medical School, the medical service at the Veterans Hospital was abruptly transferred to the responsibility of the Department of Medicine. Four young men, all of whom were later to distinguish themselves, were asked to go out there at once to serve as residents. This was a considerable assignment when one takes into account that there were nearly 500 medical beds including about 200 for tuberculosis. The "four horsemen" were Doctors William Hollinshead, Robert Green, Howard Horns and Oren Skouge. A little later, they were joined by William Knight. For a time, these men were pretty much on their own, but they were unusually capable and the transfer went smoothly. Very quickly more young men, returning veterans, were assigned there as residents. It was essential that an outstanding person be selected as Chief of the Medical Service, one who would promote teaching and research. Fortunately, the services of

Dr. Richard Ebert were obtained. He had been trained at the Peter Bent Brigham Hospital under Dr. Soma Weiss and had just returned to Chicago, his home city, after a long period in the Army. He quickly proved himself a real leader in the establishment of the medical unit at Veterans Hospital. The members of the staff and the fellows rapidly increased in number, the quality of the individuals and their work being well maintained with the increase.

Dr. Paul Hagen, a University of Minnesota alumnus with a distinguished undergraduate record, was an intern at the Brigham in Boston. He entered the Army early in the war and spent five years in the military service, mainly in the South Pacific. He was a gifted teacher and investigator. When he returned from the war, he was really the first chief resident of the Medical Service at the University Hospital. He joined the staff at the Veterans Hospital in the early period of its formation and for a number of years was director of the Hematology Unit. He was deeply interested in teaching as well as in a basic type of clinical investigation. His tragic death in an automobile accident in the fall of 1963 was a great loss to the faculty of the department. At this time, Dr. Flink had already left the Veterans Hospital to become professor of medicine at the University of West Virginia, and he was succeeded by Dr. Wendell Hall, the present incumbent who has gained an international reputation as a clinical investigator in the field of infectious disease. In 1962, Dr. Leslie Zieve was appointed research director of the Veterans Hospital. He continued to be in charge of the radioisotope laboratory. His organization of this unit and, indeed, of the entire research program at the Veterans Hospital has been exemplary. Other staff members whose research and teaching activities at the Veterans Hospital deserve special mention are: Drs. Horace Zinneman, Richard Doe, Frank MacDonald, Carl Alexander, John Jenne, Alfred Doscher Holmen, Robert Mulhausen, Arnold Edicoff, and Jack Vennes.

University affiliation with the Ancker Hospital in St. Paul has indeed had a rather checkered history. There was a long lapse in the relationship which had existed long before the war. The exact date of the prewar termination of this affiliation is not known. In the years after the war, a number of discussions finally led to the reestablishment of an undergraduate and graduate teaching program at Ancker Hospital. This was not set up as it should have been at the outset in the form

of a regular professorial unit with a senior full-time professor as chief of the medical service; instead, the individual assigned on a full-time basis, although in fact, having the main responsibility for the Medical Service, was formally designated only as the executive to the chief of the service, who was elected by the staff on a two-year basis. This, together with many petty administrative restrictions and obstructions, was a source of considerable difficulty and unhappiness with the result that one man after another stayed for a relatively short time and then resigned, either to go into practice or to assume some other academic post. Difficulties in maintaining the direction of the service, and hence of the teaching, finally led to withdrawal of students and discontinuance of the program.

After a period of two years, at the urgent request of the County Board and members of the staff, certain conditions were agreed upon, forming the basis of renewal of the affiliation and the teaching program. In the main, this included the appointment of a full senior professor as the chief of the service and of additional full-time positions in the department. Dr. James L. Hammarsten, who had formerly been with Dr. Ebert at the Veterans Hospital as an assistant professor in the department, and who had gone as chief of the Medical Service at the University of Oklahoma Veterans Administration Hospital at the same time that Dr. Ebert went to Arkansas, was now invited to return to Minnesota and to become the chief of medicine at the Ancker Hospital. His period of activities there began in August 1962. Another condition of the renewed affiliation was the appointment of a director of medical education. Dr. Dennis Kane, an assistant professor, later an associate professor in the Department of Medicine, was appointed to this position and served until 1966. Dr. Hammarsten, despite many obstacles, succeeded in bringing about a vast improvement in the organization and personnel of the medical service at Ancker. During the period when the affiliation temporarily stopped, the number of house officers in Medicine diminished to a very marked degree. Dr. Hammarsten brought them back to more than a normal complement and succeeded in attracting excellent applicants for both internships and residencies. In addition, he strengthened the full-time staff, especially by bringing with him from Oklahoma Dr. Harold Muchmore, an associate professor in the department, with special interest in infectious diseases and particularly in fungus diseases. The administrative diffi-

culties which persisted stemmed largely from philisophical grounds, especially a lack of appreciation of the great contribution which a university teaching unit properly established in a municipal hospital can make to the welfare of the community. It is greatly to be hoped that the people of St. Paul and Ramsey County will understand the value of the affiliation and will not allow it to be impaired (written in 1966). Doctors Hammarsten and Muchmore resigned in 1965 to take up academic practice elsewhere.

Dr. F. W. Hoffbauer served as professor and chief of the Medical Service at the Hennepin County General Hospital until his untimely death, July 30, 1965. He was succeeded by Dr. Alvin Schultz, professor of medicine and until his new appointment, chief of the medical service at Mount Sinai Hospital in Minneapolis, where he established a fine unit for teaching and research.

To bring the history of the department down to June 30, 1966, it is desirable to indicate something of its organization at the University Hospitals. It was the philosophy of the department that medicine should be taught in a broad context at both undergraduate and graduate levels, and that in general, there should not be segregated subspecialty services, such as beds here for diabetics, and beds there for patients with leukemia. Nevertheless, a certain amount of segregation was implicit in acceptance from the Variety Club in 1950 of the Variety Club Heart Hospital Unit of the University Hospitals. It was understood in the early discussions with the Variety Club members which led to their generous gift that while priority would be given to cardiac patients in the Heart Hospitals, patients with other types of disease might be admitted within reason. In this agreement, there was tacit understanding that many patients with heart disease also suffer from other disturbances which may even be of equal or greater importance to them and, vice versa, patients admitted because of some serious non-cardiac diseases may also have cardiac complications.

Soon after the opening of the Variety Club Heart Hospital, a generous legacy became available to the Department of Medicine for the study of hypertension and related diseases. This was in the will of Mr. George S. Clark, a former Minneapolis lumberman and business man. The amount of his bequest was about a half-million dollars. After careful exploration of possible candidates for the George S. Clark Professorship, Dr. Ivan Frantz of Harvard University, Massachusetts General Hos-

pital and the Massachusetts Institute of Technology was selected. His personal research interests were more intimately concerned with cholesterol metabolism and arteriosclerosis. However, this was well within the liberal provisions of the will. Soon after Dr. Frantz was appointed, another vacancy in the department was occasioned by acceptance on the part of Dr. Carlton B. Chapman of a professorship at Southwestern University in Dallas. Dr. Louis Tobian was appointed as associate professor, with special interest in the field of hypertension. He has established an excellent program of research and has gained an international reputation in this area.

Up until June 30, 1966, Dr. Frantz served as chairman of the Cardiovascular Unit which then included Dr. Tobian, Professor; Drs. Naip Tuna, Yang Wang and Paul Winchell, Associate Professors; Dr. Robert Eliot, Assistant Professor and Dr. John Levitt, Instructor.

Other associate professors in the department at that time were Doctors B. J. Kennedy (cancer, biology and chemotherapy); Fred Goetz (diabetes, metabolism and endocrinology); J. B. Carey, Jr. (gastroenterology); M. J. Murray (general medicine); Ralph Williams (arthritis, collagen disease and immunology).

Dr. Richard Magraw then held the appointments as professor of social medicine in the department, and director of the Comprehensive Clinic Program. The latter was an interdepartmental unit directly responsible to the dean. Dr. Magraw was assisted by Dr. Ben Fuller, assistant professor in the department, and Dr. Graham Beaumont, instructor in medicine. Dr. Carey was in charge of the Medical Clinic which was integrated with the Comprehensive Clinic Program. He was also admitting physician for the hospital. Dr. Luigi Taddeini, then an instructor, worked with Dr. Carey in the Medical Clinic.

Dr. Maynard Jacobson, instructor, was the coordinator of the Departmental Fellowship Program, also devoting considerable time to a long term study of the complications of diabetes, under the direction of Dr. Goetz.

Dr. M. J. Murray served as departmental coordinator of postgraduate teaching and as deputy chief of Service.

Dr. James P. Lillehei was the Minnesota Tuberculosis Association assistant professor in the department, in charge of the chest clinic and consultant in chest diseases.

Dr. Soloman Zak, instructor, was in charge of the allergy clinic.

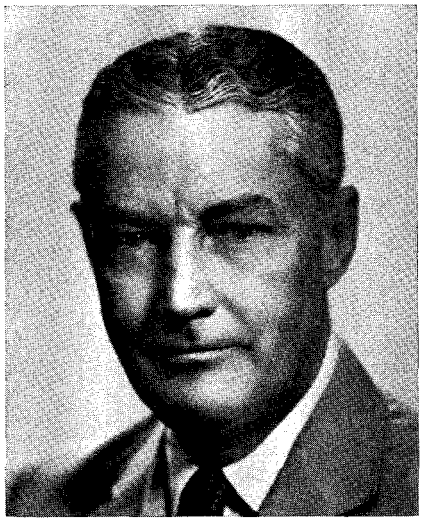
Dean R. B. Howard holds his professorship in the Department of Medicine, in which he had his earlier clinical and research training. Dr. N. L. Gault, formerly a chief resident in medicine, was associate dean and associate professor of medicine. Dr. Robert McCollister, also a former chief resident in the department is assistant dean on a part-time basis, still active in clinical teaching and research (hematology).

Dr. Samuel Schwartz is a research professor holding a Career Research Award of the United States Public Health Service. Dr. Richard Davis is assistant professor, a Career Development Awardee of the United States Public Health Service.

For many years, the department has been fortunate in having the assistance of approximately 150 clinical appointees ranging in rank from clinical professor to clinical instructor. These individuals all devote themselves mainly to private practice but have given varying amounts of time to clinical teaching in one form or another, at one or more of the teaching hospitals. It is manifestly impossible to single out individuals from among this large list. Suffice it to say that over the years and in the aggregate their contribution has been of great value and is highly esteemed.

In 1964, Mr. and Mrs. John C. Cornelius of Minneapolis established an annual Visiting Professorship in the Department of Medicine, to be known as the John and Miriam Cornelius Professorship. This brings to the department and school each year a professor of medicine of outstanding ability, character and international reputation, to spend a week in close relationship with the faculty and students, thus providing stimulus and new ideas. The Cornelius Professor gives two formal lectures during his tenure, makes ward rounds and takes part in various functions of the department such as seminars and conferences. Opportunities are provided for him to meet with the undergraduate students and the House Staff. The first Cornelius Professor (1965) was Sir George Pickering, Regius Professor of Medicine at Oxford University. He fulfilled the objectives of the Cornelius Professorship in a superb manner. (See Appendix J.)

Dr. *Cecil Watson* who prepared the above account of the latter years of the department, was born in Minneapolis, the son of J. A. Watson, a highly respected expert in diseases of the eye, ear, nose and throat.



Cecil J. Watson

In due time, he enrolled in the University of Minnesota where he was awarded the degree of doctor of medicine in 1924. He then registered in the Graduate School under Dr. E. T. Bell, professor of pathology, where he worked especially on Periarteritis Nodosa and wrote his thesis on this subject for which he was awarded the master of science degree in pathology. While working with Dr. Bell, Dr. Watson did a necropsy on a person who had died without a diagnosis. He studied the lesions in great detail and reviewed them with Dr. Hal Downey of hematology fame and Dr. William Riley, who was expert in parasitology. He was able to identify the organism in the tissue sections which justified a diagnosis of Histoplasmosis. This was the first case reported in the United States.

In 1928, Dr. Watson was granted the degree of doctor of philosophy in pathology with a thesis on splenic disorders. In 1930, he took advanced courses in organic chemistry before leaving for Munich, Germany to work in the laboratory of Hans Fischer. In that laboratory, he accomplished the isolation of crystalline stercobilin. He remained in Munich for two years, the second as a National Research Council Fellow. He also attended the medical clinics of Dr. Friedrich Mueller.

By 1932, Dr. Watson had firmly decided upon a career in academic medicine. When he returned to Minneapolis, he became assistant resident in medicine at the Minneapolis General Hospital and at the

University Hospital continuing basic and clinical studies in the field of bile-pigment-porphyrin chemistry.

While an associate professor of medicine he was named director of the Division of Internal Medicine in 1936 under Dr. J. C. McKinley, later head of the Department of Medicine. When Dr. McKinley chose to limit his work to psychiatry, Dr. Watson was promoted to a full professorship and became head of the Department of Medicine in 1942.

As World War II was underway, he became visiting professor of medicine to the University of Chicago while continuing his regular duties in Minneapolis. He was made associate director of the Health Division of the so-called Metaleurgical Laboratory. When World War II was over, Dr. Watson continued to direct the Department of Medicine at the University of Minnesota.

Dr. Watson has been called upon to participate in many activities. For some time, he was the recorder for the Association of American Physicians. He later became counselor and served as president in 1960-61. He also served as President of The American Society for Clinical Investigation and the Central Society for Clinical Research.

He served as a member of the Committee on Medicine and Surgery of the National Research Council as well as the Medical Fellowship Board of the Council. In 1959, he was honored by election to the National Academy of Sciences. In 1961, he received the Distinguished Service Award of the Minnesota Medical Foundation and was named Distinguished Service Professor by the University.

On June 30, 1966, he relinquished the headship of the Department of Medicine and on July 1, transferred his research to a new University unit for teaching and research at Northwestern Hospital, Minneapolis. Several of his associates accompanied him, including Dr. Vincent Fromke, assistant professor, Dr. Z. Petryka, research associate, Mrs. Eugenia Davis, research fellow, Miss Irene Bossenmaier, scientist, Miss Mary Weimer, associate scientist, and Miss Ruth Cardinal, associate scientist.

Dr. *Richard Ebert,* Professor and Head of the Department of Medicine at the University of Arkansas, was appointed as Dr. Watson's successor. Concerning him, Dr. Watson wrote: "Dr. Ebert is well known in Minnesota because he was chief of the Medical Service at the Veterans Hospital and a professor of medicine in the University of Minnesota from 1946 to 1953. He organized the Medical Service at

Richard Ebert

the Veterans Hospital and brought it to a very high level in terms of teaching, research and service during his tenure. In this period of time, he had the primary responsibility for the graduate training in internal medicine of a large number of residents and he was a very popular leader. At Arkansas, he has established the same kind of reputation as a department head. Dr. Ebert was born in St. Paul, the son of a dermatologist who shortly entered practice in Chicago where Dr. Richard Ebert received most of his education. He graduated from the University of Chicago Medical School in 1937 and then had graduate-residency training with Dr. Soma Weiss in Boston. During World War II, he served overseas and received the Bronze Star for studies of treatment of shock in wounded soldiers."

Dr. Ebert is widely known for his studies in the field of cardiovascular and pulmonary disease, especially for his work on pulmonary emphysema. He was recently appointed as a member of the National Advisory Health Council, a highly important group which is advisory to the Surgeon General of the United States Public Health Service.

Dr. Richard Ebert is a man who can be counted on to administer the Department of Medicine in excellent fashion, to maintain the teaching program on a high level, and to stimulate and catalyze the research activities of the department and of the school.

DIVISION OF DERMATOLOGY

An understanding of the early history of dermatology in the Medical School of the University of Minnesota requires some knowledge of the position of American dermatology at the time. The American Dermatological Association was organized in 1876, initiating the division between dermatology and urology, which had previously been closely linked by a common interest in venereology, but the American Medical Association Section on Dermatology and Venereal Diseases was not established until 1886. In the Midwest in the 1880's, the separation was less advanced than in the East. The title changed several times prior to 1909 when it became the Section of Dermatology; later it reverted to Dermatology and Syphilology, returning only recently to Dermatology alone.

In Minnesota, an early item regarding dermatologic teaching was recorded in *Northwestern Lancet* in 1881 when Dr. Frederick Dedolph was referred to as "Late Professor" at a St. Paul medical school. In 1885, dermatologic teaching at the St. Paul Medical College came under the direction of Dr. Le Grand Denslow, formerly of Minneapolis, who joined the University faculty when the University Medical School was formed in 1888. It appears that Dr. Max Posa Vander Horck was already teaching at a Minneapolis hospital prior to joining the University faculty the same year. Dr. Burnside Foster established himself in dermatologic practice in Minneapolis in 1887 and became a member of the University Medical School Faculty upon its organization, and before he moved to St. Paul following Dr. Denslow's departure in 1891. In 1892, he became a member of the staff of City and County Hospital of St. Paul. He was appointed as clinical professor in 1899.

Dermatology at the University of Minnesota evidently started with these three men. Although these, and perhaps other and unremembered physicians were "Professors of Dermatology," they seem to have offered no organized program of clinical teaching at the start, only a series of lectures. Later, under the direction of Dr. Max Posa Vander Horck, more modern teaching of dermatology at the Medical School was offered. He began medical studies at the College of Physicians and Surgeons in New York City and subsequently continued at Jefferson Medical College in Philadelphia, where he was awarded a Gold Medal. From his dermatologic practice in Minneapolis, he became a member

of the University faculty and was professor of dermatology from 1899. Illustrating the ambivalence mentioned earlier, he chose to become professor of genito-urinary diseases in 1899 but continued in charge of dermatology and taught students in Minneapolis at the same time as did Dr. Foster in St. Paul. These professors later had voluntary teaching assistants in the separate out-patient clinics. Among those who taught with Dr. Vander Horck during the early part of the 20th Century were Doctors Franklin Wright (who continued in urology), Samuel Sweitzer and John Butler; Dr. Wright later became professor of urology.

After Dr. Vander Horck died in 1911, Dr. Foster continued to teach at the St. Paul Dispensary, assisted at first by Dr. Charles D. Freeman, Sr., and later helped also by Doctors John Armstrong and Henry (Nick) Klein. Illness soon forced Dr. Foster's retirement.

After Dr. Vander Horck, the next figure of lasting importance to dermatologic teaching was Dr. Samuel E. Sweitzer, whose significant dermatologic activities continued until his death in 1964. He studied abroad in 1904 (and again in 1907 and 1912) and returned to practice in Minneapolis, becoming a faculty member in 1905 as clinical assistant. Thus, he was first a medical student and then a faculty associate of Dr. Vander Horck. He became clinical instructor in 1912. Following Dr. Foster's retirement, Dr. Sweitzer in 1913 became assistant professor and director of the dermatologic program. It seems now impossible to determine the exact date when the Division of Dermatology was established, but the year 1913 apparently is *de facto* if not *de jure*. Dr. Sweitzer further developed the undergraduate teaching program and had as assistants Doctors John Butler, Harry Irvine, George Olson, and Clifford Boreen. Dr. Sweitzer had become consultant dermatologist at the University Hospital when it opened in 1911 but the major dermatologic teaching program of Minneapolis was conducted at the University Outpatient Clinic near Seven Corners; Dr. Charles D. Freeman was in charge in St. Paul. Dr. Sweitzer was appointed as associate professor in 1917 but the administrative situation at the Medical School and the status of dermatologic teaching were not long satisfactory to him and he left the school program in 1920, becoming the first chief of dermatology and syphilography (sic) at the Minneapolis General Hospital, with both inpatient and outpatient services. Later, during Dr. Michelson's tenure as director of dermatology, Dr. Sweitzer became a clinical professor. He was an enthusiastic teacher and he con-

tinued active clinical work at the hospital until his retirement in 1948.

Upon Dr. Sweitzer's withdrawal from active teaching at the Medical School, the program came temporarily under the joint direction of Doctors Butler and Irvine but the dominant figure in the teaching of dermatology already was Dr. *Henry E. Michelson.* In 1925, he was appointed professor of dermatology and director of the division. He undoubtedly has been the most influential figure in dermatology in Minnesota, not only within the school but generally, as well. He continued in charge of the teaching program and the clinical care of patients until his retirement as director in 1957.

Under the direction of Dr. Michelson, the clinical and teaching programs at the Medical School expanded steadily, with help in the earlier years from Doctors Butler, Irvine, Turnacliff and Boreen. Inpatient and outpatient services were developed on a scale suitable to the nature of the institution and their quality was at a high level.

Because dermatologic practice is principally an office or outpatient activity, the dermatologic teaching program has always required full cooperation from practicing dermatologists in the Twin Cities and has necessarily depended more than other clinical teaching services upon the facilities of the affiliated hospitals and their clinics.

In 1930, Dr. John F. Madden succeeded Dr. Freeman as chief of dermatology at Ancker Hospital, followed upon his death by Dr. Francis

Henry E. Michelson

W. Lynch for about a five-year period, and then by Dr. Harold G. Ravits who continues to direct the undergraduate and residency training programs at what is now known as St. Paul-Ramsey Hospital. In 1948, Dr. Carl W. Laymon succeeded Dr. Sweitzer at the Minneapolis General Hospital (now the Hennepin County General Hospital), and continues teaching both there and at the Medical School. The residency training began at Minneapolis General Hospital about 1926.

Teaching at the Minneapolis Veterans Administration Hospital began as a residency training program soon after the conclusion of World War II, under the direction of Dr. Michelson. For a short time, Dr. John R. Haserick was a full-time staff member there. Dr. Isadore Fisher is now in charge of an undergraduate and residency teaching program there.

As in the case of most of the teaching units at the Medical School, the dermatologic specialty training program began informally and at a precepter or tutorial level. More formal training began about 1927, as noted earlier, and has subsequently provided all or a major portion of the specialized training for a succession of approximately 100 dermatologists.

Dr. Louis H. Winer should probably be regarded as the first "resident" in training, although his financial support derived from night work as an "assistant to the superintendent" in the Emergency Room at the Minneapolis General Hospital. During two years in that position, he worked regularly during the day with Dr. Sweitzer in the Dermatology Outpatient Clinic and on the Inpatient Service. He also assisted Dr. Michelson in his program at the Medical School, especially in histopathology which later became a major interest for him. Subsequently, he spent a year in Vienna and then returned to continue his interest in dermatologic histopathology and to teach the residents in training. After nearly 15 years on the staff of the Minneapolis General Hospital and at the University, he left to practice and teach in Southern California.

Many who received training in the division have remained in the Twin Cities and continue to participate in its activities. Clinical experience of trainees is now gained by rotation at two or more of the four principal teaching hospitals and each medical fellow in dermatology spends at least one day a week at the Medical school throughout his three years of training. The degree program was activated in 1931. More recent has been the development and expansion of cooperative

exchange of trainees between the Medical School and the Mayo Foundation.

During the two periods which Dr. Michelson spent in advanced dermatologic training in Vienna, much of his attention had been concentrated on histopathology. A dermatologic histopathologic laboratory unit was established within the area of Dr. Bell's department and later Dr. Michelson established a separate dermatologic histopathology laboratory. For a short period of time, Dr. John R. Haserick concentrated his efforts in the field of histopathology. Subsequently, Dr. Robert W. Goltz was in charge of the histopathology laboratory of the division.

In addition to interest in histopathology, Dr. Michelson had lesser interests in many other basic science fields, leading to varied research activities by Medical Fellows and by several of his teaching staff. Shortly before Dr. Michelson's retirement from the active staff, an increasing interest and an expansion of research activity was activated by younger members of the staff and by Medical Fellows. Dr. Goltz and Dr. Ramon M. Fusaro collaborated in the field of histochemistry, a field which continued to attract Dr. Goltz' interest until his departure from the School in 1965 to head the division of dermatology of the University of Colorado Medical Center and Medical School.

In 1957, Dr. Fusaro became the first dermatologist to have a continuing full-time appointment at Minnesota. In addition to his clinical interests and his contributions to the teaching program of the division, he has concentrated a considerable portion of his attention to research in biochemistry and to immunology as related with the skin. He directs a biochemical laboratory working with John A. Johnson, M.S., in organic chemistry, chiefly on studies of cutaneous carbohydrate metabolism. Dr. Fusaro is also doing work in immunology and in a variety of studies on light sensitivity.

In 1958, the Hill Family Foundation granted five years of support for a research biochemist, Quenton T. Smith, doctor of philosophy, who has continued as the second full-time teaching member of the staff, with research activities especially along the line of connective tissue metabolism, aging of the skin, and cutaneous lipid metabolism.

In 1961, the division received a United States Public Health Service Training Grant which led to expansion of laboratory facilities, equipment and personnel. Subsequently, there has been continuing expansion in

dermatologic research in the fields of histopathology, histochemistry biochemistry and immunology. Still more recently the division acquired an electron microscope.

As the third full-time member of the division faculty, Dr. Dorothy B. Windhorst, is currently a special research fellow working in immunology under the direction of Dr. Robert W. Good of the Department of Pediatrics. Several part-time salaried staff members are active in directing the Histopathology Laboratory (Dr. Milton Orkin), and Electron Microscopy Laboratory (Dr. Alvin S. Zelickson), working in immunology and in histochemistry (Dr. Willard C. Peterson, Jr.) and in teaching at the University Hospital (Doctors Manuel Jaffe, Kenneth P. Manick and John G. Rukavina).

It is evident that the 75-year history of dermatologic teaching at the University of Minnesota has encompassed three fairly separate stages of development. First, approximately 35 years of gradually improving and competent clinical teaching of undergraduate students, chiefly under the supervision of Dr. Vander Horck and then Dr. Sweitzer. Secondly, under Dr. Michelson's direction a period of nearly 35 years resulted in major expansion of the undergraduate teaching program; the development of one of the largest and most effective residency training programs in the United States; active participation in postgraduate teaching at the Center for Continuation Study since its establishment; encouragement of a considerable interest in clinical research; and the development of a Histopathology Laboratory, encouraging basic science studies in that field. During this stage of the program, some of the trainees developed interest in other basic science fields as they related with dermatology and several of them exhibited considerable interest in preparation for academic positions; toward the end of this second period, there began more rapid extension of the program along those lines and the first acceptance of Federal support for research projects.

As a third stage, in the more recent past, funds from Federal and other sources have allowed development of a series of divisional research laboratories and a more specific direction of attention toward preparation of trainees for academic careers in dermatology. Most of this expansion and modernization has continued to depend upon part-time teachers but the trend toward development of a full-time staff in the division is now clearly evident. Dermatology seems now to be prepared to join effectively with the other clinical disciplines in whatever program the

Francis W. Lynch

School may encourage for further development of modern academic medicine.

Dr. *Francis W. Lynch,* who prepared this account of the Division of Dermatology, was born on June 21, 1906, in Winona, Minnesota. In 1903, he was awarded the degree of doctor of medicine and degree of master of science in dermatology in 1933. Immediately after receiving the degree of doctor of medicine, he became a member of the faculty of the Medical School.

He has been active with the Minnesota Medical Alumni Association of which he was president in 1941. He was also vice-president of the Minnesota Medical Foundation in 1954.

His research and teaching were of such fine quality that when Dr. Henry Michelson retired from the directorship of the Division of Dermatology in 1956, Dr. Lynch was chosen as his successor.

In the Society for Investigative Dermatology, Dr. Lynch has been director and vice-president. Since 1963, he has been associate editor of the *Journal For Investigative Dermatology.* In 1938, he became a member of the American Academy of Dermatology. From 1947 to 1950, he was the director. In 1950, he was vice-president and a decade later president of the American Academy of Dermatology.

Dr. Lynch has held the highest positions on the American Board of Dermatology having been vice-president in 1957, president in 1959

and adviser since 1960. The Association of Professors of Dermatology elected him secretary for 1962 and 1963 and president in 1964. After becoming a member of the American Dermatological Association, he served as director from 1958 to 1962 and president in 1964. In 1961 he was elected to membership in the International Society of Tropical Dermatology.

Since 1956, he has been honorary member of the Pacific Dermatological Association and since 1961 corresponding member of the Danish Dermatological Society.

In 1961, he received the Distinguished Service Award from the Archbishop of the Roman Catholic Diocese of St. Paul.

Chapter XXII

The Department of Obstetrics and Gynecology

An attempt will be made to describe the progress of the Department of Obstetrics and Gynecology of the University of Minnesota Medical School under three headings. First will come the events, to be followed by some details of the influences of a very few selected men. At the end, the activities and contributions of the department over the years will be mentioned briefly.

EARLY HISTORY

From 1882 through 1886, Dr. William H. Leonard of Minneapolis was shown in the University bulletins as professor of obstetrics in 1882 and as professor of obstetrics and diseases of women and children in 1884, 1885 and 1886.

In 1887 and 1888, the University bulletin listed two staffs in Obstetrics and Gynecology. One was in a "College of Homeopathic Medicine and Surgery" and listed Henry C. Leonard, B.S., M.D. as professor of obstetrics and Albert E. Highbee, M.D. as professor of gynecology.

In the same years, another faculty of medicine, presumably eclectic, is listed in the bulletin. Parks Ritchie, M.D. now appears as professor of obstetrics, Alexander J. Stone, M.D., LL.D. as professor of diseases of women and A. B. Cates, M.D. as "Adjunct to the Chair of Obstetrics." Of these, more later.

In 1888, 1889 and 1890, but not in 1891, the bulletin listed an assigned text in obstetrics by "Leavitt" for the Homeopathic College of Medicine and Surgery. The *Index Catalogue of the Surgeon General's Library,* second series, Volume IX, 1904, p. 346 lists Sheldon Leavitt as the author of the following texts:

1. *Homeopathic Therapeutics as Applied to Obstetrics.* 1881.
2. *The Science and Art of Obstetrics.* 1883.
3. *The Science and Art of Obstetrics.* Third edition. 1901.

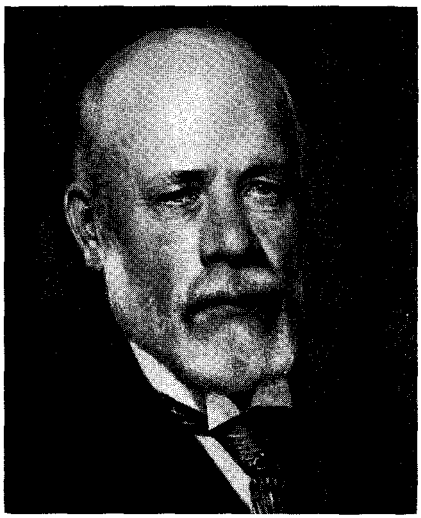
These references were discovered by Dr. Irwin H. Daiser. The books themselves are not available.

When the University College of Medicine and Surgery was established in 1888, aside from lectures, teaching of Obstetrics and Gynecology was done in St. Paul and Minneapolis Hospitals.

MORE RECENT HISTORY

The history of the Department of Obstetrics and Gynecology really begins with the academic appearance of Doctors H. Parks Ritchie and Alexander J. Stone. The 1887 bulletin which may represent the plans for 1888 teaching lists Drs. Ritchie, Stone and Cates as shown above. They made up the staff of the department in the College of Medicine and Surgery as distinct from the College of Homeopathic Medicine and Surgery.

Dr. *H. Parks Ritchie* was born in Bainbridge, Indiana in 1845. He attended Franklin Academy and received the doctor of medicine degree from Ohio Medical College, Cincinnati, Ohio in 1870. He was professor of obstetrics in the St. Paul Medical College in 1885. In 1888, he became professor of obstetrics in the University of Minnesota College of Medicine and Surgery. He was dean of the Medical College from 1897 to 1906. When Dr. Alexander J. Stone died in 1910, the Depart-



H. Parks Ritchie

ment of Obstetrics and the Department of Gynecology were combined to form the Department of Obstetrics and Gynecology of which Professor Ritchie was made head. He was also a busy practitioner in St. Paul. This left precious little time for mischief. He died suddenly of apoplexy in 1913 at age 68. (See Chapter IX.)

Dr. *Alexander J. Stone* was born in Auberndale, Massachusetts, in 1845. He graduated from Bowdoin College and the Harvard Medical School and came to Minnesota in 1869. He was the guiding genius of the St. Paul Medical College which was organized in 1869. In that school, he was dean and professor of obstetrics, gynecology and medical jurisprudence. In 1887, he was awarded the degree of doctor of laws by the University of Iowa. When the original faculty of the University of Minnesota College of Medicine and Surgery was organized in 1888, he was appointed professor of diseases of women. When the College was departmentalized in 1909, he served as head of the Department of Gynecology until his death in 1910.

These must have been stirring times. The University of Minnesota published a small book which summarized papers which were presented on December 8, 1908 in a symposium entitled *The Unification of Medical Teaching in the State of Minnesota. An Historical Evening.* It quotes Dr. Parks Ritchie, the ex-dean but still head of the Department of Obstetrics as follows: "Dr. William Davis (a member of the first class I taught in Obstetrics-Gynecology) is a graduate of Harvard Medical School and at that time was unfamiliar with the crude teaching methods of the 'wild and woolly' Northwest. He told me afterward that my first lecture was the most interesting and entertaining bit of farce comedy he had ever listened to.

"Because Dr. Stone could talk with equal fluency on gynecology or surgery or obstetrics or chemistry or mothers' clubs he assumed that anyone else could do the same. Dr. Charles Wheaton is responsible for the outrageous slander that the less Dr. Stone knew of a subject, the better he could talk about it."

Dr. Stone spoke on the same evening on the subject, "The St. Paul Medical College." He said: "The trials and tribulations which we had in those early days, those teaching now, those studying at the present time, can hardly appreciate. As president of the St. Paul Medical School it was my duty, then, not only to teach the subjects assigned to me, obstetrics and diseases of women, but to fill at any hour, in any

subject, the part of the teacher who could not be present. And as a matter of fact, I had to lecture upon every subject save that of chemistry, of which I knew nothing."

Dr. Stone was introduced in 1910 by Dr. Richard O. Beard, professor of physiology as follows: (Executive Committee Minutes, Medical School, July 1910). "President of the St. Paul Medical School, Preparatory, pioneer of college education in Minnesota, Alexander J. Stone. Always the same genial and scholarly gentleman that he is today, will speak to us to-night. He lectured then on diseases of women as he lectures still but combined with it the subject of obstetrics."

Dr. *A. B. Cates* who was appointed adjunct professor of obstetrics in 1888 was born in Maine in 1854. After graduating in medicine from the University of the City of New York in 1881, he established a practice in Minneapolis in 1883. Dr. Cates has been credited with having aided in obtaining the first gift toward building the Elliot Hospital on the University campus.

Two other men who were to play significant roles in the department appear by the way of back doors, so to speak. They appeared first as associated with other departments. In 1896, the University bulletin lists Dr. John Rothrock as clinical instructor in pathology. This continued to 1903 when his appointment was listed as in both pathology and gynecology. In 1905, he was shown as clinical professor of diseases of women, a rapid academic advancement.

In 1903, he and Dr. Frederick Leavitt were conducting ward rounds for students in several hospitals in St. Paul while Dr. J. C. Litzenberg was doing similar service in Minneapolis.

Dr. *John L. Rothrock* was born near Mifflintown, Pennsylvania, on July 12, 1863. He graduated from Gettysburg College, Pennsylvania in 1885. In 1934, that school gave him a doctor of science degree and in 1941 he gave them $50,000. In 1888, he graduated from the University of Pennsylvania Medical School and after an internship, he began practice in St. Paul in 1890. In 1893-1894, he "studied in Baltimore, Philadelphia, Leipsic (sic), Berlin, Vienna and Prague." It is assumed that he spent this time at obstetrics and gynecology. It is said that he "established a bacterial laboratory in St. Paul and served as assistant health commissioner from 1896 to 1898." The Gettysburg College Bulletin of October, 1941, carries his picture on the front and a detailed description of his career inside.

In Dr. Rothrock's file in the department, there is an unsigned typed manuscript dated June 10, 1936 which was the date of a meeting on the occasion of his retirement from the Medical School. The content would seem to make it clear that it was the work of Dr. Jennings C. Litzenberg and was for presentation on that occasion. This contains two interesting photographs.

June 10, 1936

"I present to you Dr. John L. Rothrock, professor of obstetrics and gynecology.

"Were it not for his own modesty, Dr. Rothrock would to-night be retiring as chief of the department, instead of as a full professor.

"When the Department of Obstetrics and Gynecology was organized at the beginning of the second decade of the century, Dr. Rothrock was asked by the administration of the Medical School to head the division of gynecology in the new department. This he declined to do and again, in 1913, at the reorganization of the Medical School, and after the death of the revered chief of the department, Dr. Parks Ritchie, Dr. Rothrock was asked to head the department. Again, he declined. This was to all of us in the department a source of great regret because we not only admired his great skill and teaching ability, but we all recognized him as the most learned man in our specialty, in this part of the country.

"When the present incumbent was then offered the chiefship, he went to Dr. Rothrock and urged him to reconsider, but he modestly but persistently adhered to his decision."

Dr. Rothrock was a quiet unassuming person who remained a bachelor and devoted his whole life and interest to obstetrics and gynecology. He was regarded as the elder statesman in his field in St. Paul. He had been responsible for the graduate training of a considerable proportion of the next generation of practitioners there. There is no evidence that he produced any startingly new information but he did set a tone of clinical and surgical excellence which was well up-to-date and of professional responsibility and integrity which were very real contributions. He died in 1943.

The second person to appear by the back door was Dr. *Jennings C. Litzenberg* (1870-1949). In the bulletin for 1900, he is listed as "assistant in ophthalmology and otology." This persisted to 1902 when he was shown as assistant in obstetrics (only obstetrics) and was said

to be responsible for demonstrating to students "study and participation in two or more deliveries." He was also "associate physical director of the University of Minnesota" from 1896 to 1908 with Dr. L. J. Cooke. He never lost an abiding interest in athletics and athletes. He became "professor and director" of the department in 1913 and it was at this point that the modern history of the department begins.

In 1906, Dr. Fred L. Adair appears as clinical assistant in medicine. He was also listed as assistant in obstetrics. He obtained a doctorate of medicine from Rush Medical College in 1901. In 1908-09 he studied with Dr. Robert Meyer in the Pathological Institute of the First Woman's Clinic in Berlin which led to an early publication dealing with the histologic details of cervical erosion healing. (See Chapter XI.)

In 1906, there is the first assignment of the textbook, *Williams' Obstetrics.*

In 1916, Drs. R. T. LaVake and L. W. Barry appear on the list of faculty for the first time and the department is simply listed as Obstetrics through 1926. The following year the title is shown as Obstetrics and Gynecology. It was during these years that the names of *Jalmar E. Simons* who was to succeed Dr. Fred Adair as department head at the Minneapolis General Hospital, and of *Roy E. Swanson* and *Samuel Solhaug* who were to give long teaching service at the University Hospitals appear in the budget lists. Dr. *Leonard Lang,* who was to succeed Dr. *Jalmar Simons,* appears as a teaching fellow in 1931.

A great many men have played a role in the development of the department's activities since 1938. Dr. *Charles E. McLennan,* a Minnesota graduate, was senior fellow in 1938. He was quickly moved to full time instructor in 1938 since there was no other full-time member of the department. He left in 1945 to take over his own department and is now department head at Stanford University Medical School in Palo Alto, California. Dr. *A. L. Dippel* came from Johns Hopkins in 1940 as full-time associate professor. He was largely responsible for the organization of the Minnesota Maternal Mortality Study, of which more later. He left to take over a department of his own in 1943. Dr. *Curtis Lund* came from the University of Wisconsin in 1943 and left in 1947 to take over his own department. He is now professor and head at the University of Rochester, New York. Dr. *Emil Holmstrom* left

to act as assistant with Dr. *McLennan.* He took over as head at the University of Utah. Dr. *Roy G. Holly,* a Minnesota graduate, left in 1954 to take over as head of the department and eventually as assistant to the president at the University of Nebraska. He is now department head at Jefferson Medical School. Dr. *Irwin Kaiser* came from Johns Hopkins and Baltimore in 1951 and left in 1959 to head the department at the University of Utah Medical School where he is now. These are the men who have made major marks in academic obstetrics and gynecology. A host of others have contributed variously in part-time teaching and in practice. Dr. *Robert O. Meyer,* the senior gynecologic pathologist probably of all time, came to the department in 1939 when he was forced to leave Germany.

ACTIVITIES OF THE DEPARTMENT

These were the men and their times. What did they do? Only a few of the contributions they have made can be considered and these must of necessity be painted with broad strokes. Dr. Ritchie must have been a really extraordinary man. His portrait which is in the department shows a full bearded serious person. One would scarcely guess that he possessed the humor which is evident in the remarks which have been quoted. He gave up the deanship in 1906 but continued on as department head until 1913 when he died suddenly of apoplexy at the age of 68. He had made a large, generous and essential contribution to the department and to the Medical School. (See Chapter IX.)

There is very little recorded detail beyond that already given about Dr. Frederick Elmer Leavitt, M.D.

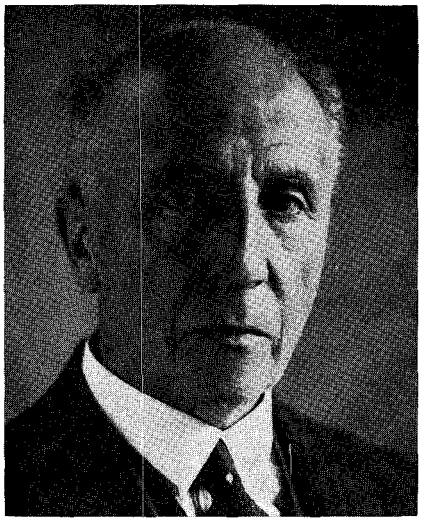
Dr. *Jennings C. Litzenberg* (1870-1948) had more influence on the development of the department, on the development of men and on the practical application in this area of the Northwest of burgeoning knowledge in the field of obstetrics and gynecology than any other single person. He took over as part-time professor and departmental chief of Obstetrics following the death of Dr. Ritchie. He had a number of assets. He was one of the earliest of the American obstetricians and gynecologists to bring back German medical knowledge. He spent the years 1909 to 1911 studying in Vienna and returned again to Vienna and Berlin following his appointment to the chair in 1913. He had a striking ability to develop and retain the loyalty of his students. And,

Jennings C. Litzenberg

he made enduring personal friendships on a national level. This led to close friendships through the American Gynecological Society and he was elected to the presidency of this society in 1940. He was one of a small group of fellows of that Society who were responsible for the establishment of the American Board of Obstetrics and Gynecology, the earliest functioning specialty certifying group.

His study interests were largely in obstetrics. His multiple activities limited these. Perhaps his major interests as manifested by the publications and the masses of pictures and slides which he left were the various aspects of tubal ectopic gestation. He developed convincing arguments for an etiologic relationship between hypothyroidism and infertility. But his major contribution was in the part he played in the professional acceptance of the significance of conservativism in obstetrics. He never tired of lecturing on one or another aspect of these principles and always to receptive audiences.

The interested reader is referred to a published "In Memoriam" by Dr. Claude J. Ehrenberg in *Minnesota Medicine* of December 1948. Other source material may be found in "An Appreciation" by perhaps his closest local friend, Dr. S. Marx White, which was presented before the Minnesota Academy of Medicine and in "Dr. Jennings Crawford Litzenberg: A Profile," by his colleague Dr. Ray F. Cochrane and published in *Minnesota Medicine* of July, 1966. Dr. Litzenberg also



Robert O. Meyer

wrote a brief autobiography for the 50th reunion of his class of 1894. His portrait is in the department with that of Dr. Ritchie. This shows a man who was at peace with himself.

The third of these men who produced an enduring effect was Dr. *Robert O. Meyer* (1864-1947). He received his doctorate in medicine in Germany in 1889. As was the accepted custom at that time, he did general practice in Hannover and later in Berlin for several years. An interest in adenomyosis in the fetus led to the establishment of a histologic laboratory in his Berlin kitchen, to an invitation to present his findings before the Berlin Gynecological Society, a most unusual opportunity, and an offer to spend the rest of his life at obstetrical-gynecological histology. He eventually took over the direction of the Pathological Institute of the First Woman's Clinic on Artilleriestrasse in Berlin. From that post, he gave leadership to the whole development of obstetrics and gynecology. One can make a good case for the conclusion that his contributions to obstetrics and gynecology were perhaps the most significant of his time. He combined an unsurpassed critical objectivity, astonishing industry and a financial independence for a large part of his professional life, all of which led to an unusual productivity. His enormous bibliography attests to this. He was author of the volume on the uterus of the *Henke-Lubarsch Handbook of Pathology* which is known to obstetricians and gynecologists here and abroad

as "the Bible." He was long-time editor of the *Archiv. f. Gynakologie.*

Dr. and Mrs. Meyer had the same single Jewish grandparent. He refused an offered "Aryanization." Presumably because of his international reputation, they were allowed to leave Germany in 1939. The alternative was spelled out for them in detail. Entry to the United States was made possible by an academic appointment at the University of Minnesota. He worked in the department until 1946 and died in 1947 of gastric carcinoma.

For further details, reference is made to the following publications: *Autobiography of Robert Meyer. A Short Abstract of a Long Life.* H. Schuman, New York, 1949. Novak, Emil: Life and Works of Robert Meyer. *Am. J. Obst. & Gyn.,* Vol. 53, No. 1, 1947. *Robert Meyer. Obituary.* Minutes, University of Minnesota Senate, 1947. J. L. McKelvey.

These seven years of Dr. Meyer's active participation in the department left a permanent mark. An appreciation of the value of detailed accuracy in the basic histologic control of many of the clinical decisions and the application of a quiet demand for critical objectivity were a part of the man and were passed on to the graduate students and staff who had the privilege of this contact. He was in every sense a scholar.

ASSOCIATED HOSPITALS

In the very early history of the department, the bulletins mentioned teaching at a variety of hospitals in the Twin Cities. The staffs appear to have been separated into those who practiced in St. Paul and so controlled the material in those hospitals, and a separate group in Minneapolis.

On March 22, 1909 a fraternity house (305 Washington Avenue) had been equipped and was opened for 24 surgical and obstetrical patients. On June 3, 1910, the hospital committee reported that up to May 1, two obstetrical cases had been admitted. During the month ending September 1, 1910, there were four obstetrical cases admitted. On October 13, 1910, Dr. Ritchie stated that the committee on gynecology recommended that gynecology shall do all didactic work and new growth, cancer, pus tubes, and pelvic abscess shall be transferred clinically to surgery.

When the Elliot Memorial Hospital was opened on September 11,

1911, the third floor was not finished, however, provision had been made for four south-west rooms on this floor for 14 obstetrical patients which became available on November 23, 1911.

The University Hospitals thus became the central teaching unit. In addition, the Minneapolis General Hospital and Ancker Hospital in St. Paul were used by most clinical departments. Part-time staffs handled each of these and each developed their own outpatient services as well. The influence of each of these waxed and waned largely as a result of the amount of time and interest given by the chief. Early in his tenure as department head, Dr. Litzenberg added more or less complete medical control of Booth Hospital for Unmarried Mothers in St. Paul and later of the similar Harriet Walker Home in Minneapolis.

After 1938, it became necessary to find additional graduate training areas which could in one way or another satisfy the requirements of the Obstetrics-Gynecology Boards for certification. Affiliation for certification and some control of teaching were obtained for the two civic hospitals and for Miller Hospital and St. Joseph's Hospital in St. Paul. These rotated graduate students in various ways but always with a part of the training being taken at the University Hospitals. Finally, a similar affiliation was arranged with the Fargo Clinic in Fargo, North Dakota.

In 1963, Dr. *Erick Y. Hakanson* became full-time chief of obstetrics and gynecology at the St. Paul-Ramsey (previously the Ancker Hospital) and in 1966, Dr. Donald W. Freeman became full-time chief at the Hennepin County General Hospital (previously the Minneapolis General Hospital). These two hospitals were fully integrated with the University Hospitals both in undergraduate and graduate teaching.

ACTIVITIES AND INTERESTS

It is trite to say that the activities of any department will involve undergraduate and graduate teaching, research, patient care and public responsibilities. Nevertheless, these are the duties of a medical school. They will vary from department to department as regards the quantity, the quality, and the relative stress given to each.

Undergraduate teaching requires little comment here. This has gradually changed from an earlier dependence on lectures with little in the way of responsible clinical experience to present dependence on seminars and association with patients as clerks for practical experience. The move has been from teaching to learning.

A great deal of the department's activities have centered about the graduate student and more staff time is given to him. The research interests of the department cannot be more than mentioned. This started with Dr. Litzenberg. Very little more could be done while the department was staffed by men who had to earn a living by what were often large private practices. With the establishment of a full-time staff, this changed. Laboratory space became available, first in Millard Hall and then in the University Hospitals. Recently, efficient research laboratory space beneath the Diehl Library was assigned, built and equipped with funds from the Federal Government, the Medical School, departmental funds obtained from the Harriet Walker Hospital donation and funds which were contributed in memory of Doctors Litzenberg and Dr. Louis L. Freidman. The laboratory has been named in their honor.

Dr. Charles E. McLennan investigated here and at the University of Virginia, among other things, problems associated with capillary function and blood volume changes and control in the pregnant woman. Dr. A. L. Dippel established the parallax method of x-ray pelvimetry with which he had worked elsewhere with Dr. Hodges. Dr. Roy Holly investigated the anemias in the pregnant woman and rapidly became a major authority in this field. He discovered and named a new entity, the hypoplastic anemia of pregnancy. Dr. Emil Holmstrom, here and later at Utah, became interested in ovarian steroid problems and is credited with contributing the progesterone therapy of endometrial hyperplasia. Dr. Robert Meyer furnished his work on the pelvic nerve tumors and wrote what will remain the classical description of these. He added a great deal to the efficiency of the early histologic recognition of malignant disease and, at least as importantly, to the definition of lesions which could be confused with cancer. Dr. Irwin Kaiser developed techniques for the study of the physiology of intrauterine fetal existence. This involved the development of the application of advanced mathematics and the establishment of microtechniques for measuring biochemical functions on small quantities of materials. He established techniques for the use of sheep and the pig for these studies. His contributions were considerable. Dr. Curtis J. Lund had worked elsewhere with fat soluble vitamin transfer across the placenta and with fetal oxygen deprivation. His more recent interests have been in hemoglobin physiology and basic functions of chorionic

epithelium. Dr. Konald Prem played a significant role in the development of the aspects of immunity to the Salk vaccine and later to the development of present day concepts of the live poliomyelitis vaccine therapy in the human.

Running through all of these years has been the Minnesota Maternal Mortality Study. This was started in 1941, largely by Dr. A. L. Dippel. Each maternal death in the State was studied at its source by a staff member. This has continued to the present with the exception only of a few years during World War II. The men who have played the most important roles in this have been Doctors Donald Freeman and Alex Barno with contributions more recently from Dr. M. P. Baken, Jr. Originally, this was largely organized within the department. In later years, more and more responsibility rested on the investigators. The final decisions were made by a committee of the Maternal Welfare Committee of the Minnesota State Medical Society. This has been a most satisfying enterprise for all concerned. The State maternal mortality rate has dropped in these years from 5 per 1,000 live births per year to a present total rate of 0.4 per 1,000 and an obstetric death rate (excluding non-obstetric caused deaths) of close to 0.2 per 1,000. What is at least as pleasing is the fact that the preventability rate has dropped from 75% in 1941 to a low of 10% in a recent year. It is impossible to ascribe this to any single cause but it seems clear that the study itself has played a significant role. Not only have important lives been saved but a great deal has been learned which has had practical application and which has directed the stress of undergraduate, postgraduate and graduate teaching.

These have been relatively rapid changes in the interests and direction of the department. More radical redirection undoubtedly lies ahead, not only for academic activities but for all medical things.

John Leyland McKelvey, who prepared the above historical sketch, was born in Kingston, Ontario, in 1901. He received the degree of doctor of medicine and also the degree of master in surgery (CM) in 1926. *Queen's University Yearbook* for 1926 reports: "He was known throughout Canada as a true sportsman and one of the greatest middle wings (Rugby) of all time. He was a member of the Dominion Champions 1922, (Captain), 1923 and 1924, intercollegiate champions 1935, starred on defense in hockey, won the intercollegiate heavyweight boxing championship. His standing in class has always been good,

John L. McKelvey

despite his sacrifice of time for the school. His one weakness—his love for Queen's—and the feeling has been mutual."

Following the award of the degree of doctor of medicine, he spent two years as intern and resident in obstetrics at the Montreal General Hospital In 1928, he was appointed intern in obstetrics at the Johns Hopkins Hospital. At the end of two years, he was granted a hospital fellowship for foreign travel. The first year was spent at the University of Kiel, Germany. The following six months were with Robert Meyer in Berlin and the last six months he traveled throughout the medical centers in Germany, Great Britain and Vienna.

In 1932, he was assistant resident in obstetrics at Johns Hopkins Hospital. The next year, he was appointed resident after which he was invited to accept an appointment as an instructor in obstetrics at the Medical School. However, at the end of one year, he accepted an invitation from the Union Medical College in Peking, China, as second in command in the Department of Obstetrics and Gynecology. Dr. McKelvey entered that school as associate professor, but was soon promoted to professor and head of the Department of Obstetrics and Gynecology.

In 1938, Dr. McKelvey received and accepted an invitation to be professor and head of the Department of Obstetrics and Gynecology,

University of Minnesota. He became the first full-time head of the department.

In 1958, he spent the summer attending clinics as a visiting professor in Melbourne, Sidney, and Perth, Australia, and Auckland, New Zealand. The academic year of 1962 was spent in Singapore, where he reorganized the Department of Obstetrics and Gynecology of the Medical School and where he was able to install a Malayasian Chinese physician as chief. He increased the teaching staff, and developed the department so it was recognized by the British Medical Council as an accredited training school in Obstetrics and Gynecology.

Dr. K. A. Prem said, "Of his many accomplishments, Dr. McKelvey is proudest of the many physicians he has trained who practice their specialty with credit throughout the country—especially those whom he has launched on academic careers both on his staff and elsewhere."

Chapter XXIII

Department of Pathology

INSTRUCTION IN PATHOLOGY at the University of Minnesota began with the opening of the Medical School in 1888. It was first taught by Dr. Charles H. Hunter who was professor of clinical medicine and pathology. After one year, Dr. Hunter was succeeded by Dr. J. Clark Stewart who was professor of histology, bacteriology and pathology. A year later, this appointment was changed to professor of pathology and still later to professor of surgical and clinical pathology. He retained this appointment until 1896. Both Dr. Hunter and Dr. Stewart remained on the staff of the Medical School but their appointments were in other departments.

In these early years, the catalogue of the University describes the course in Pathology as one involving lectures, recitations and work in the "dead house." It further states, "The technique of the autopsy will be dwelt on so that each student can learn to make a correct post-mortem examination." The emphasis was on the study of fresh autopsy material supplemented by fixed gross specimens. The study of microscopic sections is first mentioned in the catalogue of 1890.

The size of the staff for the first few years is difficult to determine since only the professors were listed, but in 1892 it was stated that Dr. Thomas Lee was appointed instructor in histology, bacteriology and urinalysis. Dr. Lee subsequently became professor of anatomy.

In 1896, Dr. *Frank F. Wesbrook* was appointed professor of pathology and bacteriology and head of the department. On his staff in 1903 were Dr. Louis B. Wilson, Senior Demonstrator in Pathology, Dr. William H. Chowning, Junior Demonstrator in Pathology, Dr. S. Marx White, Assistant Professor of Pathology and Bacteriology and Dr. Head, Instructor in Pathology and Clinical Microscopy.

The staff as listed had responsibility for teaching pathology, bacteriology and hygiene or public health. In fact, the department was housed in the Institute of Public Health and Dr. Wesbrook taught hygiene

and was director of the State Laboratories. Drs. Wilson and Chowning, in 1902 and 1904, made significant contributions to public health by their studies of Rocky Mountain Spotted Fever. Of special significance was their conclusion that the disease was transmitted by ticks.

Dr. *Wilson* was born in Pittsburgh, Pa., December 22, 1866. After receiving his education through college in that state, he accepted a position as Principal of a grade school in Des Moines, Iowa for the years 1887-1888 and then moved to St. Paul, Minnesota where he taught Biology at Central High School. This teaching experience and also his friendship for Dr. Walter Reed influenced him to study medicine at the University of Minnesota and in 1896 he received his M.D. degree. Immediately upon graduation, he was appointed instructor in pathology and bacteriology at this University and in 1900 he was made assistant professor.

Dr. Wilson accepted an invitation to go to Rochester as director of laboratories in 1905 and in this position he was largely responsible for developing these laboratories. When the Mayo Foundation was established as a part of the Graduate School of the University of Minnesota in 1915, Dr. Wilson was made its first director, a position he held until his retirement in 1937. (See Chapter XIII.)

In 1906, Dr. Wesbrook was appointed dean of the Medical School but he continued his functions as professor and head of the Department of Pathology and Bacteriology. From 1906, until his resignation in 1913, Dr. Wesbrook made significant departmental appointments; Dr. H. E. Robertson in 1906, Dr. E. T. Bell in 1911, and Dr. Moses Barron in 1912. These men, added to the group including Drs. Wilson, Chowning, White and Head, all of whom were brought into the department by Dr. Wesbrook, established beyond doubt Wesbrook's ability to judge men. (See Chapter X.)

Dr. Wesbrook's keen appraisal of men is also attested by the contributions of Mr. Henry W. Morris, who started to work as a part time employee in 1906. The following year Dr. Wesbrook, foreseeing the need for a photographer, sent Mr. Morris to Eastman Kodak Company in Rochester, New York to learn about photography. Also learning the art with him were a Mr. Walt Disney and a Mr. Louis Schmidt. Returning to Minnesota, Mr. Morris set up the photographic unit. He was chief photographer and director until retirement. He was responsible for the photographs used by Dr. Bell in his text books and

monographs and he also prepared photographs for many others not only for use in texts but also for illustration of papers. Mr. Morris, who is still healthy and active, is undoubtedly the Dean of American Medical Photographers.

Frank Fairchild Wesbrook was born in Oakland, Ontario July 12, 1868. He received his bachelor of arts degree from the University of Manitoba in 1887 and the master of arts, doctor of medicine and master of surgery degrees from the same school in 1890. He was a John Lucas Walker student at Cambridge, England and professor of pathology at Manitoba before coming to Minnesota as professor of pathology and bacteriology in the Medical School and director of the Bacteriological Laboratories at the Minnesota State Board of Health.

His career at Minnesota extended from 1896 until 1913. For the first ten years, he was professor of pathology and bacteriology and for the last six years he was also dean of the Medical School. (See Chapter X.) In James Gray's history of the University and in Dr. Bell's history of the Medical School, Dr. Wesbrook is given little space either as professor of pathology and bacteriology or as dean of the Medical School. From their accounts, Dr. Wesbrook had little interest in scientific medicine or in research. For one who did not know Dr. Wesbrook it is obviously impossible to evaluate the man or his attitude toward medicine or research. However, it should be noted that Dr. Wesbrook did engage in research and that he did publish at least 45 papers. Some of these reported the results of experimental work on toxins of various types and many were on the practical application of experimental procedures to the control of disease. From the published papers, it is evident that Dr. Wesbrook had greater interest in bacteriology and public health than in pathology, but it is equally apparent that he appreciated the importance of pathology since he appointed such men as Dr. Bell and Dr. H. E. Robertson.

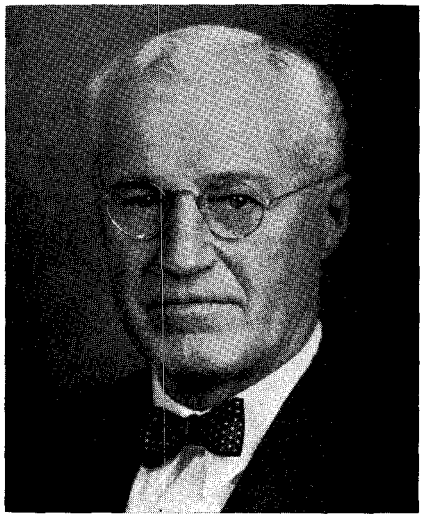
Much of his published work was concerned with problems which were of practical importance in diagnosis, treatment and prevention of infectious disease. As Mr. Gray indicates in his history of the University, this type of research was characteristic of the Medical School in the Pre-Vincent era. Dr. Wesbrook was also criticized for his firm conviction that teaching was the prime obligation of the faculty and that neither research nor private practice should interfere with it.

One must agree, at least in part, with some of these criticisms. It

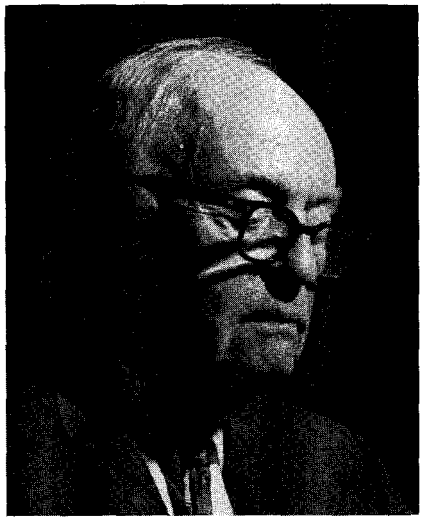
was obviously necessary that the faculty of the Medical School engage in fundamental research but as Dr. Wesbrook wrote, apparently in answer to his critics: "Knowledge is none the less scientific because of its possible application nor less cultural if useful." It is not difficult to appreciate this point of view when one considers the fact that during the period 1896-1913 great advances were being made in the control of infectious disease and for one interested in public health and well informed in bacteriology and immunology, the time-lag between discovery and application must have been frustrating and failure to teach students about these newly discovered principles must have been intolerable. Viewed in this perspective, Dr. Wesbrook's philosophy may not seem so reactionary.

In 1913, when Dr. Wesbrook resigned to become chancellor of the University of British Columbia, bacteriology was established as a separate department with Dr. *W. P. Larson* as head. Dr. *H. E. Robertson* was appointed acting director of the Department of Pathology and Public Health and in 1919 he was made director. During this period, Dr. *Harold Diehl* was appointed instructor in pathology, a position he held until 1918. No other significant appointment was made.

Dr. *Robertson* was born in Waseca, Minnesota on October 8, 1878. After graduation from Carleton College in 1899, he attended Columbia University for one year and then enrolled in the University of Pennsyl-



Harold E. Robertson



Elexious T. Bell

vania School of Medicine where he received his doctor of medicine degree in 1905. For short periods of time, he was an instructor in pharmacology at Albany Medical College and instructor in pathology at Harvard before coming to Minnesota as instructor in pathology and bacteriology in 1907. He was promoted to assistant professor in 1909, to associate professor in 1910, and to full professor in 1913.

Although Dr. Robertson served either as acting director or director from 1913 until 1920, during at least two years he was in Europe; first in 1914-15 when he was studying in Germany, and later in 1917-18 when he was with the American Expeditionary Forces in France. In 1920, Dr. Robertson left Minneapolis to assume the position of professor of pathology in the Mayo Foundation in Rochester, Minnesota.

Thus, in 1920, Dr. *E. T. Bell* was appointed professor and head of the Department of Pathology. This appointment, made by Dean E. P. Lyon, had great significance not only for the Department of Pathology but also for the entire Medical School. It marked the beginning of 29 years of progress for the Department of Pathology.

Dr. Bell was born in Hatch, Missouri on August 30, 1880. His father and his uncle were physicians so it is not surprising that he entered medical school after receiving his bachelor of science degree from the University of Missouri in 1901. From the same University, he received the doctor of medicine degree in 1903.

After graduation, he was appointed to the staff of the Department of Anatomy at his Alma Mater where he remained until 1910 except for a sojourn at the University of Bonn during 1905-06. In 1910, he accepted an appointment as assistant professor of anatomy at the University of Minnesota under Dr. *Thomas G. Lee*. Dr. Lee had formerly been on the staff of the Department of Pathology as instructor in histology, bacteriology and urinalysis and Dr. Bell was soon to move from anatomy to pathology where he was made assistant professor in 1911, associate professor in 1916 and finally professor and head of the department.

Prior to Dr. Bell's appointment, there had been many capable staff members in the department but almost all of them had ultimately gone into other fields; Dr. Wilson to the Mayo Foundation, Dr. White into the Department of Medicine at Minnesota, Dr. Barron into private practice and Dr. Diehl into public health. Only Dr. H. E. Robertson had achieved distinction in pathology. With Dr. Bell's appointment, he began to build the departmental staff by acquisition and by training young men. In his first year, he appointed Dr. James S. McCartney, and the following year Dr. B. J. Clawson was brought into the department. In 1923, Dr. John F. Noble was appointed to the staff and in 1924 Dr. William A. O'Brien. Of this group, only Dr. O'Brien left the fold to achieve renown as the first director of Continuation Medical Education at Minnesota.

Dr. *McCartney,* after graduation from Washington and Jefferson and Johns Hopkins Medical School, came first to the Mayo Clinic in Rochester as a fellow in surgery and then to Minneapolis as instructor in pathology in 1920. He was promoted to assistant professor in 1921, associate professor in 1930 and professor in 1949. He was active in the department until his death in 1958. Dr. McCartney was for many years president of the Minnesota Board of Basic Science Examiners and he was also highly regarded as a forensic pathologist.

Dr. *Clawson,* who had been awarded bachelor of science and master of arts degrees from the University of Kansas, the doctor of medicine degree from Rush Medical College and a doctor of philosophy degree from the University of Chicago, came to Minnesota from the University of North Dakota. At Minnesota, he was appointed assistant professor of pathology in 1921, associate professor in 1925 and professor in 1927. Dr. Clawson was an active member of the department

until his retirement in 1949. He was a stimulating teacher and a productive investigator. He is well known for his contributions in the field of cardiac disease, especially rheumatic fever.

Dr. *Noble* was at the University Hospitals for only two years before he moved to Ancker Hospital in St. Paul as director of their laboratories and as associate professor of pathology in the Medical School. He was promoted to professor of pathology in 1960. Dr. Noble retired as emeritus professor in 1962 and died in 1963. He was a highly respected pathologist and an excellent teacher. For almost 40 years, he participated actively and effectively in the training of residents at Ancker Hospital.

A succession of able pathologists were trained by Dr. Bell. Dr. Cecil J. Watson, since defected to Internal Medicine, was the first, then Drs. Edith Potter, Nat Lufkin, A. B. Baker, Robert Hebbel, E. H. Norris, James Arey, Arthur Nelson, Ambrose Hertzog, Lawrence Berman, Leone McGregor, John Coe, Donald Gleason, Paul Lober and many others too numerous to name. In addition to these men who spent years with Dr. Bell, there were literally hundreds of others who, although trained primarily as internists, surgeons, etc., spent some of their time with him. Drs. Charles Rea, A. H. Pederson and others still refer to themselves as "Bell Boys" even though they are surgeons. Large as these groups are, they form only a small portion of that much larger group of medical students who were privileged to have Dr. Bell teach them.

The Department of Pathology at the University of Minnesota is Dr. Bell's department. Although Dr. Wesbrook and Dr. Robertson preceded him, there was no real solid growth until Dr. E. T. Bell became head. In fact, one is inclined to believe that his influence was felt from the time of his appointment as assistant professor in 1911. Certain it is that the department began to prosper when he was appointed head. Progress was evident in teaching, research, and in service, and Dr. Bell made this progress possible by setting the pace himself. Even though he had heavy administrative commitments, he somehow found time to teach, to do investigative work and to write.

His teaching is remembered vividly by all of his students and his *Textbook of Pathology,* first published in 1930, went through eight editions before he decided not to revise it again. The monographs on *Renal Diseases* published in 1946 and *Diabetes* published in 1960, added

to his national and international fame. In addition to these major contributions, his bibliography includes almost 90 original articles.

These contributions are easily documented. More difficult to document but no less real are the far reaching effects Dr. Bell had on his students and his colleagues and the profound influence he exerted on the Medical School and the University. His scholarly attitude together with his industry, honesty and humility set a high standard for all who knew him.

From the organization of the Medical School in 1888 until the time of Dr. Bell, pathology had been joined with various other disciplines to form an administrative unit. The other disciplines included histology, bacteriology, public health and hygiene. When Dr. Bell took over, the department became an administrative unit with only one discipline and it remained so until 1957 when the Division of Cancer Biology was transferred from the Department of Physiology to the Department of Pathology. This change was made because of certain conflicts of personality which had arisen. Dr. John Bittner, Director of the Division of Cancer Biology, and his colleagues Dr. Franz Halberg and Dr. Herbert Hirsch, did not have the background and training ordinarily expected of members of the staff of the Department of Pathology, so each of them retained his appointment in cancer biology but they were not given comparable appointments in pathology. After the death of Dr. Bittner in 1961, it was decided there was no longer any valid reason for continuing cancer biology as a separate division in the Department of Pathology. Consequently, it was discontinued. The two members of its staff, Dr. Halberg and Dr. Hirsch, were appointed professor and associate professor of experimental pathology.

Dr. Halberg, early in his career, was impressed by the rhythmic variations in some of the physiologic functions, specifically the variation in the numbers of circulating eosinophilic leukocytes. Subsequently, he documented many other functions which vary in a rhythmic manner with a cycle of nearly 24 hours. He has emphasized the importance of these variations and has popularized the term "Circadian Periodicity" to characterize them.

The history of pathology at Minnesota is principally a history of the men and women who worked in the department but it should also include a history of space. In the early years, the department was

housed in the Institute of Public Health. Shortly before Dr. Bell's appointment, the department moved into the relatively new Institute of Anatomy, now known as Jackson Hall. Although the quarters in Jackson Hall were magnificent in comparison to those in the Institute of Public Health, they provided almost no space for animals and only adequate space for laboratories.

Hope for new space and more space rose with planning for the Mayo Memorial in 1949. Pathology was to have two floors in the tower but delays and inflation brought about by the Korean War caused revision of plans and a reduction in size of the building. As a consequence, pathology remained in its old quarters in Jackson Hall. However, with the completion of the new student health service building in 1955 some space in the temporary building North of the old Health Service was assigned to pathology. This was makeshift space but it *was* space and it provided the opportunity for some of the young men in the department to get on with their research.

In 1957, a legislative appropriation for renovating and remodeling Jackson Hall made possible further expansion. A part of these funds was used to obtain matching funds from the U. S. Public Health Service. Pathology decided to utilize its share of these funds to build a fourth floor addition to the main portion of Jackson Hall. Multipurpose laboratories were planned for the west side of this area.

Meanwhile, a larger project was started, again with Legislative funds and matching Public Health Service grants. This project involved the construction of a Jackson-Owre addition connecting the south end of Jackson Hall with Owre Hall. It was to provide space for dentistry, anatomy and pathology. Almost before the completion of the new space on the fourth floor of Jackson Hall, the temporary building north of the old Health Service was wrecked to permit construction of the new Owre-Jackson addition. In this new building pathology was to have the fourth floor.

The research space in the temporary building enabled Drs. Lee Wattenberg and Joel Brunson to make a start with their research projects and completion of the quarters on the fourth floor of Jackson Hall provided more adequate laboratory facilities but animal quarters were still inadequate.

With the completion of the Owre-Jackson building and also the underground laboratories in the court, anatomy moved out of its animal

quarters to give pathology almost all of the fourth floor of Jackson Hall and the fourth floor of the new Jackson-Owre addition. Subsequently, funds were provided to complete the unfinished space on the east side of the fourth floor of Jackson Hall. Animal quarters were constructed in this area. By 1963, pathology had acquired for the first time adequate animal rooms and research laboratories.

During the years from 1920, a few changes had been made in the student laboratories and few changes were required since they had been well planned but other facilities were needed and these were to be provided in the Bell Museum. When Dr. Bell retired in 1949, his friends established the E. T. Bell Museum Fund. Originally, it was planned to house this museum in space allocated to pathology in the tower of the Mayo Memorial and later on other plans were suggested for the museum but it was not possible to find space for it until 1962 when space was allocated in the northwest portion of the ground floor of Jackson Hall. Remodeling of part of this space was completed in the fall of 1964 and the museum was opened for use as the E. T. Bell Pathology Museum. This museum will serve as an area where the autopsy and surgical material accumulated in the department will be available for use by students and physicians. The material will include protocols, microscopic sections and kodachrome transparencies. Microscopes and short-throw projectors will also be provided in the museum. The transparencies will be cross indexed and sets illustrating specific diseases will be available for study. These sets will be an integral part of the course for sophomore medical students.

To honor Dr. Bell for all of his contributions to the University and to the Medical School, the laboratories on the second and fourth floors of the new Jackson-Owre addition were officially designated the E. T. Bell Laboratories. It had been hoped that the building could be called Bell Hall but the School of Dentistry wished to honor one of its illustrious professors by naming their portion of the building the Peter John Brekhus Laboratories.

The improvement in physical facilities in Jackson Hall and the Owre-Jackson addition was paralleled by improvement in the facilities of the department in the hospital. With the opening of the new Mayo Memorial in 1954, surgical pathology moved from its miniature laboratory across from the old operating rooms to relatively spacious quarters adjacent to the magnificent new operating suite on the fourth floor of

Mayo Memorial. Somewhat later, the dingy, cramped quarters of the old autopsy room were abandoned for new quarters just east of the ambulance entrance in the rear of Elliott Memorial Hospital. Two spacious autopsy rooms and a small office were provided.

The acquisition of this new and much needed space made possible many changes. In the old hospital, a senior resident under the direction of a staff man had been assigned to the surgical pathology laboratory. Now it was possible to have a full-time staff man in this position with residents rotating through his laboratory. The new research space provided inducement for young men to come into the department. Along with the new space came new sources of financial support from the Public Health Service, the American Cancer Society, the Lederle Medical Faculty Awards, the Elsa U. Pardee Foundation and the Hill Family Foundation. These funds as supplements to Legislature support funds provided opportunities for the young men who wished to come into the department.

After retirement in 1949, Dr. Bell still came to his office and laboratory in the department and he also served two days each week as a consultant in pathology at Minneapolis Veterans Administration Hospital. He continued his active interest in research and in resident training. Nonetheless, until his untimely death in an automobile accident in 1963, much of his role as consultant to pathologists in the area and much of his function in training of residents was assumed by two of his pupils, Drs. *James S. McCartney* and *Robert Hebbel.* Following the death of Dr. McCartney in the fall of 1958, Dr. Hebbel assumed these responsibilities. For many years, Dr. Hebbel's courses on diagnosis of tumors and diseases of the kidney have been attended by almost all pathology residents in the Twin cities area and by large numbers of residents in other specialties.

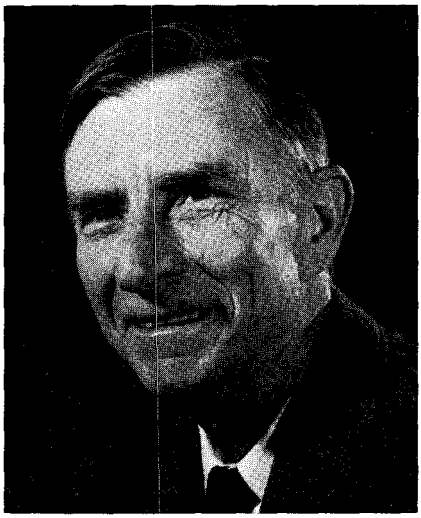
Dr. *Hebbel* was born in Windom, Minnesota, and received his undergraduate education as well as his doctor of medicine, master of science and doctor of philosophy degrees from the University. He received all of his pathology training under Dr. Bell and was appointed to the staff as instructor in 1942. Subsequently he was promoted to assistant professor in 1947, and professor in 1952. More than anyone else, Dr. Hebbel has been responsible for maintaining and extending the traditions set by Dr. Bell.

Beginning with Dr. Lober in 1949, and continuing with Dr. Lee

Wattenberg and Dr. Brunson in 1950, a group of promising young men came into the department. In turn, they influenced others to come for training so that in 1964 a group of men composed of Doctors Kenneth Osterberg, Bertram Woolfrey, William Foley and Erhard Haus in addition to Doctors Lober and Wattenberg were making significant contributions to teaching and to research. Others have moved on to new positions: Joel Brunson to head the Department of Pathology at the University of Mississippi, Mitchell J. Rosenholtz to the University of Maryland School of Medicine, Richard Davis to the Armed Forces Institute of Pathology and John Gronvall to the University of Mississippi. (See Appendix J.)

When Dr. Bell retired in 1949, a search committee had already made a careful study and survey of the pathologists of this country for Dr. Bell's replacement. Dr. *James R. Dawson,* who prepared the above sketch of the Department of Pathology, was the choice of the committee and he was promptly appointed professor and head of the Department of Pathology.

James Dawson was born in Birmingham, Alabama, on January 19, 1908. He attended Vanderbilt University where he was awarded the degree of bachelor of arts in 1928 and the degree of doctor of medicine in 1931. He promptly was appointed instructor in the Department of Pathology at his Alma Mater.



James R. Dawson

In 1932, he became assistant in pathology and bacteriology at the Rockefeller Institute for Medical Research. Before going there, much of his research effort was in virology and especially to viruses affecting the central nervous system. This work he continued at the Rockefeller Institute intensifying his efforts on the rabies virus. After a year at the Rockefeller Institute, he was called to the Department of Bacteriology and Immunology of Cornell University School of Medicine. He remained there as an instructor until 1938 when he accepted an invitation to become associate professor of pathology at his Alma Mater. Soon thereafter he was awarded full professorship.

Dr. Lee W. Wattenberg, Associate Professor of Pathology, recently wrote: "Dr. Dawson has a commitment to the concept that the chairman of a department should devote himself to the academic advancement of individuals at all levels at which the department functioned. Thus, he presents the majority of the lectures to the medical students. With the residents, he devotes a great deal of time to going over their autopsy material. Since a solid experience in autopsy pathology is essential for the mastery of pathology, this has provided a fundamental training which is available in few other institutions. He likewise makes himself available for consultation and advice to his departmental colleagues. This was done in an unhurried spirit of mutual exploration and with great wisdom and objectivity. In many instances his contributions are of a very substantial nature so that the final results reflects a combined effort in which Dr. Dawson's very profound intellectual capacities and extensive knowledge of medicine and pathology had an important effect. Thus, during a period of rapid growth of medical techniques and facilities with all of the potential for turbulence and distortion, there has existed under Dr. Dawson a department sturdily grounded in fundamentals, working cohesively and effectively, and in which all the members are fully aware of the depth of strength, wisdom and encouragement which their chairman imparts."

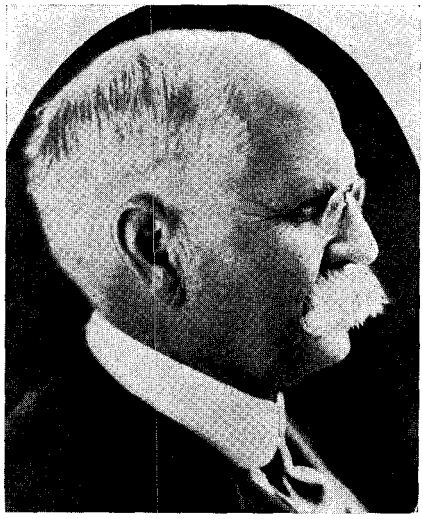
Chapter XXIV

Department of Psychiatry and Neurology

Division of Neurology. The Division of Neurology at the University of Minnesota is in particular the product of four professors, past and present, who have directed it over the years since 1888. Each successive leader has extended the aims and achievements of his predecessor. Along the way have been several mostly part-time faculty members and many clinical teachers all of whom have contributed considerably to its maintenance and development.

THE DIRECTORS

C. Eugene Riggs, received bachelor of arts and master of arts degrees from Ohio Wesleyan University and studied medicine in the office of his physician brother for two years. He then had one formal year in the Medical College of Nashville, Tennessee. He graduated in 1880 from the College of Physicians and Surgeons, Baltimore. After a one year



C. Eugene Riggs

senior internship at Woman's Hospital in Baltimore, he came to St. Paul and engaged in general practice.

In 1882, he became professor of mental and nervous diseases in the St. Paul Medical College. *Thus began the neurological adventure of the first neurologist in the Northwest.*

When the Minnesota College Hospital was organized, Dr. Riggs became its professor of nervous diseases. Dr. *W. A. Jones,* was adjunct professor of diseases of the nervous system in the University of Minnesota College of Medicine and Surgery. In 1893, his faculty title became professor of nervous and mental diseases. He was a founder of the Minnesota Neurological Society in 1909. He was interested in both neurology and psychiatry and in 1909, largely through his efforts, the Minnesota Voluntary Commitment and Detention laws were enacted.

In 1909, Dr. Riggs became professor and chief of the Department of Nervous and Mental Diseases. He resigned from the faculty appointments after 25 years of gratuitous service and became professor emeritus of nervous and mental diseases.

Arthur S. Hamilton was awarded the degree of doctor of medicine by the University of Pennsylvania in 1897. He was assistant physician at the Independence, Iowa State Hospital for seven years. In 1904, he entered the private practice of neurology and psychiatry in Minneapolis.

Dr. Hamilton was appointed assistant in pathology of the nervous

Arthur S. Hamilton

system, Department of Pathology and Bacteriology, at the University, College of Medicine and Surgery in 1905. In 1906, Dr. Hamilton became instructor in pathology of the nervous system and in sole charge of the course on pathology of the nervous system. Thus began the dichotomy of Neuropathology.

In 1907, Dr. Hamilton was also named clinical instructor in nervous and mental diseases, the first faculty member to hold a dual appointment. He conducted a clinic at the University Free Dispensary near Seven Corners in Minneapolis. Dr. Hamilton became assistant professor of nervous and mental diseases in 1912, associate professor and director of the Division of Nervous and Mental Diseases in 1913, and professor and director of the division in 1915.

He was a founder of the Minnesota Neurological Society in 1909 and of the Central Neuropsychiatric Association in 1922. He had a great interest in medical history and medical literature.

His breadth of knowledge, clear analytic thinking, careful technique, gentleness with patients and consideration for the younger colleagues' opinions constituted in him the nearly ideal combination for an adviser and preceptor of the more advanced students.

Dr. Hamilton was an early and forceful advocate of postgraduate medical education. He contributed of his time and private funds to further this program. A number of teaching fellows had the good fortune to come under his tutelage. His two outstanding students were Henry W. Woltman, who became chairman of the Department of Neurology and Psychiatry at the Mayo Clinic in 1930, and J. Charnley McKinley, who succeeded Dr. Hamilton in 1935.

J. Charnley McKinley earned the doctor of medicine degree from the University of Minnesota in 1919. Continuing as a teaching fellow, in 1921 he received a doctor of philosophy degree in nervous and mental diseases. His teaching and research abilities were quite evident and, with Dr. Hamilton's hearty endorsement, he then became assistant professor of nervous and mental diseases. He was the first full-time faculty member in the field of neurology. In 1925, he was advanced to associate professor. In 1928, he received a Guggenheim Fellowship and studied neuropathology and neurology at the Universities of Breslau and Munich, Germany. Upon his return to the Medical School in 1929, he became professor of nervous and mental diseases. In 1934, he was made administrative head of the Department of Medicine. He was president

J. Charnley McKinley

of the Central Neuropsychiatric Association in 1938. He was a director of the American Board of Psychiatry and Neurology from 1941 to 1945.

McKinley did extensive research on muscle tonus and in poliomyelitis. He compounded a vaccine for active immunization against poliomyelitis and offered a proposal of wholesale passive immunization against poliomyelitis epidemics. He studied the mid-brain nuclei in postencephalitic paralysis agitans and did meticulous stains and cell counts of these areas.

A methodical teacher and author, McKinley was precise in his lecturing and writing. His scientific watchwords were accuracy and honesty. Early in his career in 1915, he prepared Sensory Nerve Topography charts, showing the segmental and radicular distributions, and companion Motor Function charts. These charts, which he carefully constructed from a composite of all the anatomy and related texts in print, have been reproduced in numerous standard text-books and are still recognized as the most usable and accurate neurologic information of its kind extant. In 1939, he edited *An Outline of Neuropsychiatry,* a compendium and ready reference book for student and practitioner. This Outline went through four editions, the last one in 1944, and was widely used for many years.

Dr. McKinley was convinced that most disasters in politics, crime and

Abe B. Baker

the like are due to mental disorders which should be detected before catastrophe occurred. He was influential in the enactment of the Minnesota Psychopathic Personality Law. Inasmuch as no device was available for quickly screening such personalities from any group of individuals, in collaboration with Dr. Starke R. Hathaway, he developed the Minnesota Multiphasic Personality Inventory. This is a psychometric device for the more objective evaluation of personality, especially in psychiatric terms. An account was first published in 1942 and because of the overwhelming demand on the local facilities for manufacture, it was released to the Psychological Corporation in New York for manufacture and distribution. It has been used routinely by hundreds of private clinics and individual doctors as well as large organizations. In 1942, McKinley was commissioned to edit a three volume text on *Clinical Neurology,* planned to be a complete treatise on the subject, and he arranged with 30 nationally known neurologists to contribute chapters. The edition was well under way when it was stayed by situations incident to World War II. (See Chapter XXI.)

Abe B. Baker earned the degree of doctor of medicine in 1931, from the University of Minnesota. He was a teaching fellow in Pathology from 1931 to 1934, and meantime earned the graduate degrees of master of science in pathology in 1932 and doctor of philosophy in pathology in 1934. The following three years he was engaged in a

clinical research project at the Medical School and also assisted in the Division of Nervous and Mental Diseases. He was appointed instructor of nervous and mental diseases in 1937. In 1939, he was made assistant professor and in 1940 he became also assistant professor of pathology.

Dr. Baker has done, or had a leading part in, many important research investigations. His studies and contributions to medical literature have been numerous and noteworthy. Best known are his work and publications on encephalitis and cerebrovascular disease. In 1940, he wrote *An Outline of Neuropathology,* which had wide acceptance and has had several editions. In 1958, Doctor Baker edited *An Outline of Clinical Neurology,* patterned after McKinley's *Outline of Neuropsychiatry* which it superseded, dealing with neurology only and in more detail. *Clinical Neurology,* a three volume encyclopedic text edited by Dr. Baker, was published in 1955. The second edition, expanded to four volumes, was published in 1962.

He was elected a director of the American Board of Psychiatry and Neurology in 1958, its President in 1963. He is a member of the American Neurological Association. He was a founder of the American Academy of Neurology in 1948 and its President until 1952. He has been for several years a member of the council and other advisory committees to the National Institute of Neurological Diseases and Blindness of the United States Public Health Service.

Following World War II, residency training programs in all specialties began with support by various federal and state agencies. Research grants became increasingly available from governmental sources and private foundations. Dr. Baker's teaching ability and his administrative knowledge have made the neurology training program of three to five years at the University of Minnesota unequalled. Twenty residents are regularly in training under his direction, 114 have completed their training, 36 are in full time academic positions, seven have become directors of neurology departments at medical schools.

THE STAFF

Among early staff members was *William A. Jones,* a graduate of the Medical Department of the University of the City of New York in 1881. He became adjunct professor of diseases of the nervous system when the College of Medicine and Surgery opened in 1888, advanced to pro-

fessor of nervous and mental diseases in 1909, and retired from the faculty in 1913 as Professor Emeritus. Jones was active in medical affairs, and was president of the Hennepin County and Minnesota State Medical Association and vice-president of the American Medical Association. He was editor of the *Northwestern Lancet,* later the *Journal-Lancet* from 1901 to 1931.

Charles H. Boardman was professor of medical jurisprudence from 1888 to 1891. That subject was considered the province of the alienist, the psychiatrist's prototype. The course of instruction in the University Bulletin listed it under Neurology or Nervous and Mental Diseases.

Arthur A. Sweeney was clinical professor and lecturer in medical jurisprudence from 1898 until his death in 1928. Dr. Sweeney graduated from Harvard Medical School in 1886. He was interested in forensic medicine, was well read and able. His course in medical jurisprudence consisted of the principles of law, rules of evidence, and duties of physicians in medico-legal cases.

Arthur W. Dunning and *Charles R. Ball* joined the faculty in 1898, as clinical instructor and assistant in nervous and mental diseases, respectively. Their assignment was that of Dr. Riggs' assistants in the St. Paul hospitals and dispensary clinics. Dr. Dunning graduated from the Physicians and Surgeons Medical College in Chicago in 1885. Dr. Ball graduated from the College of Medicine and Surgery of the University of Minnesota in 1894. In 1907, Dr. Ball became clinical instructor and in 1910 Dr. Dunning became clinical professor of nervous and mentai diseases. Dr. Dunning offered an elective course in electro-therapeutics from 1901 to 1908. Dr. Ball then had the course and in 1910 it was expanded to electro-diagnosis and electro-therapy. Medical electricity was regarded as possessing a real importance and electro-therapy.

Haldor Sneve, an 1887 graduate of the College of Medicine, Ohio State University, in 1909 was named clinical professor of nervous and mental diseases. Dr. Sneve was active in many medical groups and was president of the Ramsey County and Minnesota State Medical Associations.

John B. Johnston was appointed assistant professor of anatomy of the nervous system, in the Department of Histology and Embryology, in 1907. The following year, he became associate professor of comparative neurology, and was advanced to full Professor in 1909. He continued to teach several courses in basic preclinical neurology until 1914 when

he became dean of the University's College of Science, Literature and Arts. (See Appendix J.)

Thereupon, appointments were made according to a specified table of organization.

Ernest M. Hammes was appointed assistant in nervous and mental diseases by Dr. Hamilton. He graduated from the College of Medicine and Surgery of the University of Minnesota in 1906 and interned at the City and County Hospital in St. Paul. In 1909 and 1910, Dr. Hammes did advanced study in neurology and psychiatry in Germany. He then resumed specialty practice in St. Paul. Dr. Hammes was active in medical organizations and was president of the Ramsey County and Minnesota State Medical Association in 1925 and 1949 respectively. He died in 1967.

In 1914, child neurology was introduced by *Julius P. Sedgwick,* then associate professor of medicine, via an elective course, nervous diseases of children.

Edward J. Engberg and *Joseph C. Michael* were added to the staff in 1915 as assistants in nervous and mental diseases to help in clinical neurology and psychiatry. Dr. Engberg graduated from the Medical School of the University of Minnesota in 1913. He discontinued his appointment at the Medical School in 1919 and has been superintendent of the State School and Hospital, Faribault, Minnesota since 1937. Dr. Michael also graduated from the medical school of the University of Minnesota in 1913. In 1921, he was appointed instructor in nervous and mental diseases, moved to clinical assistant professor in 1924, clinical associate professor in 1935. He assisted in the clinics and from 1935 on, he had charge of the psychiatry service at the Minneapolis General Hospital. He transferred to the division of psychiatry in 1946.

Dr. Henry Woltman completed his teaching fellowship in 1917 and was awarded the first degree of doctor of philosophy in nervous and mental diseases from the University of Minnesota. *Walter D. Shelden,* former clinical professor of medicine, a fellow faculty member of Dr. Hamilton's from 1905 to 1913, was then engaged in establishing a section of neurology at the Mayo Clinic. Dr. Hamilton readily recommended Dr. Woltman to him and the latter joined Dr. Shelden. Frederick P. Moersch, another graduate of the Medical School of the University of Minnesota in 1913, was in practice in Minneapolis, officed with Doctors Hamilton and Morrison, and was an assistant in nervous

and mental diseases until 1917. In 1920, he became associated with Doctors Shelden and Woltman at the Mayo Clinic. These three developed there one of the great centers of neurology in this country.

Frank W. Whitmore, who graduated from Northwestern University Medical School, Chicago, in 1915 did postgraduate study at Freud's clinic in Vienna in 1920. He was appointed assistant in nervous and mental diseases at Minnesota in 1920 and moved to instructor in 1923 and clinical assistant professor in 1929. He retired in 1945 due to ill health. *Gordon R. Kamman,* who graduated from our medical school in 1923, was appointed assistant in nervous and mental diseases, moved to clinical instructor in 1927, clinical assistant professor in 1939, and transferred to the division of psychiatry in 1946. *Richard S. Ahrens,* after graduation from the medical school of the University of Minnesota in 1923, was appointed assistant in nervous and mental diseases. He was advanced to instructor in 1929, and clinical assistant professor in 1935. He resigned in 1938 and became a state hospital administrator. *George N. Ruhberg,* upon graduation from the Medical School of the University of Minnesota in 1921, was appointed an assistant in nervous and mental diseases in 1925, instructor in 1927 and clinical assistant professor in 1939. He retired in 1947 due to ill health. *Walter P. Gardner* graduated from the Medical School of the University of Minnesota in 1927. He was appointed an instructor in nervous and mental diseases in 1931. He became a Minnesota State Hospital Administrator from 1935 until 1943. In 1952, he became clinical assistant professor of neurology and clinical associate professor in 1957. He transferred to the Division of Psychiatry in 1960.

Nathaniel J. Berkwitz graduated from the Medical School in 1925, and interned at the University Hospitals. He was a teaching fellow in nervous and mental diseases from 1926 to 1929. His research studies were with Dr. McKinley in animal decorticate rigidity and in human muscle tonus. He received a doctor of philosophy degree in 1929 and was appointed clinical instructor in nervous and mental diseases. He became clinical assistant professor in 1948 and resigned in 1954.

In 1946, the faculty of the department of psychiatry and neurology individually elected to be identified with the *Division of Psychiatry* or the *Division of Neurology.*

Dr. Royal C. Gray, who prepared the above historical sketch of neurology, graduated from the Medical School of the University of

Royal C. Gray

Minnesota in 1924, and after internship was in rural general practice three years. He was a teaching fellow in nervous and mental diseases from 1928 to 1931. His principal research was in a quantitative study of vibration sensation and in hereditary and familial diseases of the nervous system. He was awarded a master of science degree in 1930 and the doctor of philosophy degree in 1931. He was then in private practice with Drs. Hamilton and Hannah until 1935 when he was appointed assistant professor of nervous and mental diseases, the division's second full-time faculty member. He conducted classes and clinics in both neurology and psychiatry. He resumed a clinical faculty position from 1938 to 1950 when he returned to the Medical School as professor of neurology and chief of the neurology service at the Minneapolis Veterans Administration Hospital.

DEPARTMENT OF NEUROPSYCHIATRY ESTABLISHED

After serving as chief of the Department of Internal Medicine for 10 years, Dr. McKinley attained a goal he had long sought, namely a psychopathic unit. He had developed the plan and oversaw every detail of construction of the unit. When it was completed in 1937, nothing had been omitted that would insure the safety of his mentally ill patients as well as those who cared for them. After this unit was established, his next goal was to develop a Department of Neuropsychiatry.

This was accomplished in 1943 when McKinley became head of the new department and thereafter limited his activities to that field. However, when he was at the height of his contributions and influence, he had a cerebral hemorrhage on May 11, 1945. Like his immediate predecessor, Dr. Hamilton, he was also totally disabled for five years before he died on January 3, 1950.

Dr. A. B. Baker said, "To me, Dr. McKinley's most outstanding quality was his total lack of personal selfishness. He was always willing and anxious to help and guide the academic and scientific development of his staff and colleagues and took great pride in their achievement. In fact, one of the greatest satisfactions one could obtain was the privilege and pleasure of being able to discuss problems with him, and become infected with his enthusiasm and encouragement."

Dr. McKinley had not completed his three-volume text on *Clinical Neurology*. However, Dr. Baker continued with the manuscript in 1945 and published it in 1955 with the well inscribed "Dedicated to a great teacher of Medical Neurology, Dr. John Charnley McKinley."

When it was determined that Dr. McKinley's incapacity would be permanent, a search committee made a thorough survey for his successor. The unanimous choice was Donald W. Hastings whose description of the department follows:

The Department of Psychiatry and Neurology is composed of four major divisions: adult psychiatry, child psychiatry, neurology and clinical psychology. Each of the divisions, with the exception of clinical psychology, carries direct patient responsibility on its hospital and outpatient services. Clinical psychology occupies a consultantship role in patient care.

The experiences during World War II brought home to the nation the importance of the mental health of its citizens. The numbers of men who were rejected for psychiatric reasons, or later discharged from active duty for psychiatric disability, were appalling. One of the effects of this phenomenon was to see the medical schools of the country place an added importance on their departments of psychiatry, with particular reference to the training of the medical student. This development occurred at Minnesota at the close of the war.

My arrival at the University of Minnesota, March 1, 1946, coincided with the development mentioned above. By coincidence, March 1, 1946,

also saw the start of a two-week pilot course, "Teaching Psychotherapeutic Medicine to the General Physician." This postgraduate session, attended by 25 Minnesota general physicians and subsidized by the Commonwealth Fund, established a pattern for similar courses soon to be conducted by most major teaching centers over the country. It was symbolic of the recognition of the importance of the general physician as the first line of defense within his own community in dealing with emotional problems.

As of March 1, 1946, the full-time departmental faculty was small. Dr. A. B. Baker, primarily a neurologist, Dr. B. C. Schiele, primarily a psychiatrist, and Dr. S. R. Hathaway, clinical psychologist, were the three senior faculty members in addition to the new chairman. There were three residents.

The department, as of 1946, was termed the "Department of Neuropsychiatry." Because the two specialties were by now quite separate in their clinical methods and techniques, plans were made for two separate divisions, i.e., the Division of Psychiatry and the Division of Neurology, the latter headed by Dr. Baker. This change was effected in the summer of 1946, a change also in keeping with the national pattern that was evolving.

The year 1946 also saw the United States Congress enact the National Mental Health Act to provide stipends for the postgraduate training of physicians in psychiatry as well as some support for faculty positions. This was a national venture destined to grow to large size in the ensuing years; it also came to include funds for psychiatric research. The new departmental chairman was one of the charter members of the United States Public Health Service training committee which began operations under the National Mental Health Act.

By mid-1946, it became apparent that relatively large numbers of physicians, recently discharged from the military services, where they had developed an interest in psychiatry, were applying for residency training. In the ensuing three years, the numbers of resident applications remained high until the backlog of qualified candidates had been trained. More "normal" numbers of applicants then became the order of the day. The department, during the immediate post-war days was, however, hard pressed to maintain its teaching obligations to the relatively large residency group and to the expanded teaching program at the medical student level.

The immediate post-war years also saw a good deal of effort go into the planning of the new psychiatric hospital and outpatient services that were to become a part of the new University Hospitals building (Mayo Memorial). This planning resulted in the department obtaining an excellent group of three psychiatric stations for adults (for a total of 70 beds) and a psychiatric unit for children (20 beds).

In the autumn of 1946, the psychiatric outpatient service of the University Hospitals was expanded materially. Because outpatients tended to approximate more closely the kinds of problems a general physician might encounter in his practice, the psychiatric outpatient service became heavily committed to the teaching of the medical student on his clerkship. Shorter teaching times saw him on the inpatient service learning to recognize the major psychiatric syndromes and to become acquainted with the methods of referral of his psychotic patients in his subsequent practice. The inpatient service placed a greater teaching weight on the resident group.

About the same time the Veterans Administration Mental Hygiene Clinic opened at Fort Snelling. From its inception, this clinic occupied a teaching role for psychiatric residents and psychology trainees and has continued to do so to the present.

The University outpatient service, utilizing the "team" concept of psychiatrist, psychologist, and social worker, soon developed a need for a number of such teams to conduct the supervision of both medical students and residents. Although all categories of faculty personnel were in short supply, psychiatrists were particularly so, and it was impossible to adequately staff the outpatient department needs from full-time faculty members. Further, there was obvious advantage in seeking teaching personnel from among the private psychiatrists in the Twin Cities (this was almost a non-existent personnel category in early 1946, so that the problems of private practice could be better presented to students. Accordingly, clinical faculty were sought for their teaching help in the outpatient department in the immediate post-war years. Twenty years later, 1965, this pattern has been seen to work so well that much of the active teaching load for medical students is carried by psychiatrists in practice, under the supervision of Dr. Richard W. Anderson, chief of the Psychiatric Outpatient Service.

From the start of the period beginning in 1946, an attempt was made to develop the workings of the department in a democratic fashion. Fac-

ulty participation in the affairs of the department by means of committees was sought and encouraged. There were numerous experiments of this nature, and over the years some committees were seen to be nonessential. New ones were formed to meet particular needs. One of the greatest factors operating to influence this was the growing size of the department. While in 1946 it was literally possible to hold a staff meeting around a table with four chairs, this soon ceased to be the case. Size brought increasing problems, particularly in methods of communication across divisions. Force of circumstance and simple expediency finally found each of the divisions holding its own staff meetings independent of others. The "Executive Council" of the department, composed of the full professors, was formed in 1958, and it was here that matters that involved the entire department (such as finances, promotions, and appointments) were discussed and decisions reached. Departmental policy matters also fall within the province of the Executive Council. Any members of the departmental faculty, and each division, may refer an item to the agenda of this committee. It turned out to be a durable system and this committee still occupies its original position in the department.

In psychiatry, it had become apparent by about 1957 that designated persons were required to coordinate the functions of undergraduate teaching and the postgraduate training program, and faculty members were appointed to these two functions. This too has been a system that has worked well over the past decade. Advisory to the coordinator of the postgraduate program, the "Residency Committee" speaks with a good deal of authority on resident appointments, postgraduate curriculum, and review of each resident's progress. A formal review of each resident is made by this committee every six months.

In April of 1957, after a good deal of faculty discussion at all levels, the department adopted a written constitution of its own which embodied the organizational practices that had developed and which seemed to work effectively.

A review of the minutes of the meetings of the psychiatric faculty over the past 20 years indicates the tremendous amount of time and effort that has gone into curriculum planning both for medical students and residents. The central question throughout has been, "What should be taught and how?"

At the outset, the principle was adopted, for medical student teach-

ing, that the purpose of the University of Minnesota Medical School was to train general physicians for the State of Minnesota. While this premise at first glance seemed unrealistic in that the majority of our graduates subsequently seek specialty training and do not in fact enter general practice, yet the principle still holds as a sound one. In essence, it indicates a desire to teach what may be useful by way of psychiatric knowledge and experience to a physician whatever his ultimate field. While there is little factual data by which to judge the effectiveness of this teaching policy, it is the opinion of the faculty that the types of referrals we get from former students (who 20 years later probably form the majority of Minnesota practitioners) are generally sophisticated and well thought through. Since the first "Commonwealth Course" (see ante) for general physicians held in 1946, the psychiatric divisions annually have held refresher courses in psychiatry at the University's Continuation Center and these have been well attended. Each annual course centers around a particular psychiatric topic that is felt to fill a need for the nonpsychiatric physician in practice.

The funds available for training purposes in psychiatry from the United States Public Health Service have been of inestimable value and have made it possible to attract top grade residents. These funds have also made it possible, to support in part or in whole, some faculty positions. At the undergraduate level they permit the hiring of medical students to work in a special research or clinical topic during the three months of free time available in the junior-senior biennium. In turn, this has aided resident recruitment from among our graduates.

Research planning and activity in the Department started slowly in 1946, because of the heavy demands for under and postgraduate training in Psychiatry and Neurology in the immediate post-war years. Further, laboratory space was at a premium and no significant expansion of research, other than that of a strictly clinical nature done on the wards or in the Record Room was possible without new construction. In spite of these handicaps, some investigation was carried on.

In 1954, the Division of Neurology obtained a small amount of space for research and for the Neuropathology Laboratory when the Department of Otolaryngology abandoned its operating room suites on the fifth floor adjacent to the neurological service (their new operating suites had become available on the opening of the Mayo Memorial Building). In 1957, the state legislature, by means of a special budget,

appropriated $70,000 for the biennium for psychiatric research and for the training of graduate students in research methodology. By way of contrast, the 1965 legislature increased this special budget to $214,500 for the biennium. These funds have permitted the appointment of faculty primarily interested and trained in investigation, and for the hiring of research assistants to help with research projects and to learn methodology by doing. In 1960, the new Biomedical Library (Diehl Hall) was opened. The Department obtained about 7,000 square feet of space in this area, and this was of great value in starting research programs in both psychiatry and neurology, particularly since it afforded facilities for small animals. However, it was clear, in light of the rapid expansion of the department, that more research space would be required and plans of several sorts were entertained. The best of the several alternatives occurred when it was seen possible to add a floor to Diehl Hall, and active planning for this got underway in 1961. Because of the legislative priorities set by the University for its building program, it was quickly apparent that there was no point in seeking legislative funds to build the new research space. About $750,000 was needed to provide the department with 15,000 square feet of laboratory space. Federal funds, however, were available on a matching basis if we could obtain the other half. Accordingly, Drs. Baker and Hastings set out to raise $375,000 by private subscription and succeeded in doing so with the help of other faculty members. This new area was opened for occupancy July 1, 1964. The 1965 legislature, to help staff the new research space, cooperated magnificantly by more than doubling the appropriation for the Psychiatric Research Special Budget which helps provide stable faculty positions for investigators and funds for graduate students to learn research method and design by participating in research projects.

The Division of Neurology's development subsequent to World War II was of special interest. Like psychiatry, there were few accredited neurological training centers in existence as of 1945, although there was one at the University of Minnesota under Dr. A. B. Baker. Like psychiatry, neurology was faced with an unheard of number of physicians, recently discharged from the armed services, seeking postgraduate training in neurology. Corresponding to the establishment of the National Institute of Mental Health, the Institute of Neurological Diseases and Blindness was also established and made available to neurology funds

for training and research programs which came to assume sizeable proportions.

The Division of Neurology expanded so rapidly that by the end of the decade (1956) it has grown larger than some old established departments in the Medical School. Prior to 1946, this department bore the title Neuropsychiatry but, as mentioned, was split into two major divisions and from that time on bore the title "Department of Psychiatry." The two specialties, from a clinical standpoint, by 1946 had developed their separate bodies of knowledge and clinical techniques and could no longer be considered one specialty as had been the case in earlier years. This, as a national trend, was symbolized by the old "National Board of Neuropsychiatry" splitting into the two component parts shortly after World War II to become the "National Board of Psychiatry and Neurology." Because of these trends, and because the departmental chairman (Donald W. Hastings) was a psychiatrist, not a neurologist, it seemed wise to delegate to Dr. Baker the authority, as well as the responsibility entailed, to run the Division of Neurology as a semi-autonomous unit within the department. This decision was arrived at in 1948, and its prudence is seen in the fact that neurology developed into a training and research center that ranked among the top few in the country. After a good deal of intra-departmental discussion, and based on the reasons previously stated, a formal request was submitted to the dean of the Medical School on December 10, 1957, that neurology be separated and given departmental status. This too was a development that was beginning to take place on the national scene. The dean appointed a committee to look into the matter and make recommendations. After a number of meetings, it became apparent that the committee felt that neurology should not have departmental status and the matter was dropped.

One of the ways by which the growth of the department during the two decades (1946-1965) can best be visualized is in terms of available funds.

	1946	*1965*
Medical School	$44,478	$185,436
Psychopathic Hospital	90,000	831,228
Child Psychiatry	15,000	318,170
Multiple Sclerosis Clinic	0	111,168
Psychiatric Research Special	0	116,000
NIH Training Grants	0	334,600
NIH Research Grants	0	508,500
Other Funds	5,000	113,600
Total	$154,478	$2,718,702

General Hospital. Minneapolis General Hospital, founded in 1887, established a Psychiatric Service in the Annex Building, where a 32-bed inpatient facility was constructed in 1933. At its inception, this service provided care for medically indigent patients with acute psychiatric disorders, as well as emergency hospitalization for many other psychiatric patients from Hennepin County.

Until 1953, the psychiatric service at the Hospital had been supervised by part-time attending men under the leadership of Dr. Joseph C. Michael. Upon his retirement and in accord with training trends, it seemed wise to think in terms of developing a full-time staff. In October of 1953, Dr. Richard W. Anderson became the first full-time chief of the psychiatric service, and he was able to attract a competent full-time basic staff consisting of Marietta Babcock and Robert Spano in psychiatric social work and Harriet Juckem in clinical psychology. In addition, eight psychiatrists were appointed to the clinical staff and given University appointments. This date, 1953, marks the development of a full-time psychiatric faculty at Minneapolis General Hospital and both medical students and residents were assigned for teaching. Dr. Anderson resigned in 1957 to assume the directorship of the psychiatric outpatient services at University Hospitals, and he was replaced by Dr. William F. Sheeley, who left in 1959 to accept a position in the central office of the American Psychiatric Association in Washington, D.C. Dr. Sheeley was succeeded by Dr. William W. Jepson, who remains chief of the service to this date.

By 1955, the service had added 20 beds for intensive in-patient treatment, had expanded out-patient facilities, and had recruited its own psychiatric residents, who participated in the academic program of the University. As the teaching program developed, exchange of residents yielded to an integrated program and six months to one year of service in the psychiatric wards and clinic of the General Hospital became a regular part of the training of all University psychiatric residents.

Under the provisions of the Community Mental Health Services Act of 1957, the State of Minnesota provided matching funds for establishment and expansion of out-patient psychiatric services. The Hennepin County Mental Health Center established at the General Hospital achieved the significant staff expansion required to provide a wider range of out-patient services, including day care and child psychiatry.

The Hennepin County General Hospital now serves patients from

the entire county, a metropolitan area of approximately one million persons. Broadening of financial support, and service to a larger population have required more personnel so that currently the hospital has eight psychiatrists, five clinical psychologists, and eight psychiatric social workers on its staff.

In line with the current trend toward community psychiatry, the receiving area of the Anoka State Hospital has been altered to include Hennepin County, and the affiliation between it and the Hennepin County General Hospital promises an integration and continuity of psychiatric services for residents of the county which are still distant goals in other areas. It is in the field of Community Psychiatry that Hennepin County General Hospital offers rich opportunities to the psychiatrist in training.

Veterans Administration Hospital. This affiliation in psychiatry began in 1946. Roger Howell was the first Chief of Psychiatry, on a half-time basis. The first group of residents were men who had just returned from military service and were eager to specialize. They were mature men, with 4 to 5 years war service behind them, as well as several years' private practice, in most instances. They were a closely knit group who identified strongly with their teachers (Hastings, Howell, Aldrich, Hinckley, Erickson, Hathaway). The Psychiatry Service was housed at the Fort Snelling Annex, more than a mile south of the main Veterans Administration Hospital. Nearby was the Veterans Administration Mental Hygiene Clinic (Marvin Sukov, Chief) where the Outpatient clinical teaching took place. In addition to residents in psychiatry, Veterans Administration trainees in clinical psychology and social work students received their clinical and field experience in this setting.

In 1948, the chief of psychiatry's position was enlarged to a full-time position and Werner Simon was appointed, who had previous Veterans Administration experience. Subsequently, the Psychiatry Service at the Minneapolis Veterans Administration Hospital underwent many rapid changes and developments. Emphasis was placed on full-time staff and additional staff psychiatrists were appointed, mainly former residents who had completed their training (Claire Kuiper, Blocker Joslin, Benjamin Lund, Margaret Bailey, Wendell Hopkins). William Hales was appointed Veterans Administration Chief of Clinical Psychology and developed an important teaching program, to be succeeded in 1952 by

Harold Gilberstadt, who has been chief since then and has had on his full-time staff people like Robert Wirt, Anne Wirt, Jan Puker, Gayle Lumry, etc. Many trainees achieved their degree of doctor of philosophy here and went on to more important teaching, research or clinical positions. Starke Hathaway, Paul Meehl, William Schofield and Robert Wirt were intimately associated in their teaching with this group. Psychiatric social work was strengthened and further developed over the years with a succession of supervisors (Thelma Dorroh, Evelyn Neilson, Alden Halloran, Lucile Spriggs). Many students have had their field training here and the class on psychopathology for the School of Social Work has been given at the Veterans Administration Hospital since 1955 by Werner Simon.

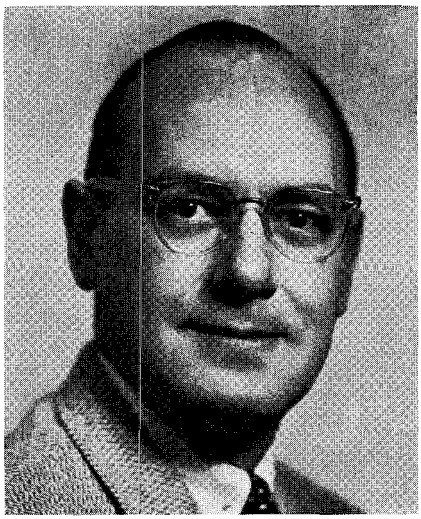
The residency program in psychiatry was further strengthened when the Psychiatry Service moved into a new building in 1956 occupying the 7th and 8th floors with three wards and a total bed capacity of 102. These added physical facilities and enlarged staff improved the teaching program and made it possible to establish a truly short-term intensive treatment Service and a large turnover of patients, over 90% of them returning to their homes, families and communities. Full-time staff was expanded to eight (including Orville Johnson, Vera Eiden, Tom Dredge and Sonja Monson) and faithful consultants and attendants from the University (Drs. Hinckley, Koutsky, Caplan, Hathaway, Schofield, Wirt) added to the teaching program. While all Veterans Administration residents rotated through the University for clinical experience with women and children, University residents began to rotate through the Psychiatry Service of the Minneapolis Veterans Administration Hospital. Also, junior medical students were assigned for their clerkship in psychiatry in 1964. Other training programs were added in nursing (St. Olaf's College), in occupational therapy, manual arts therapy, and in recreation.

Usually, from 6-10 psychiatric residents have been in the Veterans Administration program, and since 1946 more than 80 residents have received their training in psychiatry on this service. Many of them are now in practice in the Minneapolis-St. Paul metropolitan area; in fact, about half of all psychiatrists in private practice in the Twin Cities have received their formal training on this service. In addition, about 30 neurology residents, who have rotated through the service, have received

training in psychiatry, as well as 25 medical residents who were taught psychosomatic medicine.

The entire staff in psychiatry and clinical psychology at the Minneapolis Veterans Administration Hospital are members of the faculty at the University of Minnesota Medical School. Their extensive research interests resulted in a large number of published papers, often with participation of University staff and residents or trainees. Over 80 publications in scientific journals have appeared, in addition to a book on schizophrenia, a book on diagnostic testing with the Minnesota Multiphasic Personality Inventory, and chapters in other books, and many papers have been presented at local, national and international professional meetings.

Dr. *Donald W. Hastings,* who prepared the above sketch as head of the Department of Psychiatry and Neurology since 1945, was born in Madison, Wisconsin. In due time, he entered the School of Medicine and for five summers he worked as an orderly in the local hospital. After receiving the degree of doctor of medicine with honors in 1934, he was resident at the Pennsylvania Hospital for Nervous and Mental Diseases and the Institute of Pennsylvania Hospital in Philadelphia. In both of these institutions, he was a Rockefeller Fellow in psychiatry. The third year of his residency was spent at Harvard University on research in



Donald W. Hastings

"normal" personality. On his return to Philadelphia, he accepted an appointment as clinical director of the Pennsylvania Hospital of Nervous and Mental Diseases.

At the outbreak of World War II, Dr. Hastings was one of the few civilians to go through the School of Aviation Medicine at Randolph Field in Texas. When he received his commission, he was sent overseas as chief of psychiatry to the 8th Air Force in England. There, he carried a heavy load of administrative and clinical responsibilities for the welfare of the flying personnel that manned the largest United States heavy bombardment force which came to total 1600 heavy bombers and 3000 fighters. He was a first-hand witness of what was to become a commonplace observation among the psychiatric armed forces staff, namely, that not only was the number of men rejected from the military for psychiatric reasons alarmingly high, but exceeded the number later released for all other medical reasons combined. He gained personal knowledge of the effects of severe emotional stress on carefully selected and highly trained men who suffered not only from the fatigue and strain of bombing missions, but also from the knowledge that their mathematical chances of survival of the 25 missions required for rotation were slim indeed. These observations impressed Dr. Hastings with the need for improving the training of physicians in psychiatry. He also had observed that the majority of wartime psychiatric disorders were not psychotic in nature but were some form of neurosis or psychosomatic disorder. This observation reinforced his belief that not only must general psychiatric training in the medical schools be improved, but that in the future particular stress should be given to teaching the diagnosis and management of the psychosomatic disorders.

Dr. Hastings was one of three psychiatrists chosen by the Air Force to return to the United States to set up the Don Cesar Hospital in St. Petersburg, Florida, for the treatment of flying personnel. His success there led to his appointment as Chief Psychiatrist of the Air Force and as such his subsequent mission to Saipan and Leyte to study methods to minimize the psychological impact of combat.

At the close of that Air Force service, the University of Pennsylvania requested that he be discharged from the Armed Forces in August 1945. However, he was in Philadelphia only a short time when an invitation was extended by the University of Minnesota to head the Department of Psychiatry and Neurology.

Dr. Hastings' personal accomplishments have brought him recognition everywhere. He has published numerous articles on such subjects as insulin shock, matrozol therapy, electroshock, and sodium amytal narcosis. He has also written on differential diagnosis of brain tumors, the psychiatric problems of mental deficients, the somato-psychic disorders of old age, the psychiatric problems of clinical rehabilitation, the prognostic factors in schizophrenia, and the clinical management of depression. He recently published a book on *Psychological Impotence and Frigidity* mainly for the general physician. In 1965 (March, April, May and July), he published in *Journal-Lancet,* a series of papers on *The Psychiatry of Presidential Assassination* which were assembled in a popular brochure. He is a former member of the Scientific Advisory Board United States Air Force, Group for Advancement of Psychiatry, the Central Neurological Society and many other medical organizations.

Dr. B. C. Schiele has recently said, "A less tangible but possibly more important contribution to the Department's growth in teaching and research has been Dr. Hastings' talent for creating an atmosphere in which staff members have found it possible to develop various potentials. Dr. Hastings is not the kind of administrator who builds around his own talents and interests, but rather is one who fosters growth in others." (See Appendix J.)

Division of Clinical Psychology. Apparently, the teaching of psychology began in the School of Medicine in the middle 1920's. In the succeeding years, a number of later widely known and significant psychologists earned minors for their doctorates in the Department of Anatomy. For the most part, the courses were human neurology and histology with anatomy an occasional further course. Over the succeeding years, Dr. McKinley encouraged those interested in psychology. On March 15, 1951, Dr. Hastings presented a motion to the Administrative Committee of the Medical School proposing a separate Division of Clinical Psychology within the Department of Psychiatry and Neurology. This motion was passed.

The original statement of purposes of the Division of Clinical Psychology included training of medical students, conduct of research, training of specialists, and the establishments of a high level of clinical excellence as a model for all students.

The new division was intended to continue close ties with the Department of Psychology in the College of Science, Literature and the Arts

as well as with other departments in the University. In more detail, the specific functions enumerated in the original statement of the establishment of the division included general psychometric work for the other divisions of the department and of the hospital as a whole. It was stated that this psychometric work would be in response to consultation requests and that summaries would be provided for the charts. Fields of testing were to include general ability, interest, personality, and other appropriate sub-areas. It was planned that a responsible staff psychologist would oversee all interpretations of psychometric findings by psychology students or other students in training. Research contributing to psychiatric theory and practice was to be emphasized, but it was also stated that such specialized research would not exclude research related to other departmental areas where psychological techniques might be applicable. It was promised that a minimal diagnostic, prognastic test battery should be developed on the basis of some evidence about the optimal kind and sequence of psychological tests. In relation to special problems, it was suggested that research might lead to tests for "psychological aberrations." These tests might be approached through the use of "frustration tests, free association tests, and the like." Also mentioned as special contribution items were procedures for the detection of guilt and for the discovery of significant information behind the amnesia of amnesic patients.

At the time the division was founded, there were two teaching assistants, and it was planned that another academic associate should soon be added. For the year 1964-65, the clinical staff responded to 3,721 consultations involving the Minnesota Multiphasic Personality Inventory and did more extended testing and consultative interpretations for over 1,000 patients.

It is difficult to estimate the contribution in psychotherapy. Many of the consultative contacts involve psychotherapuetic elements. These often pave the way to more extended referral to psychiatry. Additionally, there is a steady increase in counseling psychotherapy with in and outpatients. The major part of this psychotherapeutic work is in the context of teaching student physicians and graduate students. A distinguishing aspect of this psychotherapeutic service is the experimentation with new techniques and theories.

In addition to this service work, most of which was integrated into the clinical teaching program, the staff, in part or in whole, taught six

regular classes and seminars and produced a considerable volume of research publication.

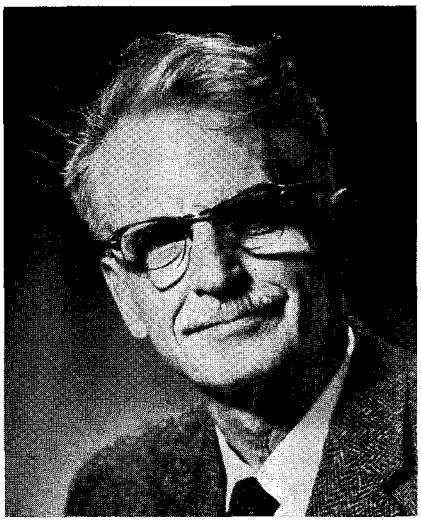
The division is now an approved independent agency for clinical psychology internship. There are four stipends under the division's training grant from the National Institute of Mental Health. From the training program of the Department of Psychology there are additional interns and 10 to 15 clerks who come for field work practice.

The full-time regular staff of the division has grown correspondingly. Counting all positions there are about 18 psychologists. At least 12 clinical appointees of the division work in affiliated clinical facilities. Of the regular staff, about 8 psychologists are primarily engaged in research. The extensive research project of the staff is impressive and varies from basic research with animals or physiological correlates of behavior to more clinical work on diagnostic tests, delinquency, and other currently significant topics.

In the spring of 1965, the Clinical Psychology Outpatient Clinic began to function two afternoons a week and was soon expanded to three afternoons. Beginning as a device to improve clinical teaching of the student physicians, the improved service efficiency suggested expansion to integrate additional services.

Possibly no other clinical and research area has more promise for further development. The contrast between mental health manpower needs and the available professionally trained clinical psychologists, psychiatrists, and social workers is well documented. Training facilities must clearly be expended if we are to provide even a minimum coverage of existing positions. But also, more and more, the psychological aspects of Medicine must be better developed. The psychological handling of psychomatic disorders is becoming a more extensive and demanding field for medical training and practice. Behavior science, in which psychology is a central discipline, must also come to make a significant contribution to medicine. Such brief indications characterize the future.

Dr. *Starke Hathaway,* who wrote the preceding sketch, was born in Central Lake, Michigan on August 22, 1903. He earned the bachelor of science degree majoring in psychology and mathematics at Ohio State University in 1927. The next year, he was awarded the degree of master of arts at Ohio State University in psychology and statistics. During his senior year at Ohio, he was teaching assistant in psychology. From 1927-29, he was instructor and assistant professor.



Starke Hathaway

Dr. Hathaway came to the University of Minnesota in 1930 as lecturer in psychology. He was awarded the degree of doctor of philosophy in psychology and anatomy in 1932.

In association with Dr. McKinley, he began a series of investigations into the subject of coordination. Also, in collaboration with Dr. Grant Rasmussen, he published on action potentials in the midbrain and, using the same amplifers, took possibly some of the earliest pictures of the alpha rhythm of the electroencephalogram then being reported by Berger. From 1937 to 1940, he was assistant professor of psychiatry and neurology, associate professor from 1940 to 1947, and professor in 1947. In 1951, he became director of the Division of Clinical Psychology.

Dr. Hathaway holds membership in and has served on various committees on all of the local and national organizations in the field of clinical psychology. He has been chairman of the Board of Professional Affairs and was president of the Division of Clinical Psychology of the American Psychological Association in 1963. He has published a large number of papers in various journals in addition to several books including *Physiological Psychology* and *Adolescent Personality and Behavior*. In 1966, he was invited back to Ohio State University to receive the degree of doctor of humane letters.

DIVISION OF CHILD PSYCHIATRY

This division began in 1938 as the Psychiatric Clinic for Children. Its roots, however, go back to the early 1920's. Following World War I, the Commonwealth Fund, in cooperation with the National Committee for Mental Hygiene, established "Demonstration Clinics" throughout the country. These clinics were to offer "a demonstration service which would examine and treat problem children, demonstrate methods and values and help with the organization of permanent clinics to follow." (1. Child Guidance Clinics: Stevenson and Smith, The Commonwealth Fund 1934.)

A Twin City Demonstration Clinic began functioning in 1923 in affiliation with the University of Minnesota. "The University affiliation was important, since the legislature had recently authorized an education program in preparation for the possible establishment of a psychopathic hospital at the Medical School. Arrangements were made for the clinic staff to teach at the University in the departments of psychology, education, medicine and sociology—" (Op. Cit paragraph 34). Though the demonstration ended in 1924, three developments ensued: (1) a child guidance clinic was established by the Minneapolis Board of Education; (2) the Amherst H. Wilder Charities established a child guidance clinic in St. Paul, and (3) the University of Minnesota supported a "mental hygiene demonstration" for the state with branches in Duluth and Mankato. Originally planned for a two-year period, it was discontinued after one year when the 1925 legislature failed to act favorably on the University request for funds and brought the early leadership in child psychiatry within the Medical School to an abrupt close.

It is difficult to determine who originated the idea for a children's psychiatric clinic because its development was due to the cooperative effort of Dr. Irvine McQuarrie, Dr. J. C. McKinley, and Mr. Ray Amberg. Their combined efforts were supported by Dr. H. S. Diehl, Dean of the Medical School. The one clue as to who initiated the idea is a statement made by Dr. McQuarrie at the first annual meeting of the Psychiatric Clinic for Children. "Doctor Diehl called me to his office one day shortly after he became dean of the Medical School and asked what we needed most in the pediatric department. I told him our one large gap was in the treatment of behavior problems."

It was not long thereafter that Dean Diehl learned the Board of the Stevens Avenue Home for Aged Women and Children was considering the establishment of a children's psychiatric clinic in Minneapolis. At the annual meeting he stated, "We contacted Mrs. Morrison and her associates and discussed plans. We stated our needs for this clinic, the benefits the community would derive, and the teaching and research opportunities it would offer to our medical students, graduate students, social workers, psychologists, etc. The trustees of the Stevens Avenue Home were interested, as they felt it was most important that such advantages should be offered. Local resources were not adequate, however, so we approached the Commonwealth Fund of New York City. Because of their knowledge and experience in this type of work, they made an initial grant of $5,000.00 with which to purchase necessary equipment for establishing the clinic and agreed to participate in the operating expenses of the clinic for a five year period." With the assurance of support from the Commonwealth Fund, the Stevens Avenue Home for Aged Women and Children agreed to support the proposed project for a similar period.

Planning progressed, and the final arrangement was that a psychiatric service to children should be established at the Medical School. The project was to be established as an independent unit with close affiliations with both the Department of Pediatrics and the Division of Neuropsychiatry.

The clinic was launched in September 1938 following the appointment of two psychiatrists. *Eric Kent Clarke,* M.D., formerly associate professor of medicine (psychiatry) of the University of Rochester, was appointed director of the Clinic and professor in the Departments of Pediatrics and Psychiatry.

In addition, two clinical psychologists were engaged two-thirds time—Robert Harris, and Stewart Cook. Two psychiatric social workers joined the staff—Elizabeth Glynn, and Ralphyne Brady. The essential secretarial help was employed. Miss Helen Haines, Superintendent of the Stevens Avenue Home for Aged Women and Children, served half-time as a social worker in charge of admissions. Supporting help to the clinic was also provided by the psychiatric consultant and the speech consultant to the State Department of Public Welfare, the latter arrangement to continue for over 10 years.

Space was provided on the sixth floor of the Eustis Children's Hos-

pital; from the beginning it was inadequate. In 1939, the Commonwealth Fund made an additional financial contribution to permit sufficient expansion to house the entire staff comfortably.

The first five years were not without struggle and tension. The Psychiatric Clinic for Children was established as "an independent unit closely affiliated with the Division of Neuropsychiatry and the Department of Pediatrics," but patients were referred directly to the clinic. This procedure was soon questioned by the hospital administration which insisted *all* patients coming to the University Hospitals should be hospital patients and be processed through usual channels. Considerable friction resulted. Retrospectively, it would have been wiser for the clinic to have used accepted referral procedures at the outset.

The clinic was also involved in a struggle between the departments of pediatrics and neuropsychiatry. Departmental status was approved for the Division of Neuropsychiatry in 1943. The staff of the newly designated department was interested in including the entire spectrum of life adjustment problems into its developing program. The staff of the pediatric department, closely identified with the Psychiatric Clinic for Children, was determined to maintain its relationship and influence. The climax was reached when, for a short time, a dual program was in operation—child psychiatry closely identified with pediatrics, and juvenile psychiatry identified with the Department of Neuropsychiatry. This arrangement proved cumbersome and was soon discontinued.

Dr. Clarke had long been an advocate of integrating the Medical School program more closely with the community. Prior to coming to Minnesota, he had developed several projects at the University of Rochester. Since the Stevens Avenue Home for Aged Women and Children was primarily interested in the community service function of the clinic, he felt justified in devoting considerable time to activity in that area. This emphasis was seriously questioned by others in the Medical School and again there was friction. In retrospect, Dr. Clarke was ahead of his time. Current developments in the overall Medical School program are being directed toward the ends he envisioned. As evidence of his broad community interest, Dr. Clarke was one of a small group who organized the Minnesota Society for Mental Hygiene—now the Minnesota Association for Mental Health.

Another element of annoyance and tension originated from the community. Shortly after the Psychiatric Clinic for Children began, the

director of the Minneapolis Child Study Department resigned. As a result, the Psychiatric Clinic for Children provided emergency care for seriously maladjusted children from the Minneapolis Public Schools. The clinic was criticized by some of the community agencies for permitting medical students to work with disturbed children and their families.

World War II contributed to the clinic's difficulties. Dr. Clarke resigned to accept the post of Director of Mental Hygiene in the new atomic energy facility at Oak Ridge, Tennessee. This left only one psychiatrist on the clinic staff and doubled his teaching load. Simultaneously, an added strain was placed on all members of the medical staff by the Medical School's adoption of an accelerated 12-month teaching program. Besides that, many staff physicians, including the clinic's remaining psychiatrist, were voluntarily spending night hours examining draftees at Fort Snelling.

The clinic's demonstration period was to terminate in 1943. As would be expected, the attendant uncertainties resulted in the resignation of other staff members to accept positions offering greater security and often higher salaries. Nonetheless, despite the growing pains, sufficient interest in the clinic's developing program was generated to encourage the administration to seek and secure a two-year extension of financial support from the Commonwealth Fund and the Stevens Avenue Home for Aged Women and Children.

In 1945, the Medical School and University Hospitals assumed full responsibility for the service. A committee appointed by Dean Diehl to advise him on where the service should be assigned administratively recommended the Department of Pediatrics. This was done, though the staff maintained joint appointments in the Department of Neuropsychiatry. In 1955, the service was granted the status of a Division in the Department of Pediatrics. Later the division was transferred administratively to the Department of Psychiatry and Neurology.

Children's Psychiatric Hospital. When the Psychiatric Clinic for Children began to function as an independent unit, no hospital bed was specifically assigned for its use. There was an informal agreement, however, that patients in whom the clinic was interested could be housed in the pediatric ward if they offered no hazard to other children. The more seriously disturbed children could be admitted to the adult psychiatric service.

During the following 12 years, an increasing number of children were admitted, particularly the more severely disturbed children who went to the adult psychiatric service. Though this was an inconvenience to that service, complete cooperation was provided at all times. The admission of 40-50 children per year to the two services demonstrated the need for a children's inpatient psychiatric service. In 1951, the University included in its hospital request to the legislature a special appropriation for the development of a Children's Psychiatric Hospital. This time, contrary to 1925 when a similar request was denied, the legislature appropriated the necessary funds. On October 6, 1951, the inpatient psychiatric service for children became operative. Space was assigned in the former intern's quarters on the sixth floor of the west wing adjacent to the staff offices. Fourteen beds were made available.

Upon completion of the Mayo Memorial, the division staff moved to its new quarters located on the fourteenth floor, permitting the remodeling of the inpatient service. Mr. Ray Amberg, then superintendent of the Hospital, was largely responsible for the expansion and improvement.

Developing an inpatient psychiatric facility for children was an exciting challenge to the staff. While disturbed children had been previously admitted to the hospital, there had been no first hand experience in administering a separate service. In preparation for this added responsibility, the staff began to hold planning meetings. Conferences were held not only with members of the various departments of the hospital, but also with representatives from state and community agencies. As in the early years of the demonstration program, again there was much to learn. Ineptness, ignorance and uncertainty on the part of the staff has been gradually replaced by understanding, skill, and confidence.

Since the first patient arrived in October 1951, nearly 1,500 children, varying in age from 18 months to 16 years, have been admitted for diagnostic evaluation and treatment. Their education while in the hospital has been continued under a school teacher with special skill and training. After the division initiated its school program, a similar one was begun for all pediatric in-patients.

The Program. At its inception the Psychiatric Clinic for Children was obliged to develop a sound program of teaching the principles of child psychiatry (expected by the Commonwealth Fund) and to provide a service function for the community (expected by the Stevens

Avenue Home for Aged Women and Children). Research and investigation were regarded as an additional function. This ordinal assignment of responsibilities—different from that of the other services—has definitely influenced the development of the total program.

Teaching. During the seven years of demonstration, the Department of Pediatrics and Neuropsychiatry provided generous time for teaching child psychiatry to medical students at all levels by means of lectures, case conferences and seminars.

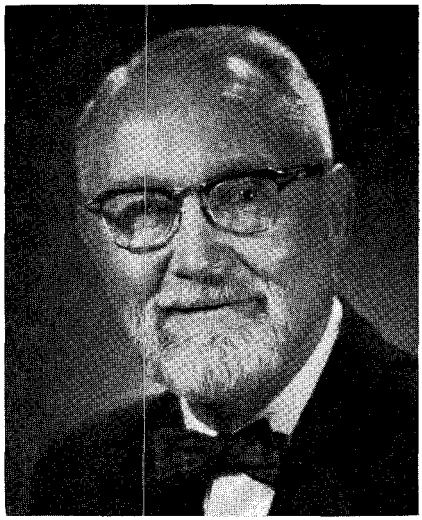
From the inception of the service, interns and residents from the two interested departments were regularly assigned for varying periods of orientation in child psychiatry. A number of residents in psychiatric training have elected to take a full year of training in child psychiatry, which is accepted by the American Board of Psychiatry and Neurology as fulfilling requirements for certification in psychiatry. Since 1960, no pediatric interns have been assigned to the service, and in 1963 regular assignments of pediatric residents ceased. In 1959, when child psychiatry was recognized as a sub-specialty in psychiatry, the Division of Child Psychiatry was officially approved as a training center for career training in child psychiatry.

In addition to teaching and training medical personnel, the division has provided advanced training for clinical psychologists, occupational therapists, teachers of special education, and others. The staff also has participated actively in the program of the University's Center for Continuation Study.

One effective teaching device—the Inter-Agency Conference—was originated early in the demonstration years. This procedure provides an opportunity for interested persons in the community to participate with the staff in planning for a child and family after a period of study. Joint planning is essential, for the staff is unable to assume full responsibility for patient care outside the hospital.

Service. During the official five-year demonstration period, 1,453 children and their families were served. Since incorporation into the total hospital program, it is estimated that more than 10,000 children of the state and their families have been served. Currently, about 400 children and their families receive service annually.

Research. Allowing for the fact that teaching and service took precedence over research in the order of responsibilities originally assigned, the child psychiatry staff has and is making a creditable contribution



Reynold A. Jensen

in the third category. During the early days, attention was directed largely to the study of psychosomatic conditions occurring in children and the collection of evidence to support the growing recognition that even the most severe psychiatry disorders are not peculiar to adults. These findings have been reported and published.

The Division of Child Psychiatry presently is an integral part of the total teaching, research and service program of the University. If, during the years of its operation, children in Minnesota and elsewhere are better understood and more effectively served, then the functions originally assigned have been fulfilled. To Doctors Diehl, McQuarrie, McKinley, Clarke, and to Mr. Ray Amberg credit is acknowledged for their wisdom and sustained support.

Dr. *Reynold A. Jensen* who prepared the departmental sketch was born on June 8, 1903, in Sleepy Eye, Minn. He earned the degree of doctor of medicine in 1935.

In 1936-37, Dr. Jensen was a Rockefeller Fellow in Psychiatry, Institute of the Pennsylvania Hospital. The next year he spent as a Commonwealth Fellow in Child Guidance at the Judge Baker Guidance Center, Boston, Mass.

He returned to the University of Minnesota as an instructor in psychiatry and pediatrics in 1938, was advanced to an assistant professorship in 1939, and to an associate professorship in 1945. In 1952, he

became professor of psychiatry and pediatrics, and also medical director of the Children's Psychiatric Hospital. In 1956, he was appointed director of the Division of Child Psychiatry, Department of Psychiatry and Neurology.

Dr. Jensen is certified in psychiatry and child psychiatry by the American Board of Psychiatry and Neurology. He holds membership in all of the local, state and national organizations in the fields of his activity. He is an Associate Fellow of the Royal Society of Medicine, London England.

Dr. Jensen has been called upon to participate in many planning conferences and institutes. The demands upon his time as a speaker have been large and he has delivered guest lectures throughout the United States.

In 1959, he began a sabbatical year for study and travel in Europe where he visited medical schools, universities, and institutions for disturbed and mentally retarded children. During his sabbatical leave, he lectured to students and others at the University of Oslo, the Karolinska Institute in Stockholm, and Salpetriere, Paris. He attended the London Conference on Mental Retardation and presented a paper entitled *Importance of Differential Diagnosis in Mental Deficiency* in July, 1960. Two years later, he chaired a plenary session of the Fifth International Congress on Child Psychiatry in The Hague.

Chapter XXV

The Department of Physiology

ITS BEGINNINGS

THE SAGA OF MEDICAL EDUCATION in the United States could be written in a typical example out of the history of the Medical School of the University of Minnesota. Until 1888, medical education in Minnesota was in the hands of proprietary medical schools. Some such schools as for example the one associated with Hamline University had nominal academic connections, but the schools lived largely, if not entirely, on tuition income. Instruction in the basic sciences as well as in clinical subjects was provided by persons whose main source of livelihood was the private practice of medicine.

In Minnesota, this situation began to change in 1888 when Dr. Perry Millard and others, including Dr. Richard Olding Beard, accomplished the bringing together of several proprietary medical schools and the surrender of their charters to the University of Minnesota which undertook to establish a Medical School as one of its functions. Millard and Beard were both concerned with public health as well as with the practice of medicine. Beard was Assistant Commissioner of Health for Minneapolis from 1886 to 1889 and was a member of the commission which investigated water supplies for the city and recommended the use of chemically treated and filtered Mississippi water, a plan which was adopted. When the Medical School was founded in 1888, Richard Beard became the first professor of physiology, being officially appointed in 1889. The official records show that in 1909 he was also put in charge of pharmacology. Of course, there were in 1889 no professors of biochemistry, that discipline being invariably treated as a part of physiology.

In reality, therefore, the chair of this Department of Physiology began as a kind of three-legged stool with one very rudimentary chemical one which was hardly visible as a reality in those days, a weak pharmacologi-

cal support and a major interest in the growing science of physiology proper.

To place physiology in its proper perspective, it may be recalled that the American Physiological Society was founded in 1888 with a mere handful of members. European physiology had just received its first modern impetus from the work of Johannes Muller, Carl Ludwig, Michael Foster and Claude Bernard. The Johns Hopkins University was being established, and among State Universities only the University of Michigan was establishing a scientifically oriented medical school, with full-time, professionally trained basic medical scientists on its faculty.

Initially, the College of Medicine carried on its teaching functions in the building formerly occupied by the Minnesota Hospital College which was located at Sixth Street and Ninth Avenue, South Minneapolis. It was moved to a building constructed for its use on the East Bank in 1892. In this structure, high school graduates were taught general chemistry by J. W. Bell, anatomy by Thomas G. Lee and physiology by Richard Olding Beard, who constituted the whole of the full-time faculty. This building, having been rebuilt after a fire in 1912, was later devoted to the work of the College of Pharmacy. It had originally carried the name of the first Dean of the College of Medicine, as Millard Hall, which was changed in 1912 when the present Millard Hall was erected. Meanwhile, another Medical Building, the present Wesbrook Hall was erected to house medical instructional activities. It, too, was converted to other uses, and between 1912 and 1932 served to house the School of Dentistry.

The nucleus of the present quarters for the Department of Physiology was built in 1912. Major additions were made in 1953, when the fourth floor of the Lyon Laboratories was added and in 1958 when the former animal house on the top floor of Millard Hall was completely rebuilt to house a major fraction of the work of the Department. The undergraduate laboratory instruction in physiology is still carried on in the same general space so utilized in 1912, somewhat enlarged, extensively reconstructed and refurnished in 1961. The laboratories built in 1912 were extremely well-designed and well-outfitted for that time, by Professor Frederick H. Scott, who modelled them after the Starling laboratories in University College, London, where he had had his post-doctoral training.

The most crucial year for the development of the Medical School of the University of Minnesota was 1913. George E. Vincent had be-

come president of the University in 1911 and set it on its course to become one of the major state Universities in the country. Vincent obviously wanted to set the stage for Minnesota to become a center of scholarship. The college of Medicine which he found upon his arrival had made great progress since its founding 21 years before, but Vincent was anxious to see it make much more rapid strides. Fortune favored him in that the then Dean Frank F. Wesbrook received and accepted a fine offer to become President of the University of British Columbia and after failing to persuade Dr. Clarence M. Jackson who had been successful in "deaning" at the University of Missouri to accept the Minnesota deanship, he took Jackson's advice and approached the physiologist, Elias Potter Lyon, who was then Dean of the St. Louis University Medical School, offering him the opportunity to lead the renovation of the faculty and the curriculum at Minnesota. Lyon accepted the challenge and became head of the Department of Physiology and dean of the School, positions which he held for a crucial period, retiring in 1936. Actually, he relinquished most of his functions in 1931 to make way for the appointment of Richard M. Scammon as dean of an enlarged College of Medical Sciences.

It is now a half century, plus five years, since the Vincent-Lyon "revolution" in the medical science enterprise at Minnesota. It is possible to see clearly now the impact of their philosophy upon later events. Essentially, the Vincent philosophy differed from that of his predecessor Northrop in that he saw more clearly that a true university must be a place in which creative scholarship was of equal importance with instructional excellence and that the latter was unattainable without the former. Vincent saw a university as a community of dynamic scholarship and he chose as his "deputies" deans who shared his view. Although Vincent himself moved on to the Presidency of the Rockefeller Foundation after only seven years at Minnesota, the deans he appointed remained (and two of the next three presidents of the University came from their ranks), his influence unquestionably set the tone of the institution for the next half century.

No account of the development of activity in the physiological sciences at the University of Minnesota would be adequate without reference to the setting up of the Mayo Foundation as an educational and research arm of the institution. The Mayo enterprise has undoubtedly had a major impact upon academic medicine in Minnesota, not to say the

world. As to its local effect, the more timid souls looked upon it as a collossus which would swallow up the interest in academic medicine in the State and leave the Medical School on the Minneapolis campus as an anemic undergraduate medical teaching enterprise. Obviously, nothing of the kind has happened. The Medical School has flourished as a center of scholarship in medical science. For some years, to be sure, the Mayo enterprise was considerably more productive than was the Minneapolis Campus Medical Center. Under Frank C. Mann, physiological research and graduate instruction gave Minnesota a position of national and international prestige, beginning with his appointment to the Mayo Clinic in 1913, a year before the Mayo Foundation was formally established.

But there can be little doubt that the existence of a "center of excellence" on the Mayo Campus only 90 miles away from its less-privileged sibling on the Minneapolis campus, provided a standard of comparison which made it easier for the University faculty and administration to acquire the support necessary to develop the Medical School enterprise. The Regents of the University and the State Legislature, could hardly live with a strong and fluorishing medical arm in Rochester and a weak or withering one in Minneapolis on the main campus. Now, after a half century, it would be laughable to suggest that the Mayo Foundation had been a hindrance to the development of the Medical School in Minneapolis. This is not to say that there have been no problems in the symbiotic relationships between the two medical arms of the University. Disagreements there have been, but no more sharp than between separate colleges or departments on the same campus in the same period of time. Having served for ten years as Chairman of the Medical Graduate Group Committee, the present writer can certify that in his experience there were no problems as between the Mayo and the Minneapolis faculties which were as awkward as some occurring within the Minneapolis campus itself.

The Mayo Foundation set the stage in Rochester for major developments in scientific medicine. The present author recalls vividly a lecture by Dr. Will Mayo in the year 1924 on the Minneapolis campus (in the amphitheatre of what is now Jackson Hall) on the theme of the importance of biophysics to the future of medicine. If one will recall that Will Mayo was a practicing surgeon, educated before the time when either biochemistry or biophysics were recognized scientific disciplines,

it will be obvious that he was well aware of the fact that in scholarly work in basic science one would find the future of medicine. Since Dr. Mayo was also a Regent of the University, it is not surprising that the Medical School found in him an ardent supporter of programs aimed at advancing scholarship in medicine in the University.

PERSONALITIES DURING ITS FORMATIVE YEARS

There have been three heads of the Department of Physiology in the three quarters of a century since the founding of the Medical School of the University of Minnesota.

Richard Olding Beard (1856-1936) was born in Tallington Park, Middlesex, England, coming to Chicago with his family in 1869. He graduated in medicine from Northwestern University in 1882 and came at once to Minneapolis to engage in the private practice of medicine which he continued on at least a part-time basis until 1900. He was Assistant Commissioner of Health for Minneapolis from 1886-1889 and became head of the Department of Physiology of the newly formed College of Medicine in 1888. He was one of its main founders and planners. (See Chapter XIV). Beard had been associated since 1883 with the faculty of the Minnesota Hospital Medical College. He was not specially trained in the science of physiology and was actually more interested in planning, organizational and promotional work than he was in participating himself in creative scholarship. He realized his own limitations. Even before the 1913 reorganization, he brought into his department Dr. F. H. Scott, a professional physiologist who would begin to build a staff with creative scholarly interests. Beard was a dedicated didactic teacher. At the time of his retirement in 1925 a former student, then President of the Minnesota Medical Alumni Association, Dr. Orville N. Meland, wrote:

> "We remember the time when the Department of Physiology consisted of two full-time men, Professor Beard and Professor Scott, and a part-time man, Dr. Russell Wilcox. Instruction was given in a large room which served as a laboratory, so filled up with desks and apparatus that it was almost impossible to turn around in it. Another small room was used as the office and store-room. After two or more hours in the laboratory, we went to the amphitheatre on the floor above, where we spent another hour on its uncomfortable straight-backed benches. Here it was that Dr. Beard lectured to us. He was always prompt. Stepping

in briskly, he delivered a finished, very polished discourse on some physiologic subject, and then as promptly disappeared. Here was laid the foundation for our clinical medicine. Those days have changed. To-day the Department of Physiology is housed in new buildings; — it has a larger Staff; but its supporting structure was built years ago by this man we revere. . . . ."

Frederick Hughes Scott (1876-1951) was born in Toronto, Canada, and had his basic education at the University of Toronto. There he earned the bachelor of arts degree in 1897, the doctor of philosophy in 1900 and the medical degree in 1904. At Toronto, he was a pupil of the chemically oriented Professor A. B. MacCallam and his doctoral dissertation was in the field of histochemistry. He spent the years 1906 to 1908 at University College, London, with Professor Ernest Starling and Sir William Bayliss, where he made pioneering studies of the comparative aspects of the actions of hypercapnia and hypoxia upon the respiratory drive. He came to the University of Minnesota in 1908 as an assistant professor, becoming associate professor in 1913, professor in 1918, and emeritus professor in 1944. He was the first professionally-trained physiologist to come to the Minnesota campus and his arrival in 1908 may fairly be said to mark the beginning of work in scientific physiology at Minnesota.

Scott set about immediately to develop a research program. The institution provided him with very ample, in fact expansive, research laboratories in Millard Hall in 1912, and his handicap was mainly a very heavy teaching load. Nevertheless he persisted in his research interests and activities and made numerous contributions toward the solution of a variety of physiological problems.

Professor Scott was the major advisor for many students including the present author. His outstanding characteristic as a graduate advisor was his kindly interest in his students which belied his gruff exterior manner. He was a rigid taskmaster in his dealings with undergraduate students and he was actually rigid in his expectations of his graduate students. Since there were fewer of the latter, however, they got to know him better and recognize the innate friendliness beneath the crust of formality which constituted his external reserve. A slight speech impediment, which did not actually interfere with his ability to lecture lucidly, may have contributed to that external reserve. It surely provided his undergraduate students with anecdotal material about his mannerisms.

Scott's own background at Toronto and London made him highly conscious of the role of physics and chemistry for advances in physiology. His doctor of philosophy majors were strongly encouraged to use some branch of chemistry or physics as the minor fields for their degree work.

Although he was full of suggestions for problem work for his students he welcomed their independent ideas and encouraged them if they chose thesis subjects far removed from his own immediate interests. Scott believed in encouraging sparks of originality in everyone around him. He was a hard worker. It was a rare Saturday or Sunday, except his vacation periods which he spent on Gull Lake at Nisswa, Minnesota, on which one did not find him spending at least part of the day at work in his laboratory or at his desk.

Elias Potter Lyon (1867-1937) helped establish the teaching fellowship system at the Medical School which was a major cornerstone for the structure of the entire graduate training program in the medical sciences at Minnesota.

Livable stipends, plus a well-grounded and scientifically oriented instructional staff in the basic medical sciences, and so far as possible in the clinical areas, within the setting of a University, offering high level training in mathematics, physics, chemistry and basic biology, made graduate study at Minnesota not only attractive but also economically feasible for bright but needy students. They came not only from Minnesota but from all over the country to seize these opportunities.

The Medical School as a whole prospered during the 23 years of Lyon's deanship. (See Chapter XI.) As far as the Department of Physiology itself was concerned, however, there were definite handicaps, the major one of which was Lyon's own policy of not favoring the department of which he was also the head. This caused him to encourage the major staff expansion of other departments rather than his own. This superficially laudable attitude, combined with the facts that he himself was too busy with Medical School administration to be able to give more than a small fraction of his time to departmental activities, resulted in a severe limitation to work in physiology. For many years Lyon, Scott and Beard constituted the professorial rank staff. Of these, only Scott was fully active in the main work. The quality of work done was high, but the quantity was rather low, as compared with that done in anatomy, pathology, bacteriology and pharmacology at Minnesota during the Lyon epoch.

Lyon conducted two regular seminars of great value to both staff and students. One was an interdepartmental current literature seminar which was a major educational device. It met regularly in the faculty room on Monday noons. Coffee was served and participants brought sandwiches for lunch. Staff members from physiology, physiological chemistry, pharmacology, medicine, pediatrics and surgery ordinarily made the presentations. For a graduate student to be asked to report was a mark of confidence and to turn in as good a performance as possible was an opportunity seldom missed. This seminar constituted an important student-evaluation opportunity as well as a system for encouraging assiduous attention to all aspects of current physiological literature, basic and applied. The increasing difficulty of performing the latter function has resulted in a major change not, necessarily to the good, in graduate education in recent years. With the many-fold increase in the volume of research publications it has become necessary to delimit literature coverage sharply, increasing greatly the degree of specialization in graduate training.

Lyon's second seminar was one on medical and other biological science history, attended mainly by graduate students. These sessions were often held in the evening at his home.

Dr. Lyon married Miss Nellie P. Eastman on September 1, 1897, the year he obtained his doctorate. Dean and Mrs. Lyon had no children and they served as very gracious informal host and hostess to students and staff at their summer home on Lake St. Croix at Prescott, Wisconsin, just across the Minnesota State line. Rare was the summer Sunday or holiday when colleagues or students were not invited to Prescott, after Dean and Mrs. Lyon gave up their practice of spending their summers at Woods Hole, Massachusetts, where the former continued for many years some of the work in general and comparative physiology which he had begun before the turn of the century in his days with Jacques Loeb. They owned a cottage in Woods Hole and used it nearly every summer until Lotus Delta Coffman became President of the University of Minnesota. Coffman was impatient with deans who were not in residence in Minnesota during the summer and insisted upon having them on the campus at least eleven months of the year.

The major formal memorializations of Elias Potter Lyon's contributions to the University of Minnesota were the establishment of a Lyon Lectureship in Physiology in 1936, and the naming of a research

building, situated between Jackson Hall and Millard Hall, as the Elias P. Lyon Laboratories in 1954. This building houses parts of the laboratories for the Departments of Biochemistry, Pathology, Physiology and Pharmacology, and was built at a cost of $725,000, partly with funds contributed by the Minnesota Division of the American Cancer Society.

Dean Lyon was awarded three honorary doctorates, the doctor of medicine in 1910 and the doctor of laws in 1920 by St. Louis University and the doctor of science by the University of Southern California in 1930. He was President of the Association of American Medical Colleges in 1913 and 1914, and Chairman of the Section of Pathology and Physiology of the American Medical Association in 1934 and 1935.

A number of persons began their work in the Department of Physiology during Lyon's headship. Among these was Dr. Esther M. Greisheimer who was born in 1891, educated at the Ohio University, Clark University, the University of Chicago and the University of Minnesota. She earned the doctor of philosophy degree at Chicago in 1919 and the doctor of medicine degree at Minnesota in 1923. She came to Minnesota first in 1918 as an instructor and left in 1935 after having been promoted to the rank of associate professor. She left to become professor of physiology at the Women's Medical College in Philadelphia. While at Minnesota, she carried out extensive studies of carbohydrate metabolism and was known as a very successful teacher.

Dean A. Collins earned both his doctor of philosophy and doctor of medicine degrees at Minnesota and served as instructor and assistant professor. He left Minnesota to go to Temple University where he became professor. His life was cut short by early death from coronary heart disease. Another person with a short period of work in the department was Milo M. Loucks, who earned doctor of philosophy and doctor of medicine degrees at Minnesota. He left the institution to enter the practice of medicine.

Other persons earning the doctor of philosophy degree in the department during the Lyon period were Alice M. Rupp, who was awarded the degree in 1925, Frederick M. Steggerda, later professor of physiology at the University of Illinois; Arthur G. Mulder, later professor of physiology at the University of Tennessee; and at Loyola University, Chicago; and Allan Hemingway, who earned the doctor of philosophy degree in 1929 at Minnesota was promoted through the several academic

ranks, becoming professor serving both in the College of Medical Sciences and in the College of Veterinary Medicine in 1948. Hemingway left Minnesota in 1959 to become professor of physiology at the University of California at Los Angeles. He made important contributions in the fields of temperature regulation and of respiration. Between 1942 and 1945 he was on military leave at the School of Aviation Medicine, Randolph Field, Texas, where he studied motion sickness and other problems.

Joseph T. King is another Minnesota product of the Lyon-Scott era. He began graduate study in 1923, earned the doctor of medicine in 1925 and the doctor of philosophy degree in 1929. He began as assistant professor in that year, was promoted to associate professor in 1942, and to professor in 1955. He retired to emeritus status in 1964. In other words, he has spent his entire academic life at Minnesota. Beginning his studies with Dr. Hal Downey in hematology, King became interested in hematopoiesis, tissue culture and coagulation problems, making valuable contributions to each of those fields. He is the author of important papers on the effects of ionizing radiations upon cells in culture. His interest later moved into the field of nutrition and his studies on rare mineral metabolism and dietary effects upon senescence are of great importance. Dr. King's great virtue as a scientist has been his meticulous attention to every detail in his experimental work, including the setting up of rigorous controls. He has left a lasting imprint on literally thousands of undergraduate students who attended his classes and upon a smaller number of graduate students who worked intimately with him.

SPONSORSHIP OF PHYSIOLOGICAL CHEMISTRY AND OTHER MARSUPIAL FUNCTIONS

As in many other medical schools, the discipline of physiological chemistry at Minnesota began to be treated separately from the remainder of physiology in instruction early in the 20th century.

Besides serving to nurture biochemistry in the Medical School, the Department of Physiology served as marsupial hostess to several other emerging disciplines. As early as 1926 the biophysicist, Dr. Karl Wilhelm Stenstrom, was appointed to carry on basic and applied work, particularly in the field of radiation. He took charge of radiation therapy in the University Hospitals and also carried out work in physical medi-

cine. In 1938, his appointment was transferred fully to the Department of Radiology.

Physiology also helped the physical medicine at Minnesota become a full-fledged department under the leadership of Dr. *Frederic J. Kottke,* who earned the degree of doctor of philosophy in Physiology in 1944, and studied under the Baruch Foundation grant to the department before assuming full-time responsibilities for clinical service, teaching and research in physical medicine and rehabilitation.

The Laboratory of Physiological Hygiene was sponsored by the Department of Physiology from 1937 to 1946 when it became part of the School of Public Health. It began as noted elsewhere in this account with the appointment of Dr. Ancel Keys on funds provided by the Department of Physical Education actually derived from intercollegiate athletic receipts. *Professor Frank McCormick,* then director of athletics at the University, was anxious to see serious work begun in the field of the physiology of exercise and offered support for this enterprise which at present carries on work over a wide spectrum. The laboratory is now housed under the University football stadium, "Gate 26."

Studies in the biology of cancer were also promoted by the establishment under Dr. John J. Bittner of a Division of Cancer Biology in the Department, who was, as noted elsewhere, appointed in 1942 as the George Chase Christian Professor. The division was transferred to the Department of Pathology in 1957. Research and teaching in physiological aspects of the cancer problem was continued in the department under the leadership of the American Cancer Society Professor the late Dr. Carlos Martinez, who died in 1966.

The Lyon view of physiology as a discipline broad enough to cover all aspects of functional biology has permitted it to serve the University, the public welfare, and science by giving hospitality to scientists for whom more specifically formal accommodations would not have been available at the time.

GRADUATE INSTRUCTION OF CLINICAL INVESTIGATORS

No account of the activities of the Department of Physiology at the University of Minnesota would be complete without mention of the scores of investigators in pediatrics, internal medicine, anesthesiology, physical medicine, and especially in surgery who obtained significant parts of their graduate training in the department. The system of

post doctor of medicine education in the Graduate School at Minnesota provided the formal framework under which prospective clinical investigators could spend one or more years in a basic science department, participating in all of its activities. It is largely due to Dr. Owen H. Wangensteen, now Emeritus Regents Professor of Surgery, that a large percentage of Minnesota-trained academic surgeons took advantage of this opportunity and became "physiologically" oriented. The list of such persons is long and includes many of the distinguished names in academic surgery today. (See Appendix C.) The Department of Physiology considers its function in assisting in the preparation for careers in clinical academic medicine to be one of its most important opportunities, because in the present era advances in clinical science cannot be made except by persons with thorough grounding in the basic sciences.

SUPPORT FOR RESEARCH AND TEACHING FROM OUTSIDE SOURCES

The first important support for research and graduate teaching from extra-University sources for the Department of Physiology at Minnesota came from the Rockefeller Foundation. A grant of $16,500 per year for five years beginning in 1937 provided support for studies on transport phenomena including the work of the physical and colloid chemist, Dr. Karl Sollner (now of the National Institutes of Health) in the field of membrane properties with particular reference to electrochemical factors in ion specificity and anamalous osmosis. It also provided funds for support of the author's work on intestinal absorption, gastric secretion, and isotopic tracer studies of fluxes between various body compartments.

An equally important circumstance to the tracer work was the cooperative presence of Professors A. O. C. Nier and the late John H. Williams in the Department of Physics. The former generously made his knowledge and technical skills available for mass spectrographic stable isotope analysis and the latter did the same with one of the first functional Van de Graaf generators, which produced all of the radioactive isotopes used in the Department of Physiology before 1945.

In 1937, the director of the Department of Physical Education and Athletics, Professor Frank McCormick, came to the Department of Physiology asking whether there might not be some way in which the teaching of the physiology of exercise for physical education majors

might be strengthened, and research in the physiology of exercise and sports be promoted. The department expressed interest and indicated that scarcity of funds was a major limiting factor. McCormick agreed to provide initially about $10,000 per annum on a continuing basis out of athletic receipts to subsidize such work. A search was made for a competent person. Dr. Ancel Keys, who had had training in America and abroad in general physiology, high altitude physiology and exercise physiology, was brought into the Department of Physiology as an associate professor, soon to be promoted to professor, to lead the work in this field. Keys continued for some years in the field of the physiology of exercise, developing a Laboratory which he named "Physiological Hygiene," that later became involved primarily with problems of diet and disease, and was transferred to the School of Public Health in 1947.

In 1938, *Professor Owen Wangensteen* brought one of his part-time clinical associates, *Dr. Iver Sivertsen,* for a conference with members of the staff of the Department of Physiology to discuss the feasibility of undertaking a research project in the role of diet upon the incidence of spontaneous cancer in mice. Dr. Sivertsen had conducted a small study on the effects of dietary restriction on mammary cancer incidence in mice. He obtained from a wealthy friend a grant, sizable for those days, of approximately $40,000 for the prosecution of such studies. The Department of Physiology agreed to accept the grant and to promote studies on the general problem, provided that a major emphasis could be on the effects of calorie-underfeeding on the physiology of the organism in general. This was the beginning of three large programs in the University, one conducted largely by *Professor Joseph T. King* on dietary effects upon reproduction, endocrine activity, and life-span; and a second bearing on the biology of carcinogenesis conducted by *Professor John H. Bittner* when he was brought into the Department in 1942, supported for his lifetime by a large grant from Mrs. George Chase Christian, and continued by *Professor Carlos Martinez.* The third was a study of biological circadian systems begun by *Dr. Franz Halberg* as a postdoctoral fellow in physiology, working on adrenal cortical function in calorie-underfed mice. He has subsequently become a Research Career Awardee of the National Institutes of Health, attached to the Department of Pathology in the University of Minnesota.

In 1940, the National Foundation for Infantile Paralysis began supporting investigative work and graduate education in the field basic

to an understanding of the nature of the disease, poliomyelitis, and its treatment. In the Department of Physiology, Dr. Allan Hemingway was interested in problems of respiration and the department needed neurophysiological talent which it appeared might be supported if adequate funds were available. The March of Dimes made a grant of $65,000 per annum for five years to the University of Minnesota to be administered through the Department of Physiology for support of a program aimed at basic studies of neurochemistry, neurophysiology, respiratory physiology, and muscle physiology. *Dr. Harland G. Wood* was supported for the years 1943 through 1946. He studied enzymatic reaction, including changes related to viral infections. *Dr. Barry Campbell* and *Dr. Ernst Gellhorn* were brought to Minnesota, partly on March of Dimes funds and worked on problems of nerve degeneration and the autonomic nervous system. *Dr. Hemingway* and *Dr. W. G. Kubicek,* particularly the latter, developed methods for handling the respiratory problems in poliomyelitis in cooperation with clinical neurologists. This work won a medal of the American Medical Association. The respiratory problems in poliomyelitis stimulated this writer's own interest in the mechanics of breathing and, with *Dr. Robert Dean* and others, he investigated tissue and air viscance and elastance problems, as well as the mechanisms of production of edema, atelectasis and hemorrhage of the lung.

Interest within the department on problems of physical medicine and rehabilitation arising from experience in the poliomyelitis field, encouraged the department in 1943 to accept a $100,000 grant from the Baruch Foundation for Physical Medicine, to promote research and basic training for this area of medicine. *Dr. Herbert S. Wells* was brought to the University of Minnesota to lead work in this area, after training at Berkeley and Harvard, and considerable experience at Vanderbilt and several years as head of the Department of Physiology at Bowman Gray School of Medicine. His services were soon sought, however, as physiologist to the Minneapolis Veterans Administration Hospital to take part in the newly organized training program for physicians in that organization. *Dr. Frederick J. Kottke,* who had just completed his work for the doctor of medicine degree after earning a degree of doctor of philosophy with a major in physiology, became interested in the field of physical medicine, and, under support from the Baruch grant, began systematic clinical fellowship training and basic research

in that area. He went on to become head of the very active Department of Physical Medicine and Rehabilitation in this University. A third person, Dr. William G. Kubicek, who had earned his doctor of philosophy degree with a major in physiology and a minor in electrical engineering, joined with Dr. Kottke in the physical medicine program, and has contributed toward making it a scientific discipline in medicine.

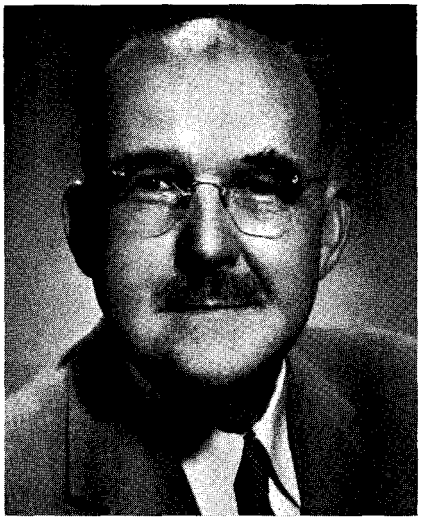
A major factor in the scientific development of the Medical School of the University of Minnesota has been the far-seeing generosity of the officers of the Louis W. and Maud Hill Family Foundation of St. Paul, Minnesota. Besides supporting a number of specific research and teaching projects, this Foundation has established four long-term professorships in the School, one in enzymology (biochemistry), one in neuropharmacology (pharmacology), and two in the Department of Physiology. One of the latter chairs is held by *Dr. Carlo Terzuolo* (biophysics/neurophysiology), and the other was held by *Dr. John A. Johnson* (for work in the general biophysical field).

The largest impetus for development of research and graduate teaching in the Department came from support from the American Heart Association, the American Cancer Society and from the National Institutes of Health of the United States Public Health Service.

STAFF AND STUDENTS SINCE 1936

Among persons already mentioned who have worked in the Department of Physiology for varying periods since 1937 were Drs. Scott, King, Hemingway and Collins. Other persons who were either members of the staff or who earned the degree of doctor of philosophy in physiology or both are listed in Appendix D. (See Appendix J for Staff list.)

When Dean Lyon retired as head of the Department of Physiology in 1936, Dr. *Maurice B. Visscher* who prepared the preceding sketch, was the unanimous choice of the School of Medicine to head the department. He was born on August 25, 1901, in Holland, Michigan, where he attended Hope College. He then became a graduate student in physiology at the University of Minnesota under the immediate direction of Dr. Frederick H. Scott. His excellent work and thesis on the "transport and storage of carbohydrates" won for him the degree of doctor of philosophy in 1925. That year, he was appointed assistant professor in the Department of Physiology.



Maurice B. Visscher

He took leave of absence without salary from 1925 to 1927 as a National Research Council Fellow and worked with E. H. Starling at University College, London, and A. J. Carlson at the University of Chicago. From 1927-1929, he was associate professor and professor at the University of Tennessee. During the next two years, he was professor and head of physiology and pharmacology in the University of Southern California. In 1931, he completed the work for the degree of doctor of medicine at the University of Minnesota. That year, he was called to the University of Illinois as professor and head of the Department of Physiology. His record was of such excellence that in 1936, on the retirement of Dean Lyon, Dr. Visscher was invited to become professor and head of the Department of Physiology, University of Minnesota.

Dr. Visscher is best known in cardiovascular physiology. He and his co-workers have extensively investigated water and ion absorption from the intestines and other luminal organs. Cancer biology and some related nutritional factors in the mouse were studied extensively by them. He has published more than 280 papers with 150 different collaborators.

Since returning to the University of Minnesota, Dr. Visscher has advised and directed 20 graduate students through the degree of doctor of philosophy and for nine others he has acted as co-adviser. In 1960, he received the Minnesota Medical Foundation Distinguished Service

Award and was named Distinguished Service Professor of Physiology by the University. He was named Regents' Professor in 1967.

Dr. Visscher has been continually aware of the hazards to progress of that group of persons who seek to prevent the use of animals in scientific research and in the training of medical practitioners. He has been unrelenting in his opposition to their more restrictive proposals, and effectively so, since the time in Chicago in the early 1930's when he vanquished the actress Irene Castle McLaughlin in debate. He has served as vice-president and president of the National Society for Medical Research, an organization which supplies information about the use of animals in biomedical research to legislative bodies and combats the exaggerated or uninformed assertions of the groups opposed to animal experimentation.

Dr. Visscher was a member of the Council of the American Association for the Advancement of Science from 1941 to 1946 and vice-president of American Heart Association from 1950 to 1962. He now serves as chairman of the scientific advisory committee of the newly established American Medical Association Educational and Research Foundation's Institute for Biomedical Research.

He has had a long time interest and role in international scientific affairs. For example, he has served on the council and was president, from 1952 to 1953, of the International Organizations of Medical Sciences. He was secretary-general from 1953 to 1959 of the International Union of Physiological Sciences, the organization which is responsible for the triennial physiological congress.

He has taken an active part in the work of the American Physiological Society and related affairs and served that society as secretary (1946 to 1948), president (1948 to 1949), and chairman of the board of publication trustees (1955 to 1959). Since 1953, he has been a member of the board of directors of *Annual Reviews,* an organization which publishes yearly reviews of selected subjects in medical science, physics, chemistry, and mathematics. An especially noteworthy activity in the field of literature compilation and synthesis is the *Handbook of Physiology* of which Dr. Visscher has been editorial board chairman from 1958 to 1967.

He is a member of the United States National Academy of Sciences and is currently chairman of its Section of Physiology. He is also a member of the American Academy of Arts and Sciences. He was granted

the Distinguished Research Award of the American Heart Association in 1960. He is currently president of the Society for Experimental Biology and Medicine. He has served local, State and Federal government agencies in various capacities. He was chairman of the Minnesota Poliomyelitis Commission and a member of three Governor's Commissions appointed by Governors Harold Stassen, Orville Freeman and Karl Rolvaag. He was a member of the first Study Section for research grant awards set up by the National Institutes of Health. He has served the American Cancer Society, the American Heart Association and the Life Insurance Medical Research Fund on their research fund allocation boards. He was a member of the Board of Visitors of the Medical Department of the Brookhaven National Laboratories, and has served the Fels Fund on its Board of Scientific Advisers.

It can be said without fear of contradiction that during Dr. Visscher's tenure as head of the Department of Physiology at Minnesota that department has become one of the leading centers of physiological research and teaching in the country. The department has emphasized the prime importance of building physiological knowledge upon basic physics, chemistry and mathematics, but it has also recognized as equally important the development of knowledge of organ system and organismic physiology in health and disease. It is partly because of the latter that in the past 30 years Minnesota has produced many clinicians well-oriented in physiological science.

Within the University of Minnesota, Dr. Visscher was for six years a member of the Faculty Consultative Committee of the Senate. He has been president of the Minnesota Chapter of the American Association of University Professors and of Sigma Xi. He is currently an elected member of the Faculty Advisory Board of the Medical School. He was chairman of the Medical Graduate Group Committee for a number of years.

Dr. W. D. Armstrong recently said, "It is probable that no major activity or innovation in the last 30 years in the Medical School has escaped Dr. Visscher's attention and influence. He is a valued counselor on formal and *ad hoc* committees and his advice and suggestions are freely offered by him and are sought by his colleagues and associates and by University officials. Dr. Visscher is an energetic and compulsive man about his own plans, projects and ideas. He rarely gives any evidence of self-doubt about his position in discussion of these or hesitancy

in their promotion. The result is that he can be more than a little vexing at times. Nevertheless, it can be said, that while Visscher is not always right he is seldom wrong!"

Chapter XXVI

Department of Surgery

It is difficult to write knowledgeably of the men of the early days of the Department of Surgery for little information has come down to us concerning the participants. One cannot read of the multiple facets concerned in the genesis of the Medical School, however, without recognizing the sense of dedication and the great interest of the founders in creating a representative school with a strong faculty.

When *President Northrup, Dean Millard,* Professor of Surgery, Dr. *Hand,* Dr. *French* and Dr. *McComb* were empowered as a committee to bring nominations to the Board of Regents for the faculty of the new College of Medicine and Surgery, they recommended the following appointments in surgery which were approved: *Charles A. Wheaton,* Professor of Principles and Practice of Surgery; *F. A. Dunsmoor,* Professor of Clinical and Operative Surgery; *James H. Dunn,* Professor of Genito-urinary Diseases; and *James E. Moore,* Professor of Orthopedic Surgery. *J. Clark Stewart,* who subsequently became a prominent member of the Department of Surgery, was named professor of histology and bacteriology.

A Memorandum in the minutes of the Board of Regents of the University for June 4, 1894, may be interpreted to suggest that Wheaton had some dissatisfactions over the matter of partition of curricular responsibilities. In any case, he resigned some of his didactic responsibilities, which were assumed by Dr. Millard.

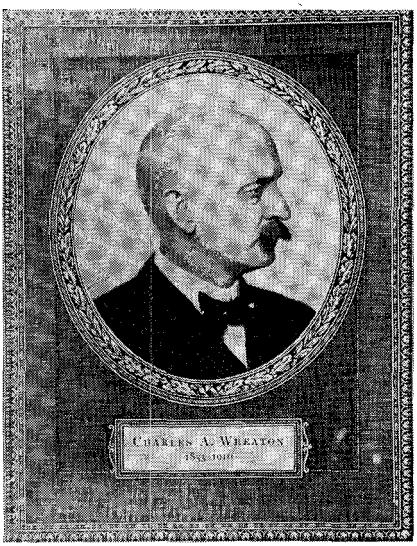
Dr. Millard was among the organizers and first officers of the Association of American Medical Colleges, in which our University's College of Medicine and Surgery was represented from the start (1888). Their first *Bulletin,* issued by Dr. Millard, Secretary-Treasurer, in St. Paul in 1892, contains two articles dealing with the importance of laboratory work for medical students.

Included also is this curious observation: "Only a few State Universities pretend to support Medical Schools, and so far as I know only one

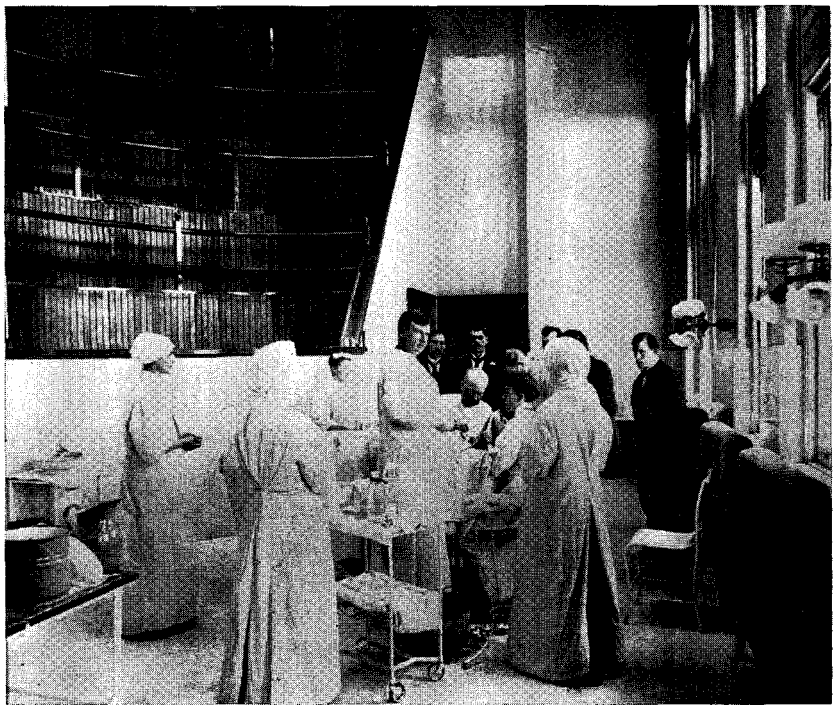
of these, Minnesota, contributes liberally to the annual expenses of the Medical Department. It seems strange that the department of the University, which should in this country furnish one-fourth of the entire enrollment, should not have received even 2% of the endowment."

Millard was the faculty's acknowledged leader until his death in February 1897. (See Chapter VII.) When Millard died, *Charles A. Wheaton's* title was changed from professor of clinical surgery to professor and Dr. *Justus Ohage* was appointed professor of clinical surgery. Dr. Ohage had performed the first successful cholecystectomy in America, at St. Joseph's Hospital in St. Paul in 1886.

Wheaton was recognized by his colleagues as a surgeon of unusual competence. A member of the American Surgical Association, he had come to Minnesota from Harvard. The obituary notices (1916) suggest that he must have been a warm and friendly colleague, universally respected, a surgeon one would like to have known. His contributions and legacy were essentially to his own generation and time, for he left no significant writings to reflect the genius for which he was so greatly appreciated and admired by his contemporaries. Both Drs. Wheaton and Moore loved books and were keen students of surgical literature. They left their collections of medical books to the university—mono-



Charles A. Wheaton

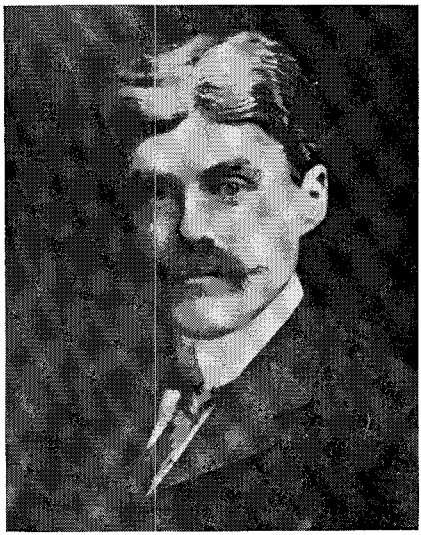


St. Lukes Hospital, St. Paul, 1890. Drs. J. Fulton and C. Wheaton, operating.

graphs which have nourished and delighted many a student of surgery in this institution over the past four decades.

Wheaton directed the destinies of the surgery department for only a few years. In May 1899, a memorandum in the minutes of a meeting of the Executive Committee of the medical college indicates his wish to resign his professorship. On June 10, 1901, the regents accepted Wheaton's resignation, and he was named professor emeritus. Not until October of 1901 did approval of Wheaton's resignation appear in the minutes of the Executive Committee of the department. Therefore, it must have been common practice for members of the faculty to communicate directly with the Board of Regents.

The minutes of the regents' meeting for April 4, 1901, lists approval of a change of title for *James A. Dunn* to professor of surgery. The *University of Minnesota Bulletin* for 1902 lists Wheaton as professor emeritus. In May 1899, when Wheaton had indicated a desire to resign, recommendation of partition of professional duties between Dunn



James A. Dunn

and Moore appears in the minutes of a meeting of the Executive Committee of the department. This apparently provoked Dunn's ire and is reflected in a long letter dated February 25, 1901, addressed to *J. Clark Stewart,* then professor of surgical pathology in the department, Dunn writes as chairman of a committee of the department and discusses the matter of responsibility for curricular assignments: "I positively declined to be a candidate for a co-ordinate professorship two years ago. For no other reason whatever, I would not attempt to serve in such an indefinite capacity with my own brother." The letter then goes on to discuss, access, and analyze the division of the curriculum in a careful and thoughtful manner. Beneath Dunn's signature appear the signatures of C. A. Wheaton, F. A. Dunsmoor, James E. Moore, and J. Clark Stewart, approving the content of Dunn's letter. It is quite obvious, therefore, that Dunn had won the mantle and had come by the responsibility for partition of curricular assignments even though he was not titular head of the department until official acceptance of Wheaton's resignation by the Board of Regents in June 1901. Whenever there were important departmental problems to be resolved, Dunsmoor was pressed into committee service for the purpose, probably at the suggestion of some member of the Board of Regents.

Dunn's letter to Stewart suggests very definitely he was a person of

James E. Moore

strong and positive opinions who took his responsibilities seriously. He died unexpectedly in June 1904, while attending a meeting in St. Louis of the American Surgical Association, of which he was a fellow. The obituary notices indicate that Dunn was a superior surgeon and a warm colleague.

James E. Moore succeeded Dunn as professor of surgery in 1904. Dr. Moore was essentially the builder of the department. He was one of the keen proponents of the Mayo affiliation. He was the leader in formulating and instituting proposals for graduate study and degrees in the clinical fields, which added strength and depth to the school.

Moore took great pride in this accomplishment, believing that teachers of surgery would emerge therefrom. However, the only escalator to a position on the staff was through the outpatient clinic, usually a long and arduous process of waiting until someone on the inpatient staff retired from the scene.

Unlike his predecessors, Moore wrote a large number of papers. He was responsible for pointing out that suppurative arthritis of the hip joint usually had its origin in osteomyelitis of the neck of the femur. Many a young surgical house officer using the Moore gallbladder spoon probably fails to realize that it traces back to our own Dr. Moore.

In his will, Moore made provision for a fund for Surgical Research

Arthur C. Strachauer

which over many years has been very useful in providing opportunities for young men. The James E. Moore Surgical Society, a student organization which fosters an interest in Medical History and Research, commemorates his name and early great influence in the Medical School.

Arthur C. Strachauer was made acting chief following Moore's death from pernicious anemia in 1918 and became chairman of the department in 1920. Strachauer continued to support Moore's keen interest in the Graduate School training program. Throughout his years as chairman, Strachauer was an ardent advocate of opportunities and operative privileges for the surgical fellows, a thesis not implemented then as readily as now in university clinics. A Surgical Fellowship Support Fund, contributed by his family, perpetuates his name and desire to make training opportunities available for young surgeons.

Hospital Facilities for the Clinical Staff. In its beginning, the Medical School complex on the north side of Washington Avenue had no hospital of its own. Surgery was taught at St. Joseph's Hospital in St. Paul and Northwestern and St. Barnabas Hospitals in Minneapolis where the Medical School staff had hospital privileges. The Minneapolis General (now the Hennepin County General Hospital) and Ancker Hospital in St. Paul (now St. Paul-Ramsey Hospital) played very important roles in providing hospital opportunities and operating privileges

for the staff of the Medical School and patients for the teaching of clinical medicine. Both these hospitals originally had a University and a non-University staff but for several decades now all appointees at the Hennepin County General Hospital have been members of the Medical School's clinical staff, and this practice is evolving too at the St. Paul-Ramsey County Hospital. Our Minneapolis Veterans Administration Hospital came into being in 1927 primarily to care for veterans of World War I. After World War II, deans' committees were formed with the management of Veterans Hospitals in medical school areas to help build strong teaching programs. In this role, Veterans Hospitals throughout the country have come to occupy positions of great importance in the Medical School teaching program.

The surgery department has a strong Surgical Teaching Unit at Mt. Sinai Hospital through an affiliation which has been in operation for approximately 15 years. In future years, such affiliations with voluntary hospitals in metropolitan medical school areas will undoubtedly become commonplace and reciprocally helpful in both hospital and Medical School.

Hospital Costs. In his report to Dean Wesbrook (1911-12), Dr. L. B. Baldwin, University Hospital superintendent, indicated the hospital cost per diem was $2.16. Those were the days of rigid economies, well known to all participants of that area. There has been more than 1500% increase in hospital costs since the 1920's, and understandably so. An intern today casually orders laboratory tests on a patient, which, at current rates, would more than absorb the entire month's cost of hospitalization in 1920 with a $3.25 per diem. Medicine, in its broad aspects today, is a larger enterprise than the steel industry. The pursuit of health rightfully has become one of man's chief occupations and concerns.

University Hospital Surgical Staff in the Post World War I Period. Besides Dr. *A. C. Strachauer*, the other full professors of post World War I were Drs. *Arthur Gillette* and *Charles H. Mayo*. The associate professors were *Colvin, Corbett, Geist, Griffith* (dental extractionist), *Law, MacLaren, Mann, H. P. Ritchie, Rogers* and *Wright*. This colorful array of professional talent were leaders of surgery in the community.

Ward rounds at the University Hospital on Saturday morning in the early 1920's was a sort of marathon, with an occasional stop at a bedside, where some member of the staff expressed an interest in a patient.

Contact between staff and patient was quite casual, as compared to today, when the surgeon has an adequate opportunity to know his patient well before operation. Moreover, Saturday morning rounds were a means of selecting patients to be operated upon by the several members of the staff the following week. A group of stellar surgical performers was regularly on hand. It was always a lively occasion. Among others present were Dr. *Arthur C. Strachauer,* chairman of the department, *Archibald MacLaren, Arthur Law, Harry Ritchie, James Johnson, George Dunn, Roscoe Webb, Franklin Wright, Angus Cameron,* the surgical residents, and the interns. As the group progressed from bed to bed, questions relating to diagnosis and therapy held the center of interest and dominated the discussions. Surgeons of that period were great individualists more likely to rest their arguments upon their own experience, or upon expressions of colleagues known to be friendly to their own attitudes, than upon objective evidence. Very rarely did experimental evidence creep into presentations. Yet, those colorful weekly sessions had important teaching value for the surgical clerk too, who was not encouraged to be present but who was permitted to tag along behind.

The Department of Surgery already had extensive research laboratories in my student days on the second and fourth floors of Millard Hall, used successively by Drs. *J. F. Corbett, Conrad Jacobson, Angus Cameron,* and *Arthur Zierold.* These laboratories did not come into daily use, however, until the mid-twenties. The influence of research then had not permeated the texture of undergraduate teaching in the same measure as today. Only the internists among the clinicians of that day took a specific problem to a conference room for a more exhaustive and, sometimes an exhausting discussion.

Observed Changes on Surgical Wards Over the Past Four Decades. The medical student attending surgical wards today is confronted with a sight quite different than that of intern days in 1921-1922. More than one third of the patients admitted to Gillette Hospital in St. Paul then came because of tuberculosis of lymph nodes and bones. Today none are to be seen there. A decade later, one of the important activities of our Surgical Service was treatment of pulmonary tuberculosis, first by thoracoplasty and later by lobectomy and segmental excision. These, too, have disappeared. It is interesting to recall that among the initial group of surgeons making up the American Thoracic Association, our

Department of Surgery was well represented. Drs. *J. F. Corbett, A. A. Law,* and *William Lerche* were all members. In the early 1920's, Law started doing thoracoplasties at Glen Lake Sanatorium. *S. W. Harrington* began his important work with excision of mediastinal tumors at the Mayo Clinic in the early 1930's.

Acute surgery occupied a large portion of the staff's attention in the '20's. Appendicitis with peritonitis, osteomyelitis, empyema, and severe hand infections were commonplace. Patients suffering from one of these disorders were always available for purposes of teaching. In the Fall of the year, we always saw shredded hands from corn-picker injuries. Elective surgery usually involved patients with goiter, hernia, biliary tract disease, peptic ulcer, and various malignancies.

The cautery was applied to oral cancers. Operation was rare for gastric cancer. Total gastrectomy had not been performed at the University Hospital, and the abdominoperineal operation for rectal cancer was yet to come. The Bloch-Paul-Mikulicz exteriorization operation was routine for cancer of the left colon. Cancer of the right half of the colon was excised by using a Murphy Button for the anastomosis, or as a two-stage procedure using a suture anastomosis.

Empyema following pneumonia was a frequent and challenging problem in my early years as a surgeon. Thanks to sulfonamides and penicillin it has virtually been eliminated. Similarly, ostomyelitis has disappeared from our wards, a windfall from antibiotics.

Patients with exophthalmic goiter could always have been seen at the hospital. Iodized table salt has greatly reduced the prevalence of goiter and today the surgeon deals more frequently with cancer of the thyroid than with hyperthyroidism.

Appendicitis ranked amongst the first ten causes of death in the United States up until the late 30's. Then, through better knowledge of its origins, improved surgery and antibiotics, it tumbled to a low level in the mortality columns. The past three decades have witnessed a very significant reduction too in the mortality of acute intestinal obstruction, through clarification of the consequences of obstruction, its clinical recognition and elaboration of nonoperative as well as surgical techniques of decompression.

Surgical Infections—Then and Now. In my student days, streptococcal cellulitic infections almost invariably terminated in death, while staphylococcal abscess could be managed quite satisfactorily by surgical

drainage. The chairman of our Department of Ophthalmology and Otolaryngology, Dr. *William Murray,* lost an arm and then his life, in the space of a few days, because of a streptococcal infection. A brilliant young anatomy student, *Lucretia Wilder,* spilled a culture of streptococci on her forearm: a rabbit on the laboratory bench scratched her arm at the site of spillage and in a few days Dr. Wilder was gone.

Since the coming of sulfonamides and antibiotics, death from rampant lymphangitic cellulitis has become virtually unknown. Yet, surgeons know that the problems which challenged Lister still confront us. Control of surgical infection is still probably one of the most important problems with which surgeons have to contend today.

When postoperative infections develop today, the problem is essentially what it was 35 years ago. On this score, antibiotics and the sulfonamides have failed.

Strict aseptic precautions, alertness to needle pricks in gloves, absolute hemostasis wound irrigation with saline solution before closure, and gentle handling of tissue during operation—these are still the best guide lines in the conduct of operations. The Viet Nam experiences of our military surgeons suggests very definitely that civilian surgeons too would be well advised to employ delayed skin closure of potentially contaminated wounds, exemplified by such operations as bowel resections.

When, through the blessings of research, it becomes possible to predict the healing of clean wounds with almost mathematical certainty, then operation will be less of an ordeal for the patient.

Divisions of Surgery. Recognition of the conventional formal Divisions of Surgery, Neurosurgery, Orthopedics and Urology at the Medical School came only in the late '30's. Prior thereto, general surgeons covered the entire range of surgery, obviously doing only those operations well in which they had special interest and experience.

Teaching and Books. The books listed in the *Bulletin* for student reading by the surgical faculty in the beginnings of our Medical School make a formidable list: Agnew, Billroth, Bryant, Erichsen, Gouley, Gross, Holmes, Smith, Van Buren, and Keys. Those tomes were as large as the texts of our day; in fact, some were two-volume affairs. It is difficult to believe that even students keenly interested in surgery consulted all these books. Much of the current day knowledge of surgery had not yet come into being. Before the end of this century, students may justifiably ask: "What defense had teachers of surgery in the 1960's

to ask undergraduates to digest texts containing much we know now not to be true?"

When our school was founded, the student had ample time for textbooks, since *Annals of Surgery* was the only general surgical journal in the English language. More and more students, as well as teachers, are learning that journals mirror far more intimately the ferment of the moving scene than do textbooks, which conventionally reflect accepted opinions and practice of three to five years past.

The surgeons of my student days taught in formal lectures, usually from outline notes, probably annotated at long intervals, some obviously in great need of being brought up to date. Our teachers, more addicted to books than to journals, were busily preoccupied with private practice and came to the Medical School to lecture or to operate. They were, however, a distinguished group of men, genuinely admired and respected by the students. George Dunn and Roscoe Webb, both graduates of Johns Hopkins, helped institute clerkship teaching in 1919. Of the surgical teachers of that period, only a few survive—Carl Chatterton, Wallace Cole, James Johnson, and Arthur Zierold, who gave long years of faithful service to the University and the community.

Early Surgical Research Facilities. About 1920, in the outpatient clinics, occasionally one heard allusions to the research worker as a "person who had bought a few white rats and a typewriter and now was busily engaged in writing his way up the academic ladder." Even the originator of the resentment inherent in that remark knew there was an element of exaggeration in the suggestion. Yet, today, a modicum of truth is still expressed therein. Ascent up the steep academic pathway without publication, as every young surgical aspirant knows, is virtually impossible.

Early experiments on bowel obstruction (1925-26) were done on the second floor of Millard Hall. A little later, our laboratories there were given over to the Department of Bacteriology. Thereafter, until 1954, the fourth floor of Millard Hall housed the combined experimental laboratories of the Department of Surgery. In the pre-World War II period, they were sufficiently large for most purposes. With the great growth of the staff after the end of World War II, these laboratories became inadequate. Our present research area by contrast is a great improvement, but is still inadequate for the needs of a growing and active staff.

It would obviously be impossible to train 60 graduate students in general surgery on the surgical wards of the University Medical Center were it not for the important help afforded by our research laboratories. Moreover, it is a source of great satisfaction to note how anxious and willing graduate students in surgery are to leave an active clinical service to spend a year or two in the laboratory.

More and more the importance of exposure of undergraduates to teachers who spend some of their time in research is being recognized in our universities—not because these men know more or as much as good clinical teachers in the same area of interest, but because teachers who are engaged in conflict with unsettled problems offer a fresh point of view which is stimulating and challenging. By the time a student reaches the stage of maturity demanded in a professional college, the most important function of the teacher is to arouse the student's own enthusiasm to instruct himself. A passion for the enlargement of one's knowledge makes the learning process easy.

Over a period of many years, it has been the privilege of the Department of Surgery to send some of its more promising academic prospects to the Department of Physiology for a year or more of training under the tutelage of Dr. *M. B. Visscher* and his staff. This innovation has paid off handsomely in the opportunities which the interchange has provided some of our trainees. In consequence, the contributions of many of these young men have taken on a special physiologic interest. This plan, save for the interruption of World War II, has been in continuous operation for more than 30 years. The succession of men who have had their thinking disciplined by exposure to physiologic technics has been very important in the growth and vigor of our department.

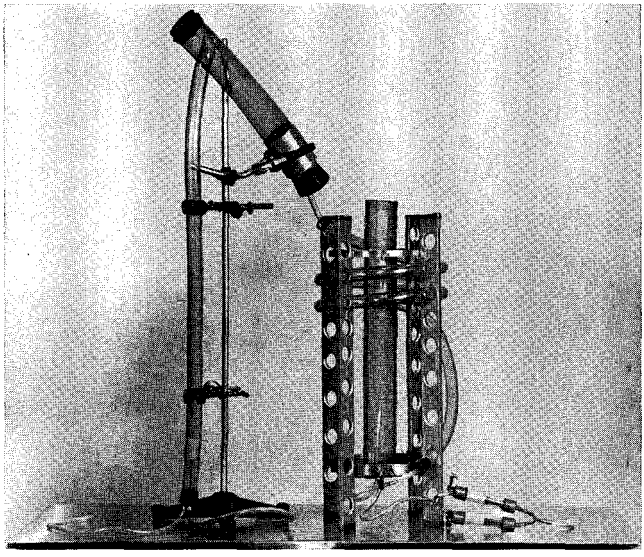
Clinical and Experimental Investigations. Abdominal Surgery has been an absorbing interest of many in this department for many years. Studies in the effects, recognition and management of acute intestinal obstruction absorbed the activities of many surgical fellows since 1930. Studies in the etiology of acute appendicitis with demonstration of the secretory capacity of the appendix, when obstructed, as the chief and likely sole cause of perforation of the appendix, have served to indicate that appendicitis is primarily obstructive and not inflammatory in its origins. Studies in the etiology and management of peptic ulcer, cancer detection and its management have long occupied the attention of many members of this department.

F. John Lewis and Richard L. Varco with hypothermia equipment

After World War II, surgeons began to address themselves seriously to the problems of paracardiac surgery. Robert Gross of Boston (1939) had succeeded in ligating the patent ductus arteriosus and a few years subsequently advised its division, which procedure became common practice among surgeons. About the same time, Gross and Clarence Craaford of Sweden were reporting successes with operations for congenital coarctation of the aorta. Successes with these procedures led to extensions of surgery to aneurysms and obstructive sclerotic lesions of the large arteries, operative procedures which had been foreshadowed by the work of Alexis Carrell and Guthrie almost 30 years previously. The dramatic change in color of "blue babies" by attachment of the subclavian artery to the pulmonary artery for improved oxygenation, an operation devised by Alfred Blalock of Johns Hopkins, served to focus

universal interest upon cardiac surgery. Then came the era of intracardiac surgery which received much of its impetus from the work of my colleagues in this department. *F. John Lewis* performed the first successful intracardiac operation (1953) with complete inflow occlusion, closing a patent interauricular septal defect under hypothermia. Similar success of closure of patent interventricular septal defects followed (1954), employing the cross circulation technique with a donor's heart and circulation serving as the source of oxygenation. In small youngsters, gravity replacement of blood was successfully employed. Drs. *C. W. Lillehei, Richard L. Varco, Morley Cohen* and *Herbert Warden* constituted the operative team that opened the field with these techniques which no longer are in use. Initiation of pump oxygenator techniques came from John H. Gibbon of Philadelphia, and Dr. *Clarence Dennis* at Minnesota also played an important role in its development. Then came the significant work of *Richard DeWall* (1955) who devised the bubble oxygenator that opened the way for a series of new developments that placed intracardiac surgery on a firm basis. Under the driving force of Drs. *C. Walton Lillehei* and *Richard Varco* and a long list of trainees who have made many additional significant contributions to intracardiac surgery, cardiac surgery has become one of the department's absorbing activities. The formidable operation of valve replacement, first successfully performed by Dr. C. W. Lillehei (1958) too has now

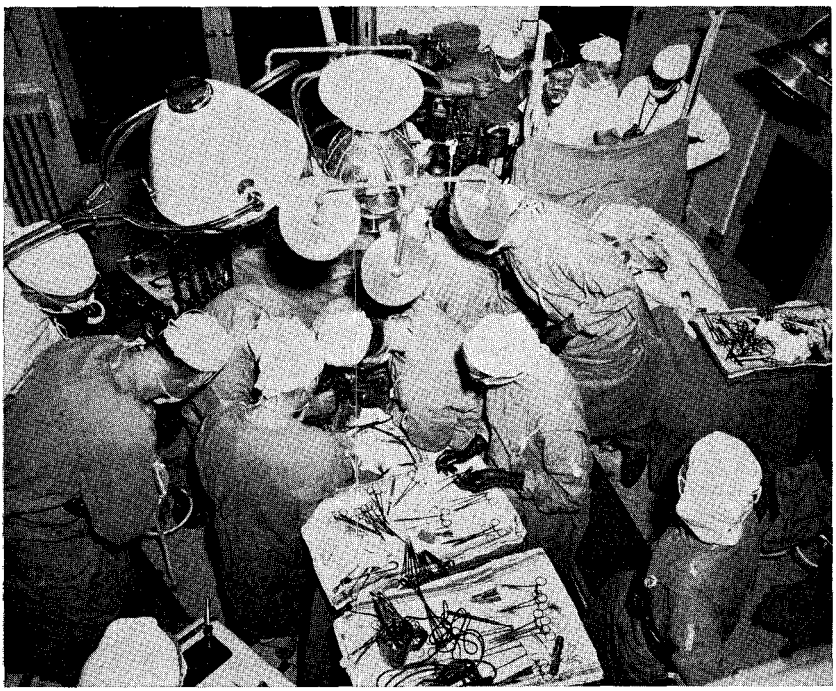
Richard A. DeWall



DeWall's "Bubble Oxygenator" (1955)

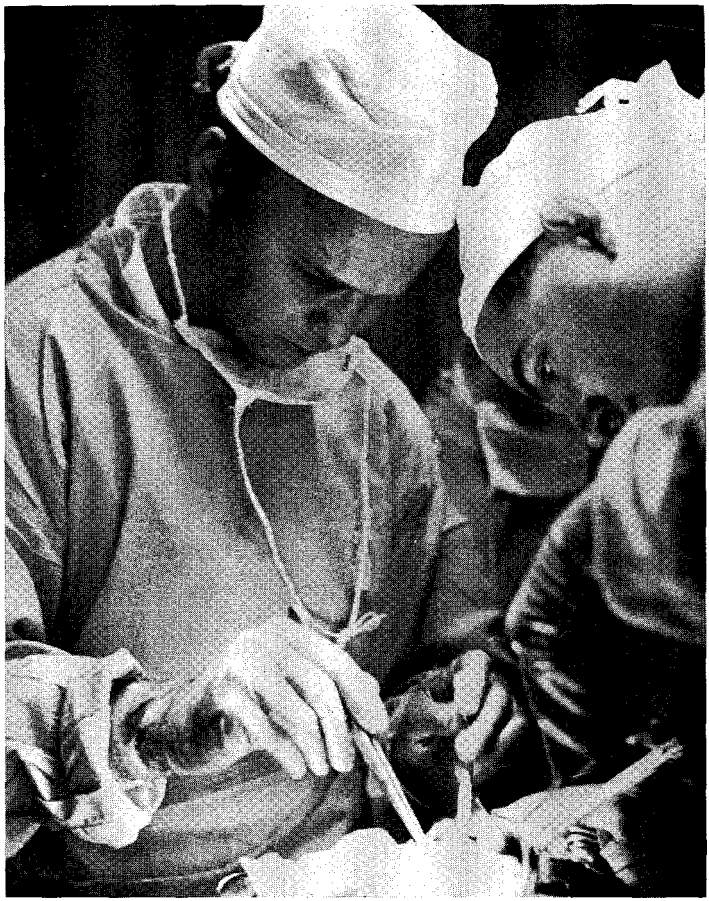
become an operation which can be viewed daily through our well constructed operating domes designed by Dr. Varco.

Thoracoplasty for pubmonary tuberculosis had its beginnings in this area at Glen Lake Sanatorium under the aegis of Dr. *Arthur Law.* About the time of his death in 1930, a similar activity was commenced at the University Hospitals and flourished in this medical community in the hands of *Thomas Kinsella.* Dr. *N. Logan Leven* of our department gave operations for tracheoesophageal fistula a significant thrust forward by performing the first successful such operation in the World in January, 1940. His operation consisted of a gastrostomy, ligature of the communication to the bronchus and exterioration in the neck of the proximal cervical portion of the esophagus, which had failed to connect up with the lower segment of the gullet, draining into the stomach. Leven and Varco succeeded in re-establishing continuity with the interposition of a jejunal loop of intestines connecting esophagus and stomach. As the children grew, this loop of intestine, originally left beneath the skin, was placed inside the thoracic cage by parasternal division of the rib cage. Today more often than not a primary anastomosis is made between the proximal and distal segments of the esophagus in patients with this deformity, the communication to the bronchus being ligated. The contribution of Logan Leven, however, showed the way.



C. W. Lillehei (right center) performing open heart surgery with large operating team

The long queues of young surgical house officers wanting special training in visceral surgery shortened considerably when intracardiac surgery came into being. An interest in tissue transplantation found its first strong impetus in our department in the successful excision and reimplantation of the canine intestine and stomach by *Richard C. Lillehei* (1960). Organ transplantation had been discussed by enterprising surgeons since World War I. Then, only the technical difficulties were appreciated. Surgeons were still unaware of the great import of incompatibility and rejection of foreign tissue by the new host. One transferred blood, cornea, and fascia successfully as today. Yet in 1932, Earl Padgett had demonstrated that skin could only be transferred successfully between identical twins. The nature of the immunological barrier is still the main concern of ardent representatives of many medical disciplines pursuing this fascinating problem. It will not be an easy victory. When the answers come, they undoubtedly will unlock the mysteries of a large number of disease entities. Kidney transplantation for renal



C. Walton Lillehei and Richard Varco performing heart surgery

failure is the newest surgical development which attracts a large number of surgical trainees. When more precise diagnostic tests make recognition of asymptomatic malignancies possible, one will undoubtedly observe a rekindling of interest in visceral surgery.

Orthotopic liver transplantation in a few children has been successful in the hands of Thomas Starzl of Denver. Pancreatic transplants have been temporary successes in the hand of Richard Lillehei and William Kelly of this Department. Norman Shumway of Stanford has demonstrated the feasibility of cardiac transplantation. Christiaan Barnard of Capetown, South Africa, was the first to do it successfully in man.

Both Shumway and Barnard had their training in cardiac surgery in this Department. The current worldwide interest in heart transplantation is understandable. Barnard remarked at a Congressional Hearing on Heart Transplantation in which I participated that precedent for the procedure was to be found in Ezekiel 11:19.

Time Factor in Operations. The general surgeon of my early days was schooled to believe that he could learn to do most operations well. Today, a more disciplined surgeon knows that, with experience, he probably can come to perform operations in one of surgery's sectors of endeavor and carry the related responsibilities on a level of competence at or even better than par; if he wanders over the entire broad territory of general surgery, he may do a large number of operations in many fields in a reasonably standard manner. Yet, compared with the performance of an expert in a particular field, his performance will be substandard in some if not many respects.

Having been privileged to spend a year of my surgical fellowship at the Mayo Foundation (1924), where many skilled surgeons operated more rapidly than is current today, I too came early to believe that speed was a significant item in operation. The late Dr. Arthur A. Law, a very skillful surgeon, was wont to do a radical operation for cancer of the breast, and a few other operations, with an eye on the wall clock. Some confreres of my student days will recall Dr. Law's obvious pleasure and the sense of drama that prevailed on such occasions. When Law was scheduled to remove a leg for diabetic gangrene, the spectators' stand in the operating room was assured of full occupancy. Brandishing an amputating knife with a long blade, Dr. Law stood poised with military bearing for the ordeal. He would say, "Are we ready?" Then, with a final glance at the clock over his half-circle glasses, he would call for time and at the same instant would plunge the long knife blade through the thigh just over the femur until it emerged on the other side. With one firm sweep, the blade would sever all structures, including the skin of the anterior aspect of the thigh and was then introduced similarly beneath the femur, cutting out a longer flap on the posterior aspect of the thigh. After the hasty application of a few hemostats, the saw would be grasped to sever the bone. Again, Dr. Law would call for time. On more than one occasion, he did this portion of the operation in less than thirty seconds. Had Law lived in Robert Liston's day

in London, there would have been competitive timekeepers carefully noting the score and conveying the telling information back and forth between these colorful gentlemen.

As the years have gone by, and operating room procedures have had help from many sources, most surgeons have grown to feel that the time factor per se is of little moment in most operations. The important thing is to take enough time to do the operation well.

Increasing Specialization in Surgery. Surgery has become so departmentalized that, save for the occasional consultation with urologist, neurosurgeon, and orthopedist, a young surgical house officer no longer can have frequent, direct and concurrent contact with many aspects of surgery, as in earlier years. Each division of surgery has it own sphere of activity. This means that surgeons generally perform fewer operations than was customary 30 years ago.

There is no longer a single surgical team which takes on all comers and performs all operations, but a group of surgical teams with special interests. Not only are certain areas sharply demarcated for the avowed specialist, such as the neurosurgeon, orthopedist, or urologist, but in the province of general surgery itself, there is far more specialization. A few surgeons elect segments of the alimentary tract as their special field of activity: others choose areas in the thorax, the peripheral blood vessels, or the heart itself. Young surgeons often work successively in a number of these areas to obtain exposure to a broad background of experience, so necessary for mature development, no matter in what surgical interest they come to spend the greater portion of their professional lives.

Contrasts in Activities of Surgical House Officers—Then and Now. The surgeon of today would find it difficult to operate under the amateurish anesthesia available 45 years ago. An intern of the 1920's, with perhaps some instruction from a surgeon or his intern predecessor on the service, or from an occasional consultant in anesthesia, gave the anesthetic, which not infrequently varied from premortal depth to a semiawake struggling patient.

The present day house officer, with bottles of blood safely stored away for major procedures, is probably unaware that the only blood available for operation 45 years ago was either in another patient's veins recuperating from an operation, or in a relative who waited nearby, if needed. The hurry of the surgeon in operations was almost universal.

The orientation of the clinician of that day in meeting fluid and electrolyte requirements reflects an abyss of ignorance.

There was no five-day week, no eight-hour day. Marriage amongst medical students was almost unheard of, as it was too among interns. In fact, clinicians like Osler and Halsted of the Johns Hopkins considered marriage incompatible with the duties of a house officer.

There were 78 students in my Medical School graduating class of 1921-1922, two of whom were married. Today, probably 50% of students in the clinical years are married and perhaps 80% or more by the time of graduation. Family cares of the medical student have increased his responsibilities and redirected his objectives.

My Appointment as Chairman. A notation from the minutes of the Administrative Committee of December 13, 1926, with Dean *E. P. Lyon* and Drs. *C. M. Jackson, J. C. Litzenberg,* and *F. W. Schultz* present, suggests I was picked to head the Department of Surgery, after the professorship had been declined by both Francis Newton of Harvard and the late Mont Reid, who left Johns Hopkins for a post at the University of Cincinnati. However, on this score, I must confess that no overtures were made which could even optimistically have been interpreted by me other than that a full-time position would be waiting on my return from a European study period which Dean E. P. Lyon urged me to make. By this time (1927), I welcomed the opportunity for foreign study. A year spent on the wards with Dr. George Fahr had stimulated my admiration and desire for a more intimate acquaintance with European scholarship. My good fortune in succeeding to the chair of surgery in January 1930, was owing not only to the endorsement of Dean Lyon's Search Committee but, in large measure, to the generosity of my preceptor, Dr. Strachauer, who resigned the chairmanship in 1925 but kindly offered to hold the reins until a successor was found.

During my year's sojourn abroad, the University supplied me with a basic stipend of $200 a month, which was probably liberally interpreted as a sabbatical, the only one I have taken advantage of these many years. It was a delightful and profitable experience. A period of foreign study is no longer, however, the compelling necessity it was once considered to be for those proposing to follow an academic career. However, it is while buoyed up by the enthusiasm of youth that visits to the clinics and laboratories of well-known men prove most rewarding.

It has been my great privilege to have had a hand in directing the activities of the school's Department of Surgery since January 1, 1930, almost as long as my five predecessors in the chair of surgery. Over these years, the department and its surgical specialty division have developed apace. The men who, by dint of their own labors and imagination, have grown to significant academic stature represent the most important and effective products of the department. Whatever success has been achieved during my tenure is owing in large measure to the strong and tangible, as well as intangible, support given the over-all enterprise by the citizens of the state, our legislators, the Board of Regents, a wonderful succession of university presidents (Drs. Coffman, Ford, Coffey, Morrill, and Wilson), and three discerning medical school deans (Lyon, Diehl, and Howard)—all with a spirit of selfless and dedicated devotion to the best interests of the school, the university, the profession, and the community.

The Department of Surgery has a large and loyal part-time staff which, in earlier years, was the very backbone of the enterprise. Today, this segment is concerned more with occasional lectures and participation in the teaching programs of our affiliated hospitals. The contribution of all these units and their staffs to the success of the over-all effort has been and continues to be very important.

Length of Surgical Training. On January 1, 1930, one surgical fellow and two interns carried the responsibility for the care of 130 surgical patients. Today 15 interns and more than 100 surgical fellows discharge these functions for approximately 200 surgical beds. This very circumstance tells a great deal of the contrast in the care of patients then and now. Obviously, considerably more attention is lavished on each patient from the admitting department on through, including the laboratory, x-ray department and other special technical aids.

All those who lived through the decade of the Depression (1930-1940) can know what a difficult period it was. As our surgical fellows completed their program, it was impossible to mobilize money to keep them on the staff. Many of these men, denied the privilege of staying on as full-time academicians, became illustrious community surgeons. Amongst others of that period were *Melville Manson, Logan Leven, Carl Rice, Herbert Carlson, Horace Scott, Charles Rea,* and *Louis Sperling.*

James E. Moore had established a Training Program in Surgery at the University of Minnesota in 1914, two years after the opening of the University Hospital, which, for its day was quite unique. It was three years in length beyond the internship and led to a graduate degree in Surgery.

Halsted had established at Johns Hopkins before the turn of the century a scheme of training rarely exceeded in length or quality anywhere. In his 1904 address at Yale University on the "Training of the Surgeon," Halsted indicated that at the Hopkins the training period was eight years beyond the internship, after which time the successful trainee became a member of the staff or wandered off to an academic opportunity in another University.

The manner in which our current training program differs from that of Halsted, though of the same length for the academically-minded surgeon, is that it has a stronger focus upon research. Halsted required that his trainees rotate successively through all the surgical specialties, spending six months or more in each of them. This scheme made skilled and versatile surgeons. Since Halsted's day, surgery has become highly specialized. In fact, several of Halsted's trainees contributed greatly to the development of surgical specialties. This intense and protracted concentration upon surgical techniques during the formative years of prospective academic surgeons, in my opinion, often blights their productive potential and inevitably sublimates and suppresses latent creative talents.

With the development and recognition of formal divisions of orthopedic, neurologic, and neurosurgery, rotation through any one of these specialties by our trainees in general surgery has been on a voluntary basis. In fact, the surgical specialties have their own surgical fellows, many of whom spend a year or two in general surgery before entering upon their life's work.

Emolument. Compensation for interns, save for lodging and board and laundry of uniforms, was unknown in post-World War I student days. Fortunately, many of the slave labor aspects of the internship are disappearing. Even so, interns and surgical house officers are still underpaid.

The surgical fellow in my day received $600 a year with no prerequisites, for the first two years of his fellowship and $900 in his

third year. The surgical fellow of that day also paid his own tuition! Today, our beginning fellows are paid $4,500 a year and the department provides their tuition.

Today, the surgical fellows inquire far less often how long the period of training is. They do want to earn a reasonable salary such that they will not acquire burdensome debts. Toward the end of this training period, our academically directed surgical fellows today earn in the area of $8,000 to $10,000, a sum approximately twice that which the chairman of the department earned in 1930.

Visitors. In my student days, the appearance of a celebrity or a distinguished person in any of the medical disciplines was an occasion which would usually convene a large segment of the Medical School. Visitors were that rare. Endowed Lectureships were unknown and visitors came usually for a specific purpose. I can well remember the privilege of giving the Sigma Xi Lecture in 1937. My topic was *Benefactions of Surgery to Man.* The first floor of Northrop Auditorium with 2500 seats was filled with an overflow to level two. Shortly after World War II, Sigma Xi again sponsored a lecture series, this time on cancer. There was no lack of public interest, although I had fewer than 100 auditors for my lecture, mostly students and younger faculty members of the School.

Today, the number of extra-curricular lectures listed on the bulletin boards of the various departments of the School indicate that distinguished visitors to the campus are a daily occurrence. Students are interested primarily in instruction which will help them in their examinations and they disaffect any suggestion of interest in the most illustrious visitors. This apathy toward the rich intellectual fare available daily in probably all medical schools and universities is startling and reflects the complexity of the lives of modern day students.

The Shoe-String Start. The strength of this department has come to depend upon young men who have manifested capacity for intellectual growth and been lured on by the attractions of an academic life. In many a university, the available staff positions have come to be looked upon as fixed. Not so many years ago, a university president from one of our neighboring states came to spend a day on our campus and to discuss with some of us the problem of his Medical School. At luncheon, President Morrill took pains to point out that when a man had academic leanings and unusual capabilities, our University left no stone unturned

to provide an opportunity for him, even though the situation had to be managed "on a shoe-string basis," an expression often used many years earlier by Lotus D. Coffman, another of the University's illustrious presidents. This is one reason that the University of Minnesota and its Medical School continue to grow in stature.

Responsibilities of the Surgical Teacher. Having observed in Germany how frequently ascent to the headship of a department dealt an overdose of anesthetic to the scientific aspirations of a promising academic surgeon, I decided that if the opportunity to build a Department of Surgery ever fell to my lot, I would see to it that the pursuit of private practice was relegated to a secondary position. To render a good brand of professional service to patients entrusted to one's care, to develop a strong teaching program—these are the primary tasks of all full-time staff members of university clinical departments. I also came early to believe that efforts directed at exciting the interest of young men in research while pursuing acquisition of their surgical training would develop a stronger and a better product than would dominant emphasis on clinical pursuits.

In a sense, it has not been too difficult in our Medical School to enlist the interest of young surgeons in research, inasmuch as every surgical fellow is required to register in the Graduate School and to work toward a graduate degree. I can still remember what a tremendous handicap I believed this requirement to be when I entered the surgical residency training program. Later, when I met men of my own age at meetings, where residency plans of training were in vogue, I found it difficult to explain to them the advantages of our plan. As the years have gone by, however, it has become quite clear that it is an enormous advantage to have this hurdle in our midst. In my own instance, had it not been for this exposure to research which made it necessary to struggle with an experimental project, I probably would never have learned how exciting research could be. Transition from rejection to acceptance is experienced by all of us many times in life. It is always a trying period and often one of acute suffering. But how else are men made strong? In this scheme of things, lies one of the ingredients which has fostered a spirit of research in our Medical School.

It is in those institutions with a keen and contagious interest in research that the learning process is most likely to catch on among students at

every level. To have the opportunity of observing developments in the making, I am certain, constitutes a tremendous challenge for young men. To be a first-hand witness or a participant in the struggles of an investigative endeavor breathes life into the dry and uninteresting task of piling fact upon fact. A teacher, interested in research, cannot fail to communicate some of his enthusiasm to his students. It is a healthy and stirring atmosphere in which to live.

Emolument of the University Surgeon. When I first became a member of the Department of Surgery, virtually all our hospital patients were charges of their respective counties and the state. A few per diem patients defrayed the cost of their own hospitalization. The only private patient, more accurately called a free patient, was a sick intern or nurse. In 1921, the regents of the University authorized admission of private patients under specified conditions into the University Hospitals. Prior to World War II, private patients on the wards of the University Hospitals were very few.

The coming of many well-equipped Hill-Burton built hospitals scattered throughout the state keeps a large number of patients, who in earlier days would have come to a university clinic, in their own home areas, where satisfactory professional care is available. This circumstance, together with the fast growth of health insurance programs, including a large fraction of employed adults in our state, has altered considerably the type of case admitted to the teaching wards of the University Hospitals. *Medicare* will accelerate this change.

When almost all hospital patients were wards of the state and county, it was a far simpler matter for a departmental chairman to effect partition of cases among members of his staff. This item is a matter of great significance in the development of young men as well as of strong departments. Medical Schools need, therefore, to study carefully this very important item of case partition in clinical departments. It is still probably one of the most important functions of a clinical chief.

As the number of county-supported patients decreased and as the number and competence of full-time staff of the hospital have increased, the private patients in the hospital have of necessity, increased. It would be relatively easy, therefore, for a full-time staff member with acknowledged competence to use his office as a high road to private practice. It is important that the full-time clinical staff of current University Medical Centers recognize and appreciate the unusual and wonderful

opportunities they are enjoying. It is the primary creed of every university teacher to consider opportunity, beyond support of a modest scale of living, to be his more important emolument. Moreover, time is for all of us life's most important commodity.

Arousing the Student's Interest is the Teacher's Function. Despite the circumstance that the teaching in the department has not always been systematic, the performance of our undergraduate medical students in the National Board examination in surgery quite regularly has been among the highest in our school, and not infrequently the highest turned in by our students in any of the clinical disciplines. My feeling through the years has been that there is no special virtue in trying to "cover the waterfront" by a systematic plan. The breadth of most clinical disciplines today is such that no one can teach or absorb it all. Thirty-five years ago, it was possible for an earnest graduate student to embrace the entire current literature of any clinical field by spending three to four hours in the library once a week. Today, if an equally motivated graduate student in surgery were to read every waking moment, it would be manifestly impossible for him to encompass the literature. As in earlier times, much of the moving scene taught today will become obsolescent in the future and should not absorb the student's attention to the exclusion of matters of great historical importance which have survived the wreck and rust of time. Much in any discipline can be written on a single page of history. Separation of the wheat from the chaff can only be accomplished by familiarizing the student with the origins of contemporary thought. The orientation afforded by a judicious appraisal of present knowledge against the background of time must not be underrated. What greater stimulus to the imagination is there than an acquaintance with the past, which is the history of men and ideas?

Interdisciplinary Attack Upon Problems and the Future. A heavy curtain of ignorance veils the future from our view. The on-coming generation is learning the great value of united interdisciplinary attacks upon problems. History has shown how dependent advances in any medical field are upon discoveries in the biologic and physical sciences. Groups of like-minded specialists are not the best company for one another. To ideas generated in a weekly seminar discussion between the Departments of Surgery and Physiology over the past 30 years can be attributed much of the credit for whatever my Department has achieved.

The lecture serves to emphasize what we know; the seminar what we do not know. In fact, future teaching as well as attack upon problems will certainly be characterized by multiple interdisciplinary seminar discussions with a critical use of information retrieval, employing the historical approach, in which the Library and the Historian will play increasingly important roles. The medical historian schooled in a basic biologic discipline, with a keen interest in current trends and developments, working in cooperation with representatives of biologic disciplines, can come to play a pivotal role in attacks upon special problems. In areas in which there are extending and converging peninsulas of information, the medical historian and the library can catalyze effectively the important role of bringing isolated ideas in to more meaningful arrangements and from which enlightenment and understanding will come. The geography of land and ideas are not so dissimilar. Had interdisciplinary contacts been more frequent over the past century, microscopy and bacteriology would have had far greater meaning for the clinician. The lag periods between discovery and useful application of newfound knowledge have been far too long.

The past decade witnessed almost complete elimination of the threat of poliomyelitis. Perhaps through the agency of interdisciplinary research the next decades may show the way to eliminate rheumatic fever by the united efforts of microbiology, immunology, and pharmacology. The nature of the origin of some congenital deformities is being revealed by biochemistry, immunology and pharmacology. Because of such advances, the cardiac surgeon of the 21st century will undoubtedly be less concerned with valve replacement and repair of congenital defects, while still concerning himself with management of coronary artery disease.

The important role of Universities in Medical School enterprises needs re-emphasizing. Many who have sat in our Surgical Conference Room have undoubtedly stayed to read John Masefield's warm appreciation of the influence of Universities. Said the Poet Laureate (1946): "There are few things more enduring than a university. Religions may split into sects or heresies; dynasties may perish or be supplanted, but for century after century, the university will continue, and a stream of life will pass through it, and the thinker and the seeker will be bound together in the undying cause of bringing thought into the world."

The curtain falls on our yesterdays and we look to those who will roll up the curtains of our tomorrows. While we await with high expecta-

Owen H. Wangensteen

tions Heralds of the New Dawn let us pause to pay tribute to our Founding Fathers and to a lengthening line of dedicated workers who nursed and shaped the destiny of this Great Enterprise. This teacher, privileged to have long been identified with the activities of the University of Minnesota's Department of Surgery, views with mingled feelings of humility and pride and deference the advancing phalanx of youth, confident that the future of the institution they serve will continue bright in their hands.

Owen H. Wangensteen, who wrote the above sketch of the Department of Surgery, was born on a farm near Lake Park, Minnesota, in September 1898. He was awarded the degree of doctor of medicine by the University of Minnesota in 1921 and the degree of doctor of philosophy in 1925. He was then appointed instructor in surgery at the Medical School. He spent the year 1927-28 as voluntary assistant in F. de Quervains Surgical Clinic, Berne, Switzerland and voluntary assistant in the Physiological Institute (Professor Leon Asher) .

On his return in the Fall of 1928, he was advanced to rank of associate professor, in 1930 he became chairman of the Department of Surgery, and in 1931 he was professor and head of the Department of Surgery. Dr. A. C. Straucher remained as professor and Dr. Charles H. Mayo was the only other full professor. However, there were seven

associate professors and ten assistant professors. There were only two full-time clinical teachers—Dr. William T. Peyton and Dr. C. Donald Creevy. The annual budget was $30,000.

Before and during the early years of his chiefship, Wangensteen laid down certain broad principles on which to operate the department. He said, "My thought has been that the power of appointment is the only authority one needs to guide the destinies of any venture. My judgments of whom to elevate to departmental responsibilities have been influenced and decided largely by considerations of the available person's motivations, competence, interest in research and teaching, and likely contribution to the over-all enterprise." Again he said, "Good men, I feel strongly, can be trusted and must be left alone to work out their own salvation. A far more useful function is served, I am certain, if the director of an enterprise abstains from trying to adjudicate or 'quarterback' every decision."

He set the example for his staff and students of all grades. Speaking of going on rounds with him, one resident physician said, "If you follow him with a pencil, you can write down 20 original ideas each day." His own work on intestinal obstruction promptly caused him to become known among surgeons around the world. As early as 1949, Dr. Visscher said that suction techniques developed by Wangensteen to deal with intestinal distention saved 100,000 lives. He devised techniques of radical resection of the stomach and colon for example for chronic peptic ulcer and malignancy. In 1948, he initiated the "second look" concept which has resulted in the salvage of many patients who would otherwise have died from malignancy. He instituted The Cancer Detection Center also in 1948.

The quality of graduate training received in Dr. Wangensteen's department and the accomplishments of his staff and trainees have caused physicians seeking graduate instruction in surgery to flock to him from all parts of the world. Since initiation of the Graduate School program in 1914 in the Medical School, 115 surgical fellows from this department have earned the degree of doctor of philosophy. Of this number, only four, of whom he was one, received this degree before his tenure. Of the others, Dr. Wangensteen served as major advisor for 69. (See Appendix E.)

An additional 105 physicians have been granted the degree of master of science in surgery. (See Appendix F.)

More than 100 former surgical fellows are engaged in some kind of academic teaching responsibility while many others are engaged in surgical practice. Indeed, 17 are professors and chairman of Departments of Surgery, and 27 are professors and/or directors of surgical divisions. (See Appendix F.) Among Wangensteen's trainees, 12 have been named Markle Scholars in Academic Medicine. Twelve professors have remained with the Department of Surgery.

A number of surgical trainees have not remained long enough to earn graduate degrees. This latter group has been predominantly practice-oriented and have come to occupy positions of responsibility and trust in their communities.

From his small staff when he became chief of the department in 1930, Dr. Wangensteen's organization has grown to 209 faculty members in 1966. He increased the surgical fellows from one to six in 1930, and to 154 in 1966.

Singly and with collaborators, Dr. Wangensteen has published more than 700 articles. Since 1930, he has encouraged members of his staff and trainees to prepare and publish manuscripts containing valuable information. More than 3,000 papers have been published from the department during his tenure.

His book entitled, *The Therapeutic Problem in Bowel Obstruction—A Physiological and Clinical Consideration* published in 1937, dedicated "To my father and the Memory of my Mother" was so popular that a second edition was demanded with second, third and fourth printings. A third edition became necessary in 1955 and remains in constant demand.

In 1940, he founded the *Surgical Forum* which by 1960 was referred to as truly the Arabian Nights reader for surgery.

The Surgeons of America chose Dr. Wangensteen as co-editor with Alton Ochsner of a new journal named *Surgery* in 1937, which soon became standard in the libraries of surgeons, hospitals and medical schools.

Since the library of the Medical School was established in 1888, no member of the faculty has used it more or has contributed more to it than Dr. Wangensteen. As chairman of a Committee on Medical History, he has procured funds adequate to provide for a full-time professor to which Dr. Leonard G. Wilson was appointed July 1, 1967.

He holds membership and fellowship in too many medical and surgical

organizations to list here. He has served on a large number of boards and advisory councils. Many organizations have honored themselves by honoring him with prizes and honorary degrees.

The following quotation emphasizes his selflessness and the keen pleasure he takes in the success of his former students, "As the life of a parent continues in a child, so too, the life of a teacher goes on to his pupils. As a father thrills in having a son whose achievements dwarf his own, so too, the teacher finds a great and keen satisfaction in the accomplishment of his scholar sons for whose training he was partly responsible as in any accomplishment of his own."

His attitude toward mankind is expressed in one of his most recent papers: "The future of Medicine and Surgery demands that while we strive to improve the sciences of our craft, we do not neglect the compassionate graces of sympathy, mercy and charity."

As Dr. Wangensteen's age for retirement approached, a search committee recommended Dr. John S. Najarian to succeed him. This recommendation was approved by the Board of Regents on February 10, 1967 to become effective on July 1. (See Appendix J for staff list.)

DIVISION OF ORTHOPEDIC SURGERY

Dr. *James Moore,* the first professor of surgery at the University of Minnesota Medical School, had an active interest in orthopedic surgery. Among his publications are a textbook on the topic. Early lecturers in orthopedic surgery also include Arthur Gillette, Dr. Carl C. Chatterton, Dr. Wallace Cole and Dr. Emil Geist. In 1930, the Division of Orthopedic Surgery was established at the University with Dr. Wallace H. Cole named professor of orthopedic surgery. Dr. Edward T. Evans and Dr. Stewart Shimonek joined him as senior attending staffmen while Dr. Meyer Goldner, Dr. John Galloway and Dr. Vernon Hart were appointed as junior staff.

In 1937, Haydn S. Cole and Mary M. Cole, who were the parents of Dr. Wallace Cole, established the Cole Fellowship for residents in 1939 as the first graduate training program in orthopedics at the University. The first Cole Fellow to enter the program was Dr. Harry B. Hall. The next Cole Fellow was Dr. Clifford Brown. Subsequently, many more fellows have followed in the appointment and have finished their training and are practicing orthopedic surgery in scattered areas of the United States.

World War II erupted and many of the orthopedic staff were called into the service. In 1941, Dr. Cole was asked to assume command of the American Hospital in Great Britain as chief of orthopedic surgery. He took with him Dr. Harry Hall, who was still in his residency training program at that time. Dr. Edward T. Evans entered the University Hospitals Army group and with him went Dr. Meyer Goldner. Dr. Stewart Shimonek entered the Navy and Dr. Vernon Hart, the Army. Residents in training were called into the service after their training program in orthopedic surgery had begun.

After the war, the Medical School Veterans Administration Hospital training program was initiated at the University of Minnesota. In establishing the orthopedics residency training program at the Veterans Hospital, Dr. Edward Evans was placed in charge and under his guidance it was maintained in close correlation with the University program. During the years following the war, Dr. Harry Hall, Dr. Malvin Nydahl, and Dr. Stewart Shimonek worked in close liason with Dr. Cole in giving a part of their time to the training of fellows in orthopedic surgery at the University.

In 1956, following the retirement of Dr. Wallace Cole to the status of professor emeritus, a temporary appointment as director of orthopedic surgery was given to Dr. Leonard Peltier, who had completed his orthopedic residency training program at the University of Minnesota.

In November of 1957, Dr. Peltier left the University to accept the post of professor of orthopedic surgery at the University of Kansas. At this time, Dr. John Moe was appointed as clinical professor and director of Orthopedic Surgery on a part-time basis. In 1957, there were two residents on the orthopedic service.

In 1958, the full-time staff was enlarged by the acceptance of Dr. Paul Arnesen as instructor in orthopedic surgery. Dr. Arnesen remained at the University until 1964, when he entered private practice in Mankato, Minnesota. In 1964, Dr. William Kane joined the full-time staff in orthopedic surgery, having finished his residency training program and in addition having spent two years in the Department of Physiology which led to his reception of the degree of doctor of philosophy in orthopedic surgery.

In 1966, the University of Minnesota had eleven residents in the Division of Orthopedic Surgery, including one each assigned to the Department of Physiology and the Department of Biochemistry. A

John H. Moe

substantial research program with an emphasis on bone blood flow and fracture healing has been developed during the past years. Residents are assigned to the Gillette State Hospital for Crippled Children in St. Paul for one year of concentrated study of children's orthopedics. They are also assigned for a period of six months to the St. Paul-Ramsey County Hospital for training in skeletal trauma. Others are assigned to the fracture and orthopedic service at Hennepin County General Hospital for a period of six months. The residency training program at the University of Minnesota in orthopedic surgery covers four years.

The Veterans Hospital program has likewise been growing. Dr. Robert Premer was appointed full-time instructor of orthopedic surgery in 1956 and he directs the program at the Veterans Hospital. Twelve of the residents from this service have been assigned to the University Hospitals and complete integration occurs, promoting constant interchange of residents of the two services.

Dr. *John H. Moe,* present director of the Division of Orthopedic Surgery and who prepared the above account of the division, was born on a farm near Grafton, North Dakota, in 1905. He received the degree of doctor of medicine from Northwestern University School of Medicine in 1930. Dr. Moe then took a residency in the Illinois Research and Educational Hospital. The next year he was resident at the Gillette

State Hospital in St. Paul, Minnesota, and in 1932, he served a residency at the San Joaquin Hospital in Stockton, California. During the early spring of that year he had a reactivation of an old tuberculous infection.

In December of 1932, he returned to Minnesota and on the advice of Dr. C. C. Chatterton, opened an office in the Medical Arts Building, Minneapolis. Dr. Chatterton immediately invited him to membership on the staff of the Gillette Hospital. Since Dr. Chatterton attained retirement age, Dr. Moe has served as chief of staff at Gillette and he has remained on that medical staff to the present time.

In 1936, he was invited to direct the orthopedic service at the Minneapolis General Hospital where he remained for many years. That year he was certified by the American Board of Orthopedic Surgery. The same year, Dr. Cole, Head of the Orthopedic Division at the University of Minnesota invited Dr. Moe to become a medical school instructor. In the early 1940's, he was promoted to a clinical assistant professorship.

After Dr. Cole retired in 1957, Dr. Moe was promoted to a clinical professorship and was made director of orthopedic surgery on a part-time basis at the University in 1957. In 1965, he accepted a full-time appointment as professor and director of the Division of Orthopedic Surgery.

Dr. Moe is a member of the American Orthopedic Association, the American Academy of Orthopedic Surgeons, Pan-American Surgical Association, Chicago Orthopedic Society, Clinical Orthopedic Society, the American College of Surgeons, and the Sociète Internationale de Chirugie Orthopedique et de Trauamatologia. He has also received honorary membership in the Bracilian Orthopedic Society, the Chilean Orthopedic Society and the Columbian Orthopedic Society in South America. For many years, he has shown an increasing interest in the treatment of scoliosis, and the University of Minnesota and the Gillette Hospital for Crippled Children in St. Paul are recognized as one of the leading centers of treatment in scoliosis which draws a constant flow of interested orthopedic surgeons from all parts of the United States as well as from foreign areas. Teaching seminars which have been conducted by the University of Minnesota orthopedic surgeons in South America have resulted in the development of teaching and training centers in this specialty in several South American cities, notably Sao Paulo in Brazil.

PLASTIC AND RECONSTRUCTIVE SURGERY SERVICE

The development of this service at the University of Minnesota Medical School is synonymous with the name Harry Parks Ritchie. His father, A. Parks Ritchie, was professor of obstetrics in the Medical School and the second dean of the Medical School. Harry Ritchie received the degree of doctor of medicine from the Medical School of the University of Minnesota in 1894. When the Spanish-American War broke out, he volunteered as a medical officer in the Thirteenth Minnesota Regiment and served in the Philippines for one year as a Captain.

In 1921, he was appointed to the University surgical staff under Dr. James E. Moore. There were many cancer cases sent to the University Hospital, and it was here that Dr. Ritchie first became interested in plastic surgery. After wide surgical removal of the tumor, serious cosmetic deformities often resulted, so Dr. Ritchie became interested in trying to repair the defects with flaps and skin grafts. Seeing his interest in this work, Dr. James E. Moore assigned to him the repair of cleft lips and palates, which had been anybody's problem up to that time.

In this special activity of plastic surgery he was among the world's best, and had few equals. He was particularly interested in classification and surgical management of congenital clefts of the lip and palate. Together with Dr. John S. Davis of Hopkins he developed a classification for congenital cleft lips and palates. For years Dr. Ritchie had a weekly operative clinic at the University Hospital on Thursday afternoons for the cases of cleft lips and palates. When he became clinical professor emeritus of surgery in June 1941 he was then, in point of years of service, the oldest living member of the faculty of the Medical School. He died September 3, 1942.

Dr. *Carl W. Waldron* also played an important role in the development of the plastic and reconstructive surgery service at the University of Minnesota. He received the combined degree of doctor of medicine and doctor of dental surgery from the University of Toronto in 1911. He was professor of maxillofacial surgery at the University of Minnesota from 1924 to 1948.

Dr. Waldron had an outstanding career in World War I in the Canadian Army Medical Corps, where he was associated with Sir Harold Gillies and had charge of the maxillofacial service in the

Canadian Army. During this period while he was stationed at Queen's Hospital at Sidcup on the Imperial Service, Major Waldron was of prime importance in the improvement of methods of treatment. He brought this valuable experience in plastic and reconstructive surgery to Minnesota. He retired in 1956.

In 1947, Dr. *Conrad I. Karleen* brought to the University his valuable experience gained during World War II. He held the combined degrees of doctor of dental surgery and doctor of medicine, being graduated from the University of Minnesota Medical School in 1939.

During the period of World War II, Dr. Karleen served five years (1942 to 1947). When he returned to civilian life in 1947, he held the rank of Lieutenant Colonel.

Many of the staff men of the general surgical service have contributed much in caring for the patients on this service, notably Drs. John Grotting and Lyle Kragh.

Since the inception of this service, perhaps the greatest evolution has occurred in the treatment of burns. Following the lead of Carl Moyer, the management of burn patients has been greatly improved and simplified by his silver nitrate treatment.

During the past fifty years, the recognition and management of the nutritional and electrolyte requirements, the great advances in anesthesiology, and the discovery of antibiotics have all contributed much to the treatment of burn patients at University Hospitals.

This sketch of the plastic and reconstructive surgery service was prepared by *N. Logan Leven,* who was born in St. Paul in 1902. He received the degree of doctor of medicine from the University of Minnesota in 1928. In 1920, he accepted a fellowship in the Department of Surgery, University of Minnesota and received the degree of doctor of philosophy from the University in 1933. During the period of his fellowship, he had a preceptorship with Drs. Ritchie and Waldron. He also spent some time with Dr. New at the Mayo Clinic. While in Graduate School, his chief interest was surgery of cleft lip and palate.

Immediately after receiving the degree of doctor of philosophy, Dr. Leven established a medical practice in St. Paul where he joined the medical staffs of the Miller, Children's, Ancker, St. Joseph's, and Midway Hospitals. In 1933, he was appointed instructor in the Department of Surgery and was promoted through the various ranks to clinical professorship in 1949. In 1941, he accepted membership on the Gillette

N. Logan Leven

State Hospital, and Shriners Hospital staffs. In 1942, he was certified by the American Board of Surgery and in 1948 by the Thoracic Surgery Board. In 1952, Macalester College awarded him the honorary degree of doctor of sciences.

When Dr. Waldron retired, Dr. Leven was promoted to the directorship of the Division of Plastic and Reconstructive Surgery, as it was then known.

In addition to excellent teaching, Dr. Leven has written or collaborated in writing more than 20 articles which have been published in standard journals in his field.

DIVISION OF NEUROLOGICAL SURGERY

This division at the University Hospitals was created in July, 1937.

During 1932, Dr. *William T. Peyton* was doing much of the teaching of neurosurgery and the operative procedures on the patients with neurosurgical problems. He was a skillful technician and an individual who had obtained advanced study in neuroanatomy, so that it was only natural, when the division was created, that he was made its director. He had worked very closely with Dr. A. T. Rasmussen, in neuroanatomy, which afforded him a thorough background to develop his neurosurgical talents.

Dr. *Wallace Ritchie,* who had trained in general surgery, began working with Dr. Peyton in about 1934 and acted as Dr. Peyton's associate until 1942, when Ritchie went into the Armed Forces. Dr. Ritchie became chief of the neurosurgery service in the 26th General Hospital, the University of Minnesota Medical Unit in World War II.

In July, 1939, Dr. *Harold Buchstein* completed training in neurological surgery at the Mayo Clinic and started private practice in Minneapolis. He joined with Dr. Ritchie as a clinical instructor in neurological surgery. Both were a great help to the residents in training at that time. They often assisted the residents and helped Dr. Peyton run the service. When Dr. Buchstein went into the Armed Services in 1942, Dr. *Horace Scott,* who was a general surgeon in Minneapolis, assisted Dr. Peyton. Dr. Scott continued in this role until the finish of World War II.

When the Division of Neurosurgery was formed in 1937, Dr. Peyton was a general surgeon of considerable renown so that a majority of the patients on the neurosurgery service actually had problems relating to general surgery. For many years, he had been interested in neoplastic lesions of the head and neck. This explains why there were so many patients with radical mandible and neck resections done on the neurosurgical service. There were not many neurosurgical patients so this afforded the residents rotating through the service considerable surgical experience. The resident staff was comprised of trainees who rotated for periods of six months from the General Surgical Service. One of these residents was Dr. *Leonard Titrud,* who eventually became the first full-time neurosurgical resident. The second full-time neurosurgical resident was Dr. *Lyle French.* Both Dr. Titrud and Dr. French entered the Armed Services and served under Dr. Wallace Ritchie in the University of Minnesota Hospital Unit and both returned to finish their training following World War II. Dr. French remained as an instructor in neurological surgery and Dr. Titrud began private practice in neurosurgery in Minneapolis and accepted a position as clinical instructor at the University.

Shortly after World War II, the Division of Neurosurgery at the Minneapolis Veterans Hospital came under the aegis of the University program and from that time on has been a very integral part of the training program, both for medical students and residents in training.

Graduated from this training program are over thirty neurosurgeons located all over the country and abroad. These alumni have been a closely knit group.

During the first ten years following organization of the Division of Neurosurgery, the principal teaching and investigative problems were of an immediate and very practical nature: treatment of herniated intervertebral discs, cranio-synostosis, cerebral trauma, brain abscesses and infections involving the cranium. Dr. Peyton's scholarly attitudes were pervasive. There was always a strong emphasis to obtain advanced degrees in neurological surgery.

Following this, there was a period in which the problems relating to cerebral edema were foremost. Investigations were made in the uptake of various dyestuffs in normal, edematous, and neoplastic cerebral tissue. The concept of the differential uptake of sodium fluorescein by neoplastic tissues compared to normal cerebral tissues was advanced. A radioactive isotope was then incorporated into the fluorescein molecule, thereby making a radioactive substance that would concentrate in abnormal cerebral tissue. Then, by the use of externally used radioactivity counting devices it was possible to localize the intracranial concentration of the isotope. This problem was worked out primarily under the guidance of Dr. *George E. Moore*, who began as an intern on the neurological surgery service, then became a resident in general surgery. He is now head of the Roswell Park Memorial Cancer Hospital in Buffalo, New York.

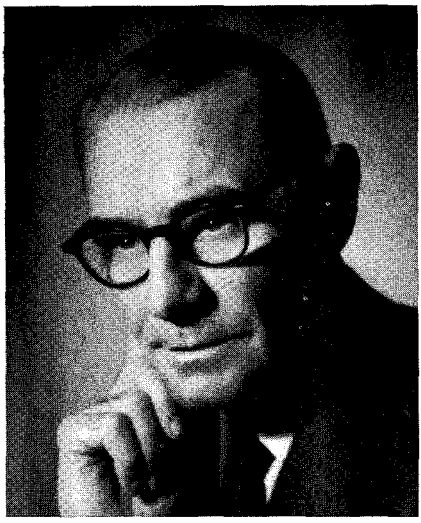
The problem of cerebral edema has remained of prime interest to the members of the Division of Neurological Surgery. Dr. *Gerald Haines* wrote his doctor of philosophy thesis on the localization of various dyes, including isotopes, in specific tissues and on techniques of brain tumor localization with radioactive isotopes. It was the continuation of this general trend of investigation into the problem of cerebral edema that eventually led to the clinical observation that glucocorticoids could be very useful in the control of edema associated with intracranial neoplasms. The most recent detailed work on this problem was by Dr. *Donlin Long,* who finished his residency training program in June, 1964. He studied the electron microscopic appearance of cerebral edema both treated and untreated by glucocorticoids.

The research interests of the department were varied, however, Dr. *Joseph Galicich,* now assistant professor of neurological surgery

in Harvard Medical School and director of the laboratories at the Children's Hospital in Boston, worked extensively on the central nervous system control of circadian rhythms. During this same period Dr. *Shelley Chou,* using intracellular recording, studied the effect of hypothermia on nerve cells. Dr. Chou joined the staff of the Division of Neurological Surgery in 1960 as an instructor in neurological surgery and has subsequently become an associate professor in neurosurgery. Dr. *Jim L. Story* finished his training in 1961 after spending an additional period of time at the Brain Research Center in Los Angeles working on neurophysiological techniques. He remained at the University of Minnesota and is now an assistant professor of neurosurgery.

In general the research problems have continued to relate to cerebral edema, but there has also been work done using sterotaxic techniques. The first of these was by Dr. *Richard Strassburger* on the production and control of Parkinsonian tremor in experimental animals. Various types of stereotaxic techniques have subsequently been used, not only for control of abnormal movements, but of psychological problems and the control of unusual pain problems.

Exchange programs have been worked out so that neurosurgical residents in training have been able to spend periods of six months to a year at the Mayo Clinic, at the Harvard Medical School and in Edinburgh, Scotland. During these periods of exchange, residents from these other institutions have spent comparable time at the University of Minnesota. The reason for this exchange is to broaden the effect of the University's training as well as to broaden the experience of the trainee. It has always been the desire of the staff to maintain a well-rounded training program by selecting trainees from various parts of the country and by accepting onto the clinical service patients who present with a wide variety of disease processes rather than a very selected and rather narrow area of neurological problems. This more broad approach benefits the medical students as well as the graduate trainees. In general, the emphasis has been on trying to relate to the medical student the general principles of the practice of neurological surgery hoping that recognition of these disease processes was to their advantage. The same has been true of the training of graduate students. It has been accepted as a responsibility the development of trainees who desire an academic environment but also are able to carry out proficiently the clinical practice of neurosurgery in the community. An attempt has



Lyle A. French

been made to coordinate the two groups into the strongest possible training program.

Dr. *Lyle Albert French* who prepared the above sketch of the Division of Neurosurgery, was born near Worthing, South Dakota in 1915. In 1939, he graduated from the Medical School of the University of Minnesota.

From 1942 to 1944, he was a neurosurgeon in military service with the 26th General Hospital, University of Minnesota Unit. He was then neurosurgeon in the 170th Evacuation Hospital from July 1944 to September 1945. Dr. French spent over three years in the Mediterranean Theatre of Operations and was discharged in January 1946 with the rank of Major.

He obtained a master of science degree in neurosurgery in 1946 with his thesis relating to problems of peripheral nerve injuries. The next year he received the degree of doctor of philosophy in neurosurgery. His thesis was a study of intracranial neoplasms in children. Since 1948, Dr. French has been consultant and acting chief of neurosurgery, Minneapolis Veterans Administration Hospital. Concerning this service, he states that "he has been fortunate enough to have the assistance of a competent group of neurosurgeons in private practice. In fact, they have been the mainstay of this service."

During the year 1947-48, he was instructor in the Division of Neuro-

surgery, University of Minnesota and for the next four years assistant professor. In 1952, he became an associate professor and in 1957, a full professor. Upon Dr. Peytons attainment of retirement age, Dr. French was appointed director of the Division of Neurosurgery in July 1960.

He holds membership in 20 medical and scientific organizations and was vice president of the Neurosurgical Society of America in 1951 and president in 1957. In 1959, he was elected president of the Minneapolis Academy of Medicine. Presently, he is a member of the American Board of Neurological Surgery and a member of the Neurological Science Research Training Committee of the National Institute of Neurological Diseases and Blindness. He is also the Civilian Consultant on Neurological Surgery for the United States Army.

Dr. French has engaged in a large volume of research having authored or co-authored 152 manuscripts published in medical and scientific journals or books.

DIVISION OF PROCTOLOGY

Dr. *Walter A. Fansler,* a graduate of Johns Hopkins Medical School in the Class of 1914, moved to Minneapolis in 1915 to become associated with Dr. Frederick Dunsmoor in general surgery. Dr. Fansler became interested in diseases of the rectum and colon and, in 1917, started an out-patient diagnostic rectal clinic in the University of Minnesota Dispensary. A short time later, Dr. Fansler began limiting his practice to the diagnosis and treatment of diseases of the rectum and colon. He became the first director of the Division of Proctology at the University of Minnesota. In 1928, Dr. *James Kerr Anderson,* came to Minneapolis and became very active in the out-patient clinic at the University and developed the clinic in its new quarters in the present out-patient facility.

In 1950, the residency program for training men in proctology was organized at the University of Minnesota Medical School. Since that time, seven young men have completed their training and have qualified for the certifying board which is now called the American Board of Colon and Rectal Surgery. Dr. Fansler retired from the teaching faculty in 1958. He continued in private practice until May 30, 1963, when he died suddenly from myocardial infarction.

When the residency program in proctology was started at the Uni-

versity, funds were needed for resident stipends, travel purposes, and teaching equipment. The late Mr. David Paper of St. Paul generously made funds available from the Lewis and Annie Paper Foundation for the support of this project. The Paper Foundation has continued its support to the present.

In addition to the diagnostic clinics and the surgery which is done at the University Hospital, Minneapolis, activities at the Hennepin County General Hospital and the St. Paul-Ramsey Hospital are coordinated with the program at the University of Minnesota Medical School. Now, besides the clinical professor and director of the Division of Proctology, there are two clinical associate professors, four clinical assistant professors, one instructor and one resident on the staff of the division.

One of the major endeavors of the Division of Proctology is the medical postgraduate course which is offered at the Center for Continuation Study one week each year. This course has attracted participants from every state in the union, from Canada, Mexico, and South America. The course is so popular that many more enrollment applications are received than can be accepted each year. Guest speakers who act as visiting professors supplement the regular Medical School faculty for these courses.

The University of Minnesota Medical School is one of the few schools in this country which has maintained a very successful Division of Proctology. Although the training of residents has been one of the most important functions of the Division, the consultation services of the members of the staff in the out-patient clinics and in the operating rooms have contributed to the success of the program.

A Section of Proctology at the Mayo Clinic was founded in 1922 by Dr. *Louis A. Buie.* Fellows in that Section are enrolled in the Graduate School at the University of Minnesota and very often receive graduate degrees from the University of Minnesota after completing the requirements and examinations which are given by the Graduate School. Members of the Mayo Clinic Proctology Staff participate in the Continuation Center courses at the University of Minnesota, and candidates for graduate degrees from the Mayo Clinic are examined by combined committees from the Mayo Graduate School and from the Division of Proctology at the University of Minnesota.

Dr. *William C. Bernstein* who prepared the above account of the

William C. Bernstein

Division, was born in Stillwater, Minnesota, in 1904. He received the degree of doctor of medicine in 1928. He established general practice at New Richland, Minnesota, until 1939, when he returned to the University of Minnesota on a voluntary fellowship and completed the requirements for a degree of master of sciences. Instead of writing a thesis, he wrote a book entitled, *Outlines of Proctology* which was published by the University Press and which served as a text for medical students and for Continuation Center courses for a few years. At the end of his fellowship, he became instructor in proctology. In 1946, he was promoted to a clinical assistant professorship and four years later to an associate professorship. In 1958, he was appointed clinical professor and director of the Division of Proctology.

From July 1943 until June 1946, Dr. Bernstein was in the Armed Forces and served as Executive Officer of the Medical Division of the Atomic Bomb Project in Oak Ridge, Tennessee, and as a member of the surgical staff where he was responsible for all the work in proctology.

Dr. Bernstein was president of the Minnesota Medical Alumni Association in 1948. For many years he has served as a member and chairman of the Education Committee of the American Proctologic Society and in 1965 was elected to the vice presidency of that organization.

In addition to the directorship of the Division of Proctology at the

University of Minnesota, he is chief of the proctology service at the Minneapolis Veterans Administration Hospital and St. Paul-Ramsey Hospital.

Department of Surgery, Minneapolis Veterans Administration Hospital. Dr. *John R. Paine* was appointed the first University Chief of Surgery at the Minneapolis Veterans Administration Hospital in 1946. He was the only full-time surgeon in the department.

Since 1946, five men have held the position of Chief of the Surgical Service: Dr. *Paine,* from January 1946 to June 1947; Dr. *Lyle Hay* from July 1947 to June 1954; Dr. *Donald J. Ferguson* from July 1954 to September 1960; Dr. *William D. Kelly* from September 1960 to August 1962; and Dr. *Edward Humphrey* from September 1962 to the present time.

The first senior resident was Dr. *Robert McCleery;* other residents in the original group were: Dr. *Harry P. Harper,* Dr. *Howard Hall,* Dr. *Edward Mandel,* Dr. *Robert Utendorfer.* The programs of graduate surgical education have grown so that there are now 60 residents being trained in the various sections of surgery. Since 1947, 61 residents in general surgery and 14 in thoracic surgery have received all or a major portion of their training at the Minneapolis Veterans Administration Hospital. This hospital has shared in undergraduate surgical teaching from the beginning of its affiliation with the University of Minnesota. From ⅓ to ½ of the students graduating from the Medical School have had a portion of their surgery clerkship at the Veterans Administration Hospital.

The growth of research in surgery at this institution has paralleled the increase in research appropriations to the United States Veterans Administration in general. In 1952, a warehouse was fitted with temporary partitions and some excess kitchen furniture was installed so that the surgical service could have a research area. In the same year, Dr. *Donald Ferguson* joined the staff, becoming its first director of experimental surgery. This building and an adjoining one were extensively remodeled in 1963 to provide one of the finest surgical research facilities available at any institution. A Veterans Administration investigatorship is now available to surgeons who have finished their residency but wish to spend several years in full-time research to increase their knowledge of a specific discipline and establish themselves in a particular research endeavor.

Dr. *Edward W. Humphrey,* who prepared the above sketch, was born in Fargo, North Dakota in 1926. He received the degree of doctor of medicine in 1952.

By 1959, he had qualified for the degree of doctor of philosophy. He was staff surgeon at the Veterans Administration Hospital from 1958 to 1960. From 1960 to 1962, he was director of its experimental surgery laboratory.

In 1958, Dr. Humphrey was appointed instructor in the Department of Surgery, University of Minnesota. In 1960, he became assistant professor and in 1961 associate professor. He served in this capacity until 1965 when he became professor of surgery. He continues as professor and chief of the surgical service of the Minneapolis Veterans Administration Hospital.

Dr. Humphrey holds membership in special organizations including the Society of Experimental Biology and Medicine, the American Society of Cell Biology, the American College of Surgery, the American Physiological Society, History of Medicine, and the Minnesota Surgical Society. He is author and co-author of more than 30 articles which have been published in local and national journals.

Department of Surgery at Hennepin County General Hospital. The Hennepin County General Hospital was constructed in 1905. Until January 1, 1964, it was operated by the City of Minneapolis as the "Minneapolis General Hospital." It was then renamed Hennepin County General Hospital.

Dr. *A. E. Wilcox* was the attending chief of surgery until September 1925. Dr. *A. A. Zierold* became an attending chief of the service and was responsible for instituting a training program in general surgery.

The first full-time *University surgeon* to be assigned for duty was *Clarence Dennis* of St. Paul. He came during 1944 and immediately improved resident training to a four-year program and increased the number of residents. In 1954, he left Minnesota, and Dr. *W. Phillip Eder* was appointed to succeed him as the University staff man on the surgical service.

Late in 1954, Dr. *Arthur A. Zierold* retired as "Attending Head" and Dr. *O. J. Campbell* was appointed to this position. In 1955, Dr. Eder left the General Hospital and Dr. C. R. Hitchcock was appointed as the University staff man on the surgical service.

In 1957, the *Residency Program* was increased to five years. The

number of Residents has been steadily increased during the past 10 years to a total of 22 positions. Three residents have accomplished the degree of doctor of philosophy in surgery and four additional residents are involved in achieving that degree at this writing.

The tone of the residency program has been to achieve a fine balance between research work and clinical experience. With 125 surgical beds in the Hennepin County General Hospital, the number of residents is balanced so that each man accrues a significant number of major operations wherein he is the surgeon. Thus, he completes the program with a rich operative experience. At any given time, at least four residents are assigned to research projects and others are assigned to the various other clinical services including soft tissue, trauma, cardiovascular pulmonary surgery, emergency room direction, surgical clinics, pathology, and anesthesia. Approximately four doctors per year complete the residency program at the General Hospital.

The hyperbaric research facility was completed in May 1964 at a total cost of $575,000. At the present time, the research complex includes special primate quarters at the University facilities at Rosemount, Minnesota, and the research facilities are valued at $1,100,000. The laboratories include animal operating rooms, dog, baboon, and small animal storage facilities, chemistry laboratories, x-ray, isotope laboratories, constant temperature room, analogue computer monitoring facility, renal physiology rooms, and the hyperbaric complex. The research budget for the Department of Surgery is about $250,000 to $275,000.

Many facets of organ transplantation have been worked out in the research laboratories during the past ten years. The staff pioneered in the successful handling of kidneys during homografting with cooling techniques using perfusion methods. Dr. *Robert Telander* was first to successfully perfuse sheep and baboon kidneys for periods as long as 24 hours in special extracorporeal pump oxygenator equipment and have the organs remain normally functional. Dr. Telander first accomplished a reimplantation of baboon kidneys after eight hours of extracorporeal perfusion into the donor animal with subsequent contralateral nephrectomy in 1962. These animals have survived for many years on the single kidney which had been artificially perfused for eight hours. This work has led the way to direct application of pump oxygenator techniques in later harvesting procedures for human kidneys in the General Hospital program.

In 1960 and 1961, staff members made two research trips to Kenya, East Africa, where projects were initiated in Kenya baboons at Darajani in the foothills of Mount Kilimanjaro. Since that time, the baboon experimental work has increased until now the Foundation houses 54 baboons on the Portland avenue premises and has facilities for storage of 65 baboons in the Rosemount addition. The initial studies were in the nature of organ transplant studies including the kidney and the lung.

Dr. *John Haglin* has pioneered in the work of pulmonary transplantation in the baboon. He has been assisted by Drs. *Joseph Kiser, Claire Strobel,* and *Orn Arnar*. Near normal function in terms of gas exchange, compliance return, etc. have been demonstrated by Dr. Haglin in these primate transplant studies and the success in this field in the baboon experiments has helped set the stage for probably successful transplantation of the lung in humans.

The first homotransplantation of a human kidney in the North Central United States was performed at the General Hospital during February 1963. In addition, the first known kidney transplant from a lower primate to a human was performed by the General Hospital group during February 1963. This was the first animal-to-human transplant performed in 60 years. Subsequently, the General Hospital group performed a joint study with the transplantation team from Denver under Dr. *Thomas Starzl* and a series of six patients were given baboon kidney transplants.

Chronic renal dialysis was first brought to the upper midwest by the General Hospital surgical team in March, 1963. Acute dialysis had been present in the community for some years but a chronic program using the specially designed instrumentation for this type of procedure was first used at the General Hospital in the Twin Cities at this time. This effort has developed into a large chronic dialysis program which is under the direction of the chief of surgery and Dr. *Fred Shapiro,* instructor on the internal medicine service. At the present time, this chronic dialysis program is the second largest in the United States and is now involved in the establishment of satellite programs in 10 different locations about the State of Minnesota. The satellite units are affiliated with the parent chronic dialysis unit at the General Hospital.

The transplantation team at the General Hospital is also involved in a parallel program of human renal transplantation. This program moves along concomitantly with the chronic dialysis program. Many patients

are treated definitively, at this time, by chronic dialysis and others for whom transplantation is appropriate are so managed.

The Department of Surgery's hyperbaric facility is being used to investigate the application of hyperbaric oxygenation in both medicine and surgery. Patients with Clostridium perfringens infections have come to the hyperbaric unit from seven states in the region and have been successfully treated by this method. The hyperbaric chambers are used to facilitate the harvesting of cadaver kidneys for human transplant cases. Improved post-implantation function of the cadaver kidneys by the application of this method has been shown. Immediately after death, the cadavers are moved to the hyperbaric chamber and connected to a pump oxygenator and harvesting is accomplished under three atmospheres absolute pressure with the viscera being perfused by an extracorporeal system. Immediate excellent kidney function results.

On November 16, 1964, our paper was published as the first in the English language pointing out the relationship of spontaneous ulceration of the small intestine to thiazide and potassium chloride therapy. This publication was the first full and comprehensive presentation of this problem in the literature. The patient material was from the Hennepin County General Hospital.

A study of the use of chemotherapeutic agents in the treatment of metastatic visceral cancers has been under way for many years in the Department of Surgery. Recently, patients have been treated in the hyperbaric chambers with hyperbaric oxygenation during the time that they were receiving therapy with 5-fluorouracil for their metastatic visceral cancer. Some improvement in the action of these drugs has been noted under these conditions.

In 1962, an endowed professorship was provided by the Onan Family Foundation of Minneapolis to support Dr. *John Haglin* in the position of assistant director of the Department of Surgery at the General Hospital. In addition to Dr. Haglin, the full-time staff includes Dr. *Theodore Peterson,* who is one-half time instructor in the department. Beginning July 1, 1967, Dr. *Lee Simso* became a full-time instructor in surgery. On July 1, 1968, Dr. *Robert Telander* is scheduled to also join the department on a full-time basis as instructor in surgery.

Board qualified, and Board eligible surgeons from the Minneapolis area serve on the attending staff of the Department of Surgery at the

General Hospital. There are 55 attending surgeons and each becomes a clinical teacher in the Medical School upon appointment.

Dr. *Claude R. Hitchcock,* who prepared the above sketch, was born in Minneapolis in 1917. He received the degree of doctor of medicine in 1945. Following military service, Dr. Hitchcock was on a fellowship in the University's Department of Surgery until he was awarded the degree of doctor of philosophy in 1954. From 1952 to 1954, he was instructor in surgery and assistant professor from 1954 to 1957. For the next five years, he was associate professor of surgery. During the period from 1952 to 1957, he was University chief of surgery at the Minneapolis General Hospital.

On January 28, 1957, Dr. Hitchcock was appointed full-time—full chief of the surgical services by the hospital staff and was the first surgeon to be so appointed both by the University of Minnesota Medical School and the staff of the General Hospital. In 1961, he was promoted to a full professorship of surgery at the University of Minnesota. In this capacity, Dr. Hitchcock has made major contributions including increase of Residency Program, opening of major research building with Dr. John Haglin, the hyperbaric research facility, conducted kidney and lung transplants and made provision for a full time staff.

He holds membership or fellowship in approximately a dozen medical organizations including the Society of Head and Neck Surgeons, Central Surgical Association, Society for Experimental Biology and Medicine, Society for Cryobiology and the Transplantation Society.

Dr. Hitchcock has published more than 90 articles in journals in his fields of special interest.

Department of Surgery, St. Paul-Ramsey Hospital. The City and County Hospital began operation in St. Paul in 1873. The first physicians were Drs. *Charles E. Smith* and *H. C. Hand.* They were followed by Drs. *Jacob Henry Stewart* and *C. A. Wheaton* in 1880. Dr. *Arthur B. Ancker* assumed the duties of superintendent of this institution on August 1, 1883 and continued in this capacity until his death May 15, 1923. The institution was re-named the Ancker Hospital shortly thereafter and remained so until opening of the new St. Paul-Ramsey Hospital on October 13, 1965. The school of nursing at the new facility retains the Ancker name.

Surgical treatment of patients was carried out in the early years by Dr.

Ancker and surgeons of the City of St. Paul. The increased census and importance of the hospital in the community led to formal organization of the medical and surgical staff in 1892.

This original surgical staff included *Charles A. Wheaton, Arthur B. Ancker, Justus Ohage* and *Perry A. Millard. Warren S. Briggs'* name was added in 1896. *John Rogers, Anton Shimonek, Alfred E. Comstock, William D. Kelly* and *Albert E. Aherns* contributed their efforts to the Department after the turn of the century. Later, *Alexander Colvin, Warren A. Dennis, John S. Abbott, J. C. Staley, Harry P. Zimmerman* and *Paul A. Kelly* were added to the staff. Alexander Colvin became the chief of general surgery in 1921 and continued in this capacity until his death in 1948. During his leadership of the department, *C. Curry Bell, E. Mendelsohn Jones, Victor P. Hauser, Leo A. Hilger, D. Greth Gardnier, J. M. Culligan, Max W. Alberts, N. Logan Leven, W. P. Brodie, Justus Ohage, Wallace P. Ritchie, Charles E. Rea, Lawrence Hilger* and *William Bernstein* were active in the department's work. Many of these surgeons continue to this day to contribute their time and energy to the surgery department. Colvin was succeeded by *E. M. Jones* as chief of surgery. *Victor Hauser* was elected to this post in 1953 and *J. M. Culligan* in 1956.

During 1945, the medical staff agreed to participate in a graduate training program for veteran physicians conducted by the University of Minnesota with funds provided by the Kellogg Foundation. When funds for support of this program expired July 1, 1950, it had been so successful that it was agreed to continue the residency training programs under University supervision at the expense of the Ramsey County Welfare Board.

Implementation of the Kellogg Foundation-financed graduate training program under the auspices of the University in 1946 led to the existence of the first full-time staff in the Department of Surgery. *K. Alvin Merendino*, the first surgeon to occupy the post, deserves great credit for developing effective liaison and for establishing a successful working arrangement between the University and the Ancker staff. He was followed in this position by *Ivan Baronofsky,* who was responsible for stimulating interest in the development of the surgery department research laboratory which was erected in 1952 at a cost of $125,000. *F. John Lewis* and *Lloyd D. MacLean* subsequently have occupied this post and both have gone on to become professors of surgery in other

institutions. The first three full-time University surgeons were designated "Graduate Study Instruction Staff." *Lloyd MacLean*, a Canadian, was elected chief of surgery by the voluntary staff in 1956 in recognition of the need to vest this authority in the full-time representative for the best functioning of the surgery residency training program.

A State Hospital for Crippled Children was organized in 1893 (under the direction of *Arthur J. Gillette*) at the City and County Hospital of St. Paul. This continued to be an active part of the hospitals' orthopedic service until moved to a separate facility at 1003 East Ivy Street. The orthopedic staff of the Gillette Hospital was augmented by *Wallace P. Cole* and *Carl C. Chatterton* in 1914. The contribution of Alexander Colvin, Victor Hauser and many other surgeons to the fracture and orthopedic service of the Gillette Hospital throughout the years has been an important one.

Today, the surgery department of the St. Paul-Ramsey Hospital is staffed by 33 general surgeons, 4 neurosurgeons and 19 orthopedic surgeons. There are 11 surgical residents in addition to two orthopedic residents who rotate from the University and Veteran's Hospital to St. Paul-Ramsey Hospital for training in treatment of fractures and one general surgery resident sent from the University to gain experience in trauma and emergency surgery. All are graduate students in the University of Minnesota. Some of the residents are accepted for one year's training only and thereafter enter surgical specialty training. Two residents complete the general surgery program each year.

Those surgeons of the community who have contributed time and talent to the Ancker-Ramsey Surgery Department deserve recognition since the department has made a significant contribution far beyond the immediate goal of excellent care of the indigent sick of St. Paul and Ramsey County. In addition to participating in the training of medical students and the interns who have served at the hospital throughout the years, the department, through its residency program has produced many fine surgeons who practice in St. Paul, throughout the state and indeed throughout the Northwest.

Dr. John Francis Perry, Jr., who prepared the above sketch of surgery at the St. Paul-Ramsey Hospital, was born in Lubbock, Texas in 1923. He won the degree of doctor of medicine from the University of Texas Medical Branch in 1947.

He came to the University of Minnesota in October, 1951 as a

surgical fellow. In 1957, he was appointed an instructor in the Department of Surgery and was awarded the degree of doctor of philosophy in surgery in 1958. He was promoted to an assistant professorship of surgery in 1959 and two years later to associate professor. In 1965, he was awarded a full professorship of surgery. Since 1962, he has been chief of the Department of Surgery at St. Paul-Ramsey Hospital.

Dr. Perry holds membership or fellowship in more than a dozen medical organizations including the American College of Surgeons, Central Surgical Association, the American College of Chest Physicians, the Society of Experimental Biology and Medicine, and the American Society for Experimental Pathology.

He has made numerous and excellent contributions to the literature having published singly or in collaboration with others, 80 manuscripts since 1950.

Department of Surgery—Mount Sinai Hospital. During the years of World War II, a movement within the Jewish community of Minneapolis to build a Jewish hospital had evoked considerable study, discussion and support. As an outgrowth of these and subsequent discussions, Rabbi Albert Gordon, was instrumental in persuading Mr. Jay Phillips to assume the leadership role in bringing this endeavor to fruition.

Although Jewish patients of Minneapolis had ready access to the various denominational hospitals, some of the Jewish physicians of the community were finding it difficult to obtain sufficient hospital facilities for their patients. More important, however, as motivation for the new proposed hospital, was a strong feeling among the leaders of the Jewish community that they too should contribute a health resource to the community at large, for use by all of the people.

After a preliminary organizing meeting, Mr. Phillips and his associates arranged an initial fund-raising dinner at the Nicollet Hotel in Minneapolis for the leaders of the Jewish community. At this meeting, on November 7, 1945, the concept of Mount Sinai Hospital took a giant step forward. Before the night was over, $1,750,000 was in hand in firm pledges. Three additional fund raising drives were held during the ensuing several years which brought total pledges to $4,500,000 sufficient to build and equip the original hospital structure.

The hospital board purchased the old Garfield School, a square block of property at 22nd and Chicago Avenue as the site for the Mount Sinai Hospital.

More than any other group, the founders and supporters of Mount Sinai Hospital sensed the importance of teaching and research and the delicate interplay of these activities with medical practice in achieving the high standards of performance and excellence they had set as goals for their hospital. To provide for these activities to give them stature, continuity and support, a University affiliation was actively pursued.

From the University, staunch support was forthcoming from Dr. *O. H. Wangensteen,* Dr. *Leo Rigler* and Dean *Harold S. Diehl,* working in close liaison with Messrs, *Jay Phillips, Louis Melamed, Arthur Melamed,* and *Samuel Maslon,* of the hospital governing board. From the then evolving medical staff of the hospital, Dr. *Moses Barron,* Dr. *Max Seham,* and Dr. *Reuben Berman* were instrumental in persuading the rest of the staff to seek out and accept a University affiliation. When the hospital opened its doors and admitted its first patient on February 19, 1951, a University affiliation was an accomplished policy.

Although many hospitals in this community have had full-time medical personnel in Departments of Pathology, Radiology and Anesthesiology, Mount Sinai was the first hospital to have a full-time clinician in the capacity of director of surgical education and research. This appointment in the Department of Surgery was the first instrument of the University affiliation, and remains to this date as a professorship within the Department of Surgery. The first appointee to this position, Dr. *Arnold J. Kremen,* served from 1951 to 1954, set up the surgical residency and laid plans for the Jay Phillips Research Laboratory which opened in 1955.

Dr. *Kremen* left the Mount Sinai post in 1954 to take a position as professor of surgery at Columbia University, New York. He was succeeded by Dr. *Lyle Hay* whose tenure in office lasted to June 30, 1959. He in turn was succeeded by Dr. *Fletcher Miller* who gave distinguished service to the hospital through June 1963 when he left to become professor and head of the Department of Surgery at Creighton University in Omaha, Nebraska. Most recently, Dr. *Peter Salmon* directed this effort in surgery until August 15, 1966 when he left to assume an academic position at the University of Alberta, Canada.

A similar, but more loosely-defined activity, continued in the Department of Medicine under part-time direction until December 1, 1959. At this time, Dr. *Alvin Schultz* assumed the full-time direction of teaching and research activities of the Department of Medicine. Under his

guidance, the medical teaching program received great stimulus and impetus, the teaching staff expanded, the activities of the department and the University affiliation were greatly strengthened. On November 1, 1965, Dr. Schultz resigned his position at Mount Sinai to become professor of medicine at the University and director of the medical service at Hennepin County General Hospital. Until a successor to Dr. Schultz was appointed, Dr. *Reuben Berman* very ably directed the medical service on a part-time basis. More recently, on August 1, 1965, Dr. *F. Bruce Lewis* was appointed as full-time director of medicine, and is now serving in the post.

Over the 16-year span of Mount Sinai Hospital's existence, the University affiliation has steadily expanded. The wisdom of Mr. Phillips and his associates on the Board of Governors, and of Dr. *O. H. Wangensteen,* Dr. *C. J. Watson,* Dean *H. S. Diehl* and Dean *R. B. Howard* of the Medical School in fostering and nurturing this relationship, has been demonstrated again and again. The University affiliation is now on a firm basis in both Departments of Medicine and Surgery, and we look forward to this continuing partnership in medical research, education and practice to provide the full portion of leadership and progress that the future requires.

Dr. *Arnold J. Kremen* who prepared the above sketch, was born in South Range, Michigan, in 1913. He was awarded the degree of doctor of medicine in 1938. From 1939 to 1942, he was a medical fellow in the Department of Surgery, University of Minnesota. From February 1942 to September 1945, he served in the United States Army Hospital Number 26, where he achieved the rank of Major at time of discharge. He resumed his medical fellowship in October 1945 and in 1946 and 1947, he was National Cancer Institute Trainee.

Dr. Kremen was awarded the degree of doctor of philosophy in surgery in 1947. That year he was appointed instructor in the Department of Surgery in August and promoted to an assistant professorship in September. In 1950-54, he was associate professor and was cancer coordinator for the United States Public Health Service, University of Minnesota Medical School, from July 1948 to July 1951. From July 1951 to 1954, he was director of surgical research and the University surgical service, Mount Sinai Hospital, Minneapolis. The next year he was professor of clinical surgery, Columbia University College of Physicians and Surgeons. That year, he was also attending surgeon,

Presbyterian Hospital, New York, and also visiting surgeon and director of surgery, Frances Delafield Hospital in New York. In 1956, Dr. Kremen returned to Minneapolis to practice surgery and resumed part time activities at the University. In 1959, he was appointed clinical professor of surgery, University of Minnesota.

Dr. Kremen is a member of numerous surgical societies including the Society of University Surgeons, American Surgical Association, the Society of Head and Neck Surgeons, of which he has been president, Minnesota and Minneapolis Surgical Societies each of which he has been president, Cancer Commission of American Colleges of Surgeons, Fellow of the American College of Surgeons. He is a member of the Board of Editors, *American Journal of Surgery.*

Chapter XXVII

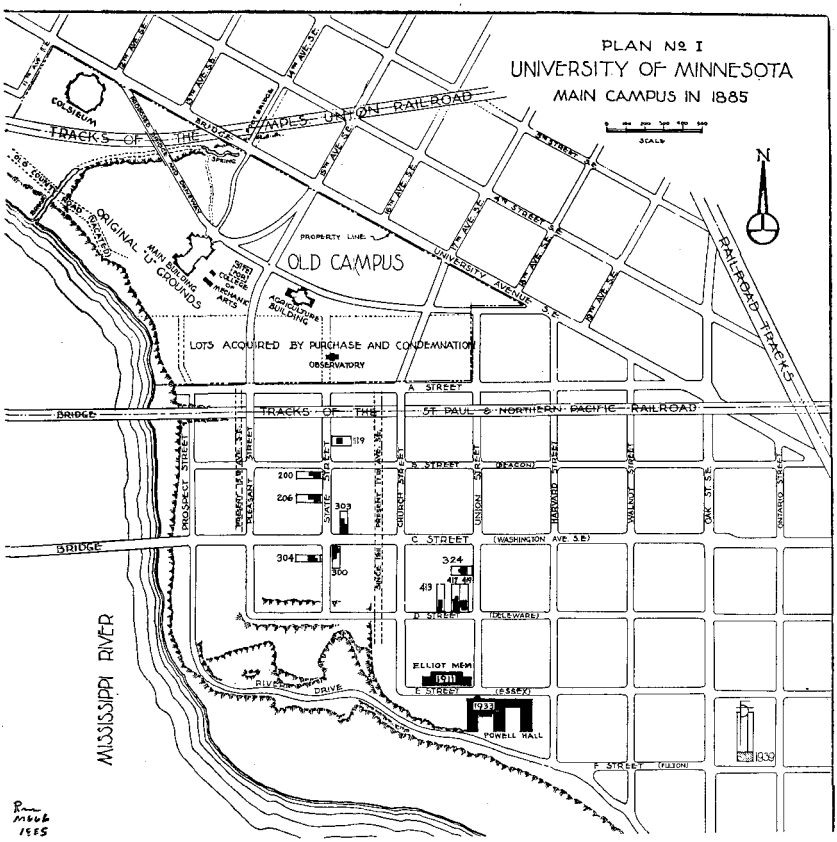
University of Minnesota Hospitals

THE UNIVERSITY OF MINNESOTA HOSPITALS are owned by the University of Minnesota and controlled by the Board of Regents. In fact, the Board of Regents is the governing body of the Hospitals, such as a Board of Trustees is the governing body of a private hospital. The Hospitals is a prime example of how the University combines service with teaching and research, the three reasons for the existence of any University department.

The Medical School of the University was established in 1888, and a temporary University hospital opened in 1909 to provide a means for teaching medical students and student nurses. In the early days, clinical instruction amounted to lectures with clinics in amphitheaters, medical students having little real contact with patients. The opportunity for Minnesota to have a University hospital came in 1905 when funds for it erection were provided by the will of Mrs. A. F. Elliot, which directed that proceeds of the sale of properties amounting to about $113,000 be used to build a hospital in memory of her husband, Dr. A. F. Elliot, who had died in 1901. There was a delay while a site was chosen. Land was finally purchased with funds amounting to about $50,000 contributed by generous citizens of the City of Minneapolis. Mr. Walter Trask, Dr. Elliot's attorney and close friend, made a gift of $13,000 to the building fund, and the legislature appropriated $40,000.

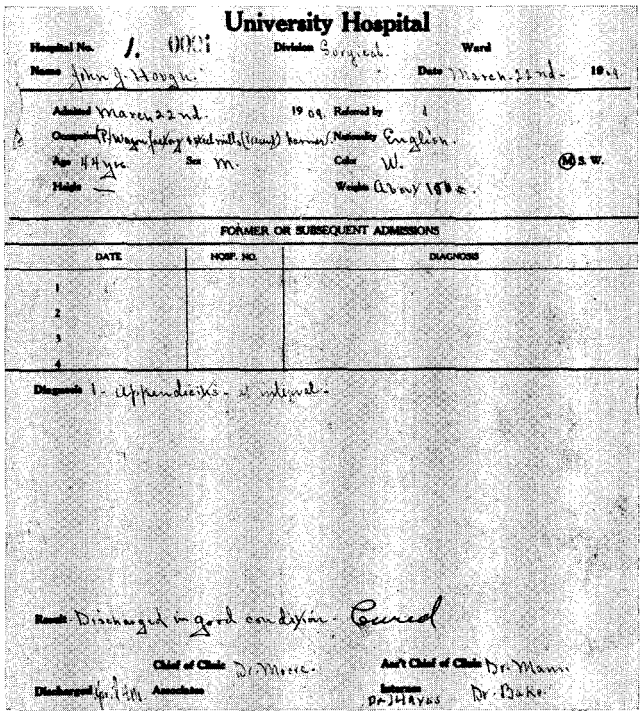
Meantime, the Board of Regents, recognizing the need of the Medical School to have a hospital, voted at its meeting on December 8, 1908 that the "old fraternity house be assigned for a temporary hospital, together with one small dwelling to be selected later" (300 Washington Avenue S. E.).

These temporary fraternity house quarters for a hospital and necessary staff of nurses and employees were made available in 1909. The buildings were at 200 State Street, 304 State Street and 303 Washington Avenue. The house at 303 Washington Avenue was equipped for 24



Early map of campus with location of buildings before Elliott Memorial was built

First Hospital--303 Washington Ave. S.E.



University Hospital

Hospital No. 1. Division Surgical. Ward

Name John J. Hogan. Date March 22nd. 1909

Admitted March 22nd. 1909. Referred by 1

Occupation Pitman packing & sold milk (farm) farmer. Nationality English.

Age 44 yrs. Sex M. Color W. M S. W.

Height — Weight About 158 #.

FORMER OR SUBSEQUENT ADMISSIONS

DATE	HOSP. NO.	DIAGNOSIS
1		
2		
3		
4		

Diagnosis 1. Appendicitis. Acute.

Result Discharged in good condition. Cured

Chief of Clinic Dr. Moore. Asst Chief of Clinic Dr. Mann

Discharged April 14th Attendants Interns Dr. Hayes Dr. Baker

Chart of first patient admitted to temporary hospital

patients (surgical and obstetrical) and is where the University Hospitals had its beginning. It opened on March 22, 1909 and operated continually until September 15, 1911 when the Elliot Memorial Hospital, first actual new unit of University Hospitals, was built. Early in 1910, a building at 119 State Street was secured for hospital patients and equipped to accommodate 18 patients.

In the summer of 1910, the Board of Regents assigned buildings at 324 Union and 417 and 419 Delaware to the Hospital, 324 Union to be used for internal medicine patients and the latter as a nurses home. At that time, the house at 119 State Street was vacated and its use as a hospital building was discontinued; the one at 304 State Street was assigned as quarters for the superintendent who came in August 1910. A building at 413 Delaware was designated by the Board of Regents for quarters for women employees in the domestic department of the hospital and the building at 200 State Street was released by the hospital.

When the Elliot Memorial Hospital was opened, the patients from

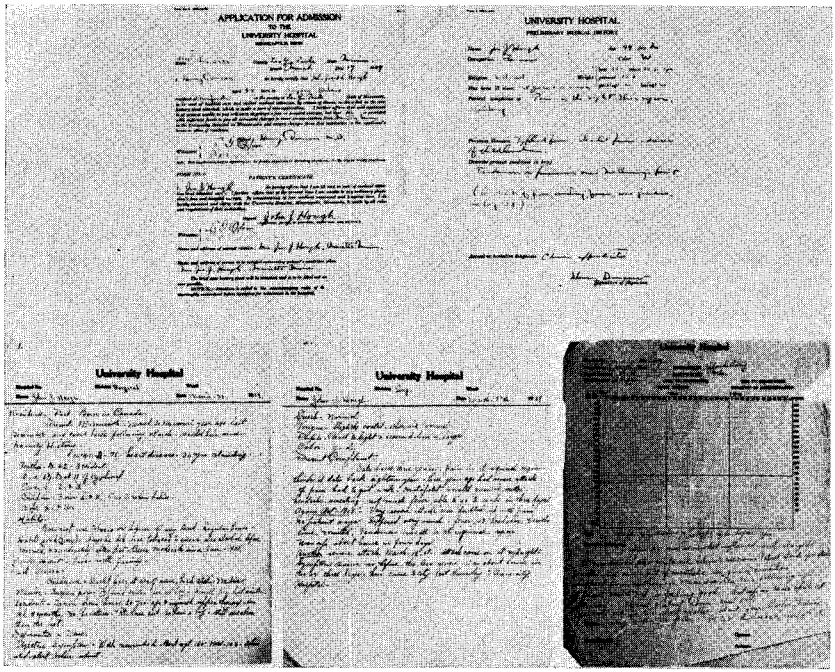


Chart of first patient admitted to temporary hospital

the temporary hospital buildings were moved into the new building. The President's Report of 1913-14 further stated that " in April 1914, a house at 206 State Street was opened for the purpose of caring for City patients, convalescent from contagious diseases, to assist the City Hospital in meeting the unusual demands made upon it by large epidemics of scarlet fever and diphtheria."

In a report made by Dr. *L. B. Baldwin,* Director, in 1911-12, he lists the hospital buildings of that date as follows:

Elliot Memorial	120 beds
Brick flat, 417-419 Delaware	Nurses Home
Frame building, 324 Union	Nurses Home
Frame building, 413 Delaware	Domestics Home
Frame building, 304 State	Superintendent's Residence
Frame building, 303 Washington	Held in reserve for cases of contagious disease in the Elliot Memorial Building and University students and employees with contagious diseases.

The policy for the admission of patients to the hospital is defined in the Minnesota University Bulletin of May 1910. It reads:

"These temporary buildings provide some 43 beds for patients who are admitted to the service only upon the certificate of physicians of the state which testify to the applicant's inability to pay ordinary hospital charges and physician's fees and which state the character of the case. No paying patients are received."

Regulations were developed by the Sub-Committee on Hospital Management of which Dr. Charles Lyman Greene was chairman and Dr. S. Marx White and Dr. Warren A. Dennis members. The 16 regulations became a part of the application for admission to the hospital and thus a part of the patient's chart. These are a few of the sixteen:

a. The University Hospital will serve the interests of the poor of the State of Minnesota and especially the worthy and self-respecting poor. It has no provision for pay patients.
h. Such patients as are able to, shall assist in nursing or performing such other services, in or about the hospital, as will not injuriously affect them or interfere with their proper treatment.
l. Patients shall be in their proper places in the wards during the visits of the physician or surgeon on duty and always after 7:30 p.m., save when excused by the superintendent of the hospital.

In the Minutes of the Board of Regents and the President's Reports there are many interesting actions relating to the Free Dispensary, the development of the temporary hospital and the Elliot Memorial Hospital. Some of these are quoted:

February 20, 1907. The following resolution was presented:

Whereas, certain citizens of Minneapolis have subscribed and donated to the University of Minnesota the sum of $50,000 to be used in purchasing a site for the Elliot Hospital, and it is proposed to purchase for such a site a tract of land located at the intersection of Washington Avenue and the Mississippi River two blocks from the University Campus and embracing an area about ten acres of land.

There had been a University of Minnesota Free Dispensary at Seven Corners in Minneapolis since 1900. Governor Pillsbury had persuaded the legislature to purchase the land. An excerpt from the 11th Board of Regents Biennial Report ending July 31, 1900 is as follows:

"At the last session of the legislature the sum of $15,000 was appropriated for the erection and equipment of a clinical building. For many years this department has been carried on in an old two-story brick

building situated on the west side of river—just across from the University. The demands on the department had taxed its facilities to the utmost, and a new building was absolutely necessary.

May 2, 1907. "Resolved—That the Executive Committee is authorized to procure options on land required for the Elliot Hospital site and make purchase of same under proper appraisal by three competent appraisers to be paid for out of special fund of $50,000 donated by citizens of Minneapolis for said site.—Adopted.

"Voted—That one Waiting Room at the Free Dispensary, 1810 Washington Avenue South, be used by both the Homeopathic and Allopathic College of Medicine and the other Waiting Room be used for the Medicine Department."

May 15, 1909. "The question as to what cases of emergencies arising on the Campus should be received at the University Hospital and what should go to private physicians was referred to the Committee of Medicine and Surgery.

"Voted—That the Elliot Memorial Hospital be located West of Union Street and South Delaware Street near the brow of the hill.

"Voted—That the two Medical Buildings (Millard Hall and the Institute of Anatomy) be located just north of the Elliot Memorial Building."

June 7, 1910. "It was voted to approve the appointment of Dr. *L. B. Baldwin* of North Dakota as superintendent of the Hospital to begin work August 1, 1910."

August 10, 1910. The following resolution concerning the location of medical buildings was presented by vote of the Board:

"Whereas, The development of modern medical education demands and the history and experience of the leading medical institutions of this country and of Europe prove, that the medicine of today cannot be taught without large clinical facilities, and

"Whereas, The number of medical students being taught, or to be taught, within the most conservative estimates, during the next few years will require a hospital service of not less than four or five hundred beds and outpatient department of commensurate size and

"Whereas, A hospital service of such size requires from nine to fourteen pavilions and service buildings, including medical, surgical, obstetrical, children's wards, operating pavilions for special cases, administration buildings, nurses home, service buildings, morgue, etc., and

"Whereas, effective service, sanitary conditions and harmonious archi-

tectural grouping alike require that these hospital buildings shall occupy ample land areas in relation to the Elliot Memorial Building;

"Therefore, be it resolved that the faculty of the College of Medicine and Surgery enters its emphatic protest against the action of the Board of Regents in locating the two medical teaching buildings to be built in front of and upon the block occupied by the Elliot Building.

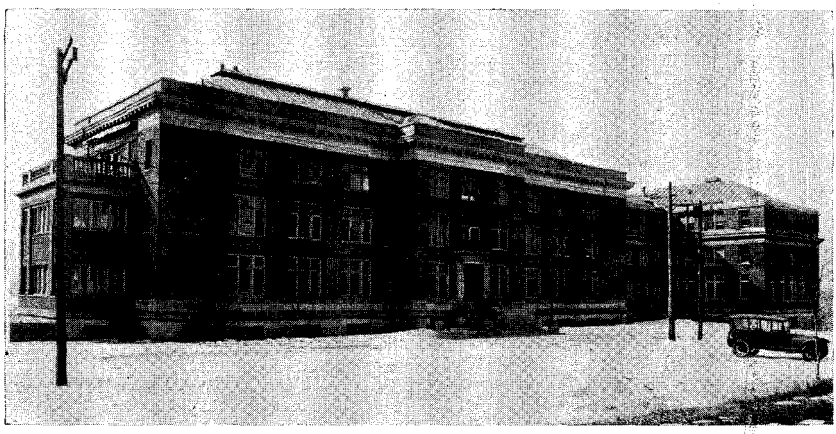
"Resolved—That this faculty renews its urgent request to the Board of Regents that these two new teaching buildings—Institute of Anatomy and New Millard Hall—provided for by the 1909 legislature, which are imperatively needed and should be begun at once, shall be so placed at this time that the block partly occupied by the Elliot Memorial be left open for future location of such a group of Hospital buildings as soon as money is provided for their erection; and that the location of other medical teaching buildings, which must follow in the new future, be left at this time an open question."

The construction of the Elliot Hospital began in the spring of 1910 and was completed in August 1911. It was four stories high, fireproof, and had 120 beds, 60 for Medicine; 40 for Surgery; and 20 for Obstetrics.

The formal dedication exercises for the Elliot Memorial Hospital were held September 5, 1911 in the University Chapel, Dr. *F. F. Wesbrook,* Dean of the College of Medicine and Surgery, presiding.

The following is quoted from his Address of Welcome:

"Today, we enter upon a new era and we realize that our faith in



Elliott Memorial Hospital with service wing

the people of Minnesota has been justified. As in the beginnings of State medical teaching, here again it only required that a few individuals should lead the way. The bequest of a successful and philanthrophic physician, the generosity of a group of citizens, the enthusiastic interest of alumni and Regents of the University and the united support of the medical profession in Minnesota have sufficed to show the people of our state what is at once their privilege and their duty.

"We have the beginning of a University Hospital system in the Elliot Memorial Hospital. It is the first of the group and is supported by adequate legislative appropriations. It will serve to demonstrate the further real need of the people in this direction, and we may expect to see a demand for service in more specialized lines that can be now accommodated.

"In the assumption by the people of their responsibilities, we cannot anticipate to what extent it may still be necessary for private beneficence to encourage state support. We may, however, rest assured that the people of Minnesota will not delay in the upbuilding of that portion of our University which, while seeking primarily to extend the limits of present medical knowledge and to train physicians and nurses for the care of our children and children's children, provides at the same time for the alleviation of suffering and pain and restores to independence and usefulness those who may have become a charge upon their friends or communities."

Dr. *J. E. Moore,* Professor of Surgery and Chief of the Department of Surgery, spoke on the "History of the Hospital Movement." Dr. *George E. Vincent,* President of the University of Minnesota, gave the dedication address; Mr. Frank M. Elliot, brother of Dr. Elliot, spoke on the Elliot Endowment; Mr. Elbert L. Carpenter spoke on the generous donors of the Hospital Site; Dr. Charles Lyman Greene, Professor of Medicine and Chief of Medicine, spoke on the "Education Value of the University Hospital"; Dr. Rollo C. Duggan of Eyota and Dr. E. L. Tuohy spoke on behalf of the medical alumni; Dr. W. J. Mayo spoke on the economic value to the state and Dr. Richard Olding Beard spoke on the School for Nurses at the University of Minnesota Hospitals.

The brochure prepared for this ceremony stated that "The superintendent of the University Hospitals, Dr. L. B. Baldwin, then invited his guests to a formal inspection of the Elliot Memorial Building."

It also contains the statistics of the Hospital service covering the entire period of its history.

STATISTICS

Number of patients admitted to the temporary hospitals from the date of organization to the opening of the Elliot Memorial building (March 22, 1909 to September 5, 1911)	952
Number of patients admitted to the Elliot Memorial building from the date of its opening to close of first year (September 1, 1911 to July 31, 1912)	912
Total admissions	1,864
Number of counties in the state represented by such patients in both temporary and Elliot hospitals	79
Number of patients discharged throughout the entire period	1,665
Number of patients died throughout the entire period	123
Number of patients remaining in the hospital July 31, 1912	76
Number of clinics held	734
Number of operations performed	966
Number of new patients admitted to the outpatient department:	
From Aug. 1, 1909, to July 31, 1910	4,206
From Aug. 1, 1910, to July 31, 1911	6,636
From Aug. 1, 1911, to July 31, 1912	9,229
Total number of visits of patients at the outpatient department:	
From Aug. 1, 1909, to July 31, 1910	15,110
From Aug. 1, 1910, to July 31, 1911	24,223
From Aug. 1, 1911, to July 31, 1912	33,190
Average attendance per diem	109
Number of prescriptions filled in the outpatient department:	
From Aug. 1, 1909, to July 31, 1910	7,954
From Aug. 1, 1910, to July 31, 1911	10,777
From Aug. 1, 1911, to July 31, 1912	13,513

In the fall of 1912, the Executive Committee of the Medical School voted to approve the establishment of an optical department at the Outpatient Department of the University Hospitals with the understanding that the service was to be self-sustaining.

In June, the Board of Regents voted to use $5,500 from the repair fund to prepare quarters for the University Dispensary in the basement of Millard Hall. The move was completed in September, 1915, funds for the new Millard Hall having been approved by the legislature of 1909.

10¢ Per Outpatient Visit Charged

The Superintendent of the hospital was authorized in 1915 to institute a fee system in the Outpatient Department. Beginning July 1st, in addition to the prescription fee, a charge of 10¢ per patient per visit was initiated.

The Report of the Medical School to the President for 1912-1913, as presented by Dr. R. O. Beard, Secretary of the Medical School, tells of the growth of both the inpatient and outpatient services. The hospital had a waiting list of 20 to 30 and the clinic was congested. Dr.

Beard also stated that it was not possible to treat all patients or to use them for clinic instruction.

At this time, there was recognition of the need to seek close cooperation with the work of the Visiting Nurse Association. A committee of the faculty was appointed to study the social service side of the hospital and outpatient work. Miss Annie Laurie Baker, in "Fifty Years of Social Service at University Hospitals," a paper she gave at Staff Meeting in May, 1963, comments that "this was a progressive move as the first department in the country had been started at the Massachusetts General Hospital in 1905. The crowds of "sick poor" who were unable to follow medical recommendations and lacked the basic essentials of life were of great concern to the doctors."

In the Report of the Medical School to the President for 1913-1914, Dr. Baldwin expresses concern over the existence of waiting lists and the fact that this frequently caused ill feeling toward the hospital, which was unavoidable because of insufficient capacity. His last sentence in the report said: "In order to properly provide for the admission of patients entitled to care at the University Hospital and to meet the teaching requirements of the Medical School, its capacity should at least be doubled, and should include adequate divisions for children's diseases, women's diseases, contagious, nervous diseases and obstetrics before our students can be assured of teaching of the highest order."

That same year, the Outpatient Department had 13,575 new patients—47,347 visits with an average daily attendance of 155.21. In the report to the President, both Dr. Beard and Dr. Baldwin emphasized the need for additional hospital beds and a new outpatient facility. The building at 1806-10 Washington had been outgrown, and they considered it essential that there be a larger facility and that it be located near the medical campus.

A service wing costing $65,000, of which $50,000 was appropriated by the 1915 legislature, enlarged the hospital facility. At this time, the kitchen, dining room, and drug room were moved from the first floor into the service wing, and the laundry, from one of the houses acquired originally, into the Elliot Building. The first floor was remodelled into wards for male surgical patients, thus increasing the capacity of the Hospital to 192 beds. In the remodelling, a larger morgue was provided and equipped which made it possible for autopsies to be done in the hospital instead of in the Pathology Building.

In July, 1916, interns were moved to the Roof House of the Service Building, funds for the Roof House having been provided from the Reserve of the Medical School. The area from which they were moved then became laboratory space for the Department of Medicine. A small room on the third floor was also equipped for routine blood examinations and urinalysis; this enabled the medical students to do laboratory work on their patients.

The First "Pay" Patients

A notation from the President's Report of 1918-1919 states:

> "The School, with the approval of the Board of Regents, has assigned 50 beds in the Elliot Memorial Hospital to the use of patients able to pay per diem charges, thus introducing the plan which is to be applied to further extensions of the hospital service. The Admissions Board of the Medical School has again recorded its judgment that the University Hospitals should have an increase to not less than 550 beds, with the necessary accompaniments of housing for nurses and enlarged admission and service features. The Social Service Department, organized two years ago, has proved its great value."

The staff of the University Hospital was badly depleted during the years of the First World War with the organization and departure of Base Hospital 26. Dr. Baldwin also was in government service.

During 1918, patients seriously ill with influenza also nurses and hospital employees were admitted to the hospital for care, and there were many deaths.

The Medical School Report of 1919-1920 to the President states:

> "The Outpatient Department shows a small decrease in the number of new patients treated, but a relatively large increase in the average number of visits these individuals made to the dispensary. This increase is due in larger part to the activities of the Social Service Department and local agencies in securing better attendance on the part of the patients."

The County-State plan for caring for indigent patients who were residents of Minnesota was inaugurated in 1921 with the passage of the law that patients be referred by their family physicians and be certified for care by the Judge of Probate of the County of residence.

In 1923, the legislature amended the general hospital bill and desig-

nated the county commissioners rather than judges of probate as officials authorized to certify to patient's eligibility under the law. *This meant that the hospital could bill the county for one-half of the patient's bill, the balance being chargeable to the state because of the state appropriation.*

MINNESOTA GENERAL HOSPITAL ESTABLISHED

In 1921, under statute, the Minnesota General Hospital was established. The law states, "The hospitals now and hereafter established in connection with the Medical School of the University of Minnesota shall be known as the Minnesota General Hospital.

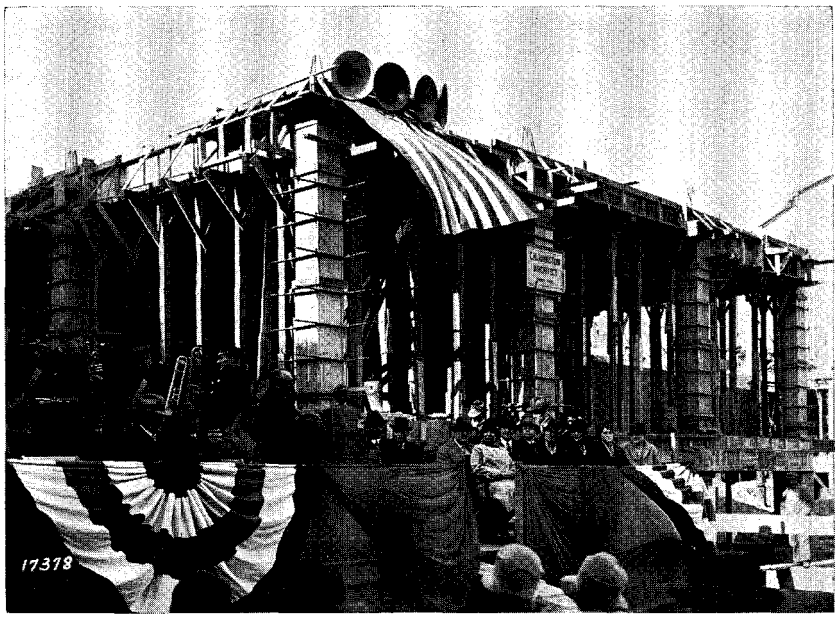
Session Laws of 1945, Chapter 563, record the name as being changed by statute to University of Minnesota Hospitals, the name by which it is now known.

TODD HOSPITAL AND THE CANCER INSTITUTE

In 1923, the Board of Regents accepted gifts from Mrs. F. C. Todd and friends of Dr. Todd for the addition of an eye, ear, nose and throat hospital. Dr. Todd, Chief of Ophthalmology and Otolaryngology at the University of Minnesota Medical School, was a colonel in the Army and commander of Base Hospital 26 at Fort Dodge, Iowa at the time of his death. Among his papers, notes were found about a hospital for eye, ear, nose and throat patients which he desired to found. Mrs. Todd and friends of Dr. Todd wished to carry out his plans and wanted the hospital, when built, to be a memorial to him. The building of Todd Memorial began in the spring of 1924. With its opening, the Medical School was provided with a hospital amphitheater.

The same year, the Board of Regents also accepted a gift from Mrs. George Chase Christian, through the Minneapolis Citizen's Aid Society, $250,000, for a cancer institute; $200,000 was for the building and $50,000 for the purchase of an x-ray machine and radium. The terms of the gift included the statement that some of the beds would be used for patients financially able to pay.

On Wednesday, October 1, 1924, the cornerstones for these two hospitals were laid with suitable ceremonies. Dr. Arthur D. Bevan, Chairman of the Council on Medical Education of the American Medical Association, who was the speaker, told those present that "you have the opportunity of developing here one of the greatest medical schools in



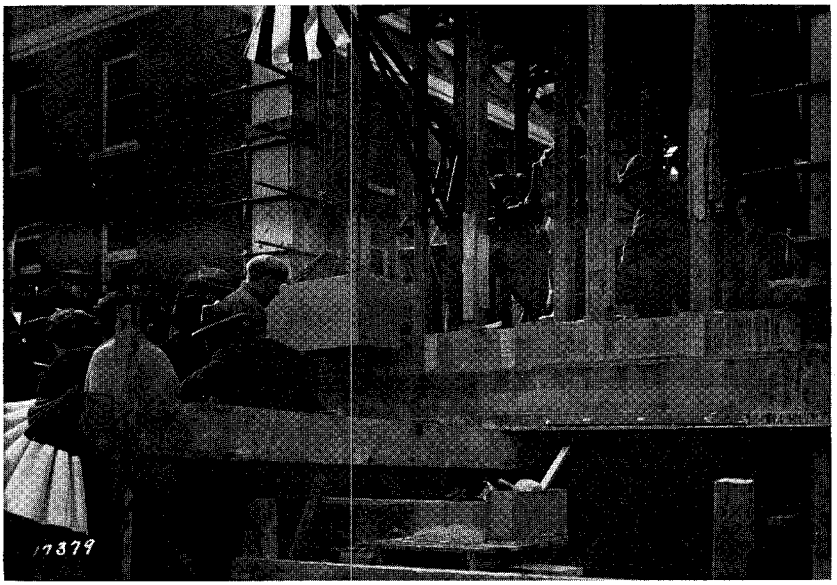
Laying the Corner Stone for the Cancer Institute and the Todd Memorial Hospital

the world." Outlining his plan for attaining this he said, "Conduct it so that it will not only train general practitioners of medicine, specialists and research men, but so that it will secure for the people of the state the best preventive and curative medicine. Seek to master the great unsolved problems of the cause, the prevention and cure of diseases so that from your laboratories and clinics there will come some great medical truths that will prove a service to all mankind."

Dr. A. C. Strachauer, Chief of the Department of Surgery, laid the cornerstone for the Cancer Institute, and Dr. W. R. Murray, Chief of Ophthalmology and Otolaryngology, the cornerstone for the Todd Memorial. Thus, 90 beds were added to the Elliot Memorial Hospital—50 for patients afflicted with cancer and 40 for patients with eye, ear, nose and throat ailments. These two hospitals adjoining each other were opened in September, 1925.

EUSTIS HOSPITAL ADDED

In June of 1923, the same year the gifts of Mrs. Todd and the Citizens Aid Society were accepted by the Board of Regents, Mr. William Henry



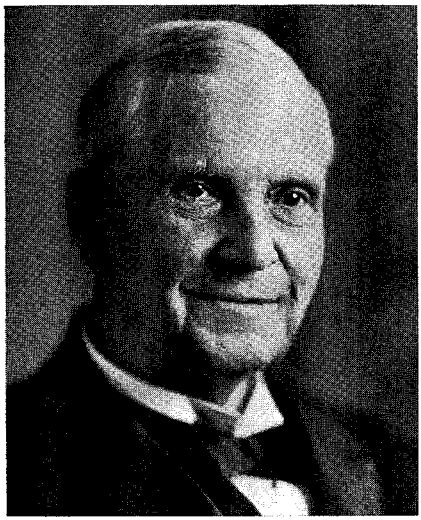
Laying of the cornerstone for Eustis Hospital November 10, 1928

Eustis offered the University land on the West River Road and other property totaling $1 million for the construction and support of an institution to be known as the Minnesota Hospital and Home for Crippled Children. The cornerstone was laid on November 10, 1928. *The Minnesota Alumni Weekly,* Vol. 28, 1928-29, pages 195-196, describes the event:

"Cornerstone Laid for Crippled Children's Hospital—With impressive ceremony, enriched by a warmth of human appeal, the University of Minnesota, Saturday, November 10, (1928) dedicated its new $250,000 hospital for crippled children, the gift of William Henry Eustis of Minneapolis, and through its official spokesman, paid tribute to the philanthropist and former mayor as 'one of Minnesota's great men'—a noble benefactor, unselfish in his generosity in his enduring service to education and in his love for unfortunate children.

"William Henry Eustis, himself crippled since boyhood, overcame physical obstacles to attain the business and financial success which made possible his donation of the quarter million dollar building for the treatment and care of maimed and sick children. . .

"His brother, Gardner T. Eustis, was present and acted for the donor. . . He also accepted on behalf of William Henry Eustis an en-



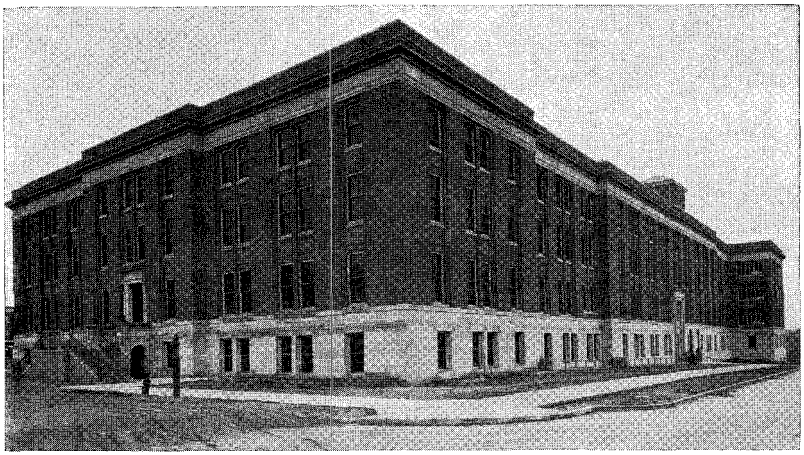
William H. Eustis

graved scroll of parchment, the physical symbol of the gratitude, respect and affection of the regents, faculty, and students of the University and of the people of Minnesota.

Speakers on the program were Mr. Fred B. Snyder, President of Board of Regents, who was Master of Ceremonies; Dr. John E. Bushnell, minister of Westminster Presbyterian Church, who gave the invocation; Dr. Lotus D. Coffman, President of the University of Minnesota, who presented the testimonial; Dr. Charles H. Mayo, who was the principal speaker, and Dean E. P. Lyons, representing the Medical School. Music was played by the University band. Nurses from the University Hospitals were present in uniform. During the program, Mr. Snyder addressed a few words directly to Mr. Eustis over the radio which carried the message to the former mayor's sick room. . .

The ceremony was characterized by Dr. Mayo as a 'great event in the history of education and a new demonstration of the growing belief among wealthy men that their riches are not entirely their own, but belong in part to the community in which they were acquired.' "

The Hospital was formally opened October 1, 1929, and the outpatient department moved from Millard Hall to the new facilities on the first, second and third floors adjacent to the Eustis wing during the same month.



Eustis Wing, Outpatient Department, Gynecology and Obstetrics, Student Health Service

The fourth floor, above the outpatient department, housed patients on the gynecological service, and the fifth floor, patients on obstetrics. The Students Health Service on the North end, with outpatient and office facilities on the first, second and third floors, isolation on the fourth floor, and beds for students needing hospitalization on the fifth floor, was dedicated with appropriate exercises on October 1, 1929.

PSYCHIATRIC CLINIC FOR CHILDREN

The need for a psychiatric unit for the study of mental illness had long been recognized, and funds for construction and operation had been sought recurrently in legislative requests. Finally, with state and federal funds, a 37-bed unit was completed, and Mrs. Mabeth Hurd Paige admitted the first patient on April 27, 1937. She was on the Health and Welfare Committee of the legislature for many years and was thus able to keep the need for such a unit before the members of her committee. Mrs. Paige entered into her political career in 1922 and never relinquished her interest in mental hygiene.

The psychiatric unit for children was established in October, 1938 by grants from the Commonwealth Fund of New York and the Stevens Avenue Home of Minneapolis. It was located on the 6th floor above the pediatric stations.

Dr. Reynold Jensen, in his paper given at the first annual meeting on

November 20, 1939, reports: "The organization of the clinic as an integral part of a Medical School is unique in the history of psychiatric work with children. To our knowledge there is only one other clinic such as ours and that has only recently been established at Stanford University, California."

There were children needing hospitalization for study, but such facilities were not available. In a few instances, children were admitted to the pediatric stations, and occasionally to the adult psychiatric ward, particularly those who were a concern to the community. The need of a ward for study and diagnostic work was evident.

In 1948, facilities for physicians to see private patients on the sixth floor were created by moving the interns from the sixth floor into Powell Hall. When the health service moved into their new building in 1950, the sixth floor clinic was moved to the health service area, and the clinic became known as North Clinic. It was at this time that the sixth floor area was remodelled for the Children's Psychiatric Hospital. The 1951 legislature made a grant for such a unit, and on October 7, 1952 the first child was admitted to the inpatient Child Psychiatric Hospital. It contained twenty-four beds and was primarily a diagnostic center where a general survey of each child's problems could be made.

Until 1948 or 1949, when plans for the Mayo Memorial Hospital were initiated, there was little construction. World War II, the poliomyelitis epidemics, and two strikes caused serious disruptions to the day-to-day operation of the Hospitals and the teaching programs of the various departments.

The war again took many doctors and nurses as it did in 1917. The formation of Base Hospital #26 for World War II was authorized, and members of the College of Medicine and Dentistry volunteered for service, as well as many nurses, both from the University Hospitals and hospitals throughout the state.

Meantime, the Cadet Nurse Corps was started. The University Hospitals was a training laboratory for this program as well as for medical students who were in the Army and Navy.

The lack of graduate staff posed many problems for the Hospital Nursing Service Department. The American Red Cross trained aides, gray ladies and dietetic aides, whose work was closely integrated with that of the regular staff of the Hospital, and with their assistance essential services to patients were provided.

COMBATTING POLIOMYELITIS

The epidemics of poliomyelitis caused the Hospitals to strain its resources to assist local communities in the care of patients. A diagnostic clinic was set up where most patients were examined on arrival. The Sister Kenny form of treatment for poliomyelitis had been accepted, and the *Staff Bulletin* of October 2, 1942 states that it was "functioning effectively." During the first epidemics, Sister Kenny was a familiar figure in the University hospital wards, visiting the patients daily. From the time of the outbreak of the first case in 1946—the year of the greatest polio epidemic in the State of Minnesota—until June 1947, 753 patients were admitted to the hospital.

Rosemount Hospital at Rosemount Research Center, with a capacity of 100 beds, was opened January 2, 1947. It remained in operation until June 30, 1948 for patients needing further treatment at the end of the acute contagious stage of the disease.

The Hospital was financed by the National Foundation for Infantile Paralysis, staffed by the various departments of the Hospitals and administratively operated as a part of the University of Minnesota Hospitals.

Again, in 1948-49 and in 1949-50, large numbers of patients with poliomyelitis needing to go into respirators were admitted. Stations 50, 49 and 35 of University Hospitals were given over almost entirely to patients in respirators. The National Foundation for Infantile Paralysis, as in previous years, assisted with the expense, and the American Red Cross assisted in recruiting nurses.

LABOR PROBLEMS

In October, 1942, the service employees of the University Hospitals belonging to Local 113, together with other University service employees, went out on strike. This first strike lasted two days, and the second one, called January 13, 1944, lasted five days.

Mr. Ray Amberg's memorandum on the strike dated October 9, 1942 gives a good picture of the situation within the Hospitals:

> "Shortly after 12:01 a.m. Saturday, October 3, the service employees of the University of Minnesota Hospitals ceased work. The first service to be interrupted at the Hospitals was the delivery of ice and oxygen to the patients. The next report received by the superin-

tendent of the Hospitals was that there were only five people in the kitchen, three of whom were union members and two non-union members, to serve meals to approximately 375 patients and 450 other people consisting of interns, graduate nurses, student nurses, technicians, and others concerned with the professional care of the patient.

At noon, the situation became so bad, there being no regular dishwasher, no elevator operators, no ward maids, no floor maids, no laundry operators and only four or five employees to distribute the food from the central kitchen to the patients, that it was decided to evacuate the patients in their best interest. No patients whose recovery would be prejudiced by moving from the Hospitals were removed. By the end of the first day, approximately 100 patients were evacuated either to rest homes or residences of relatives or friends. The following day, the situation was even worse in regard to the amount of help available for service, so the evacuation of the patients was continued. By Tuesday morning, the number of patients at the Hospitals had been reduced to about 170. On Monday, October 5, approximately 85% of the service employees returned to duty at the request of Governor Stassen.

The members of the medical and other members of the professional staff of the Hospitals, who were anxious to resume the operation of the Hospitals, but due to the statement made by the business representative of the union that they reserve the right to strike again, even after having been told to return to work by the Governor, did not wish to submit the patients to the hazard involved in transferring them in and out again.

Wednesday, October 7, cases of an emergency nature were admitted and the Hospitals resumed partial normal operation. Later on in the day, on reassurance by telegram from Governor Stassen and upon instruction from Dean Diehl, normal operation was planned and resumed. By Monday or Tuesday, October 12 or 13, the Hospitals should be near capacity operation again."

The second strike became effective at midnight the 13th of January, 1944. Pickets were stationed at approaches to the Hospitals and refused admission to employees in the service groups; other employees were challenged but not prevented from entering the Hospitals. As in October 1942, the Hospitals were full to capacity—patients to be cared for and fed and at least 300 nurses and doctors to be fed. Since there were Navy and Army men on the campus, for whose medical care the Health Service was responsible, two Navy cooks were assigned to the

hospital kitchens. As in the previous strike, admissions were limited to emergencies only, and as many patients who could go home or to nursing homes without impairing their chances of recovery, were discharged. On formal request to their Executive Committee, the Hennepin County Chapter of the American Red Cross furnished Red Cross volunteers, canteen workers, nurses aides, and dietitian aides who assisted with the care of the patients, together with the preparation and serving of food to patients and staff. After conferences with union leaders, and later with the Hospitals Administrative staff on Monday the 17th, the following announcement was released to the public:

> "The authorities of the University Hospitals, with the cooperation of Public Building Service Employees Union Local 113, are in a position to announce that the University Hospitals is now functioning normally and is prepared to receive patients as usual".

On Tuesday, hospital services functioned normally, and by the end of the week the Hospitals were fully occupied again. The medical staff and University faculty members offered their services on both occasions for cleaning, serving trays or any other needed task they could perform.

The two strikes were called because of inability to reach a formula for arbitration between the University and the Union, and a third one threatened for an increase in salary, a 40-hour week and union recognition. Fortunately, the third one did not materialize, the settlement being an agreement by the University to a study of wages, hours, benefits, et cetera by the Public Administrative Service.

Legislation resulting from these strikes was the Charitable Hospital Act of 1947 which prohibits strikes and requires compulsory arbitration of labor disputes not settled by conciliation.

NEW CONSTRUCTION

Though there were no units constructed from 1937 to 1951, plans were under way for both the Variety Club Heart Hospital and the Mayo Memorial Hospital.

Due to the conversion of Lymanhurst Hospital into Sister Kenny Institute for patients with poliomyelitis, it became necessary to make new arrangements for the Minneapolis Heart Clinic which had been housed in the old Lymanhurst Hospital. Dr. Morse J. Shapiro had been in charge for many years and was deeply concerned about the

continuation of a program which screened children who came to the clinic for examination because of early heart disease.

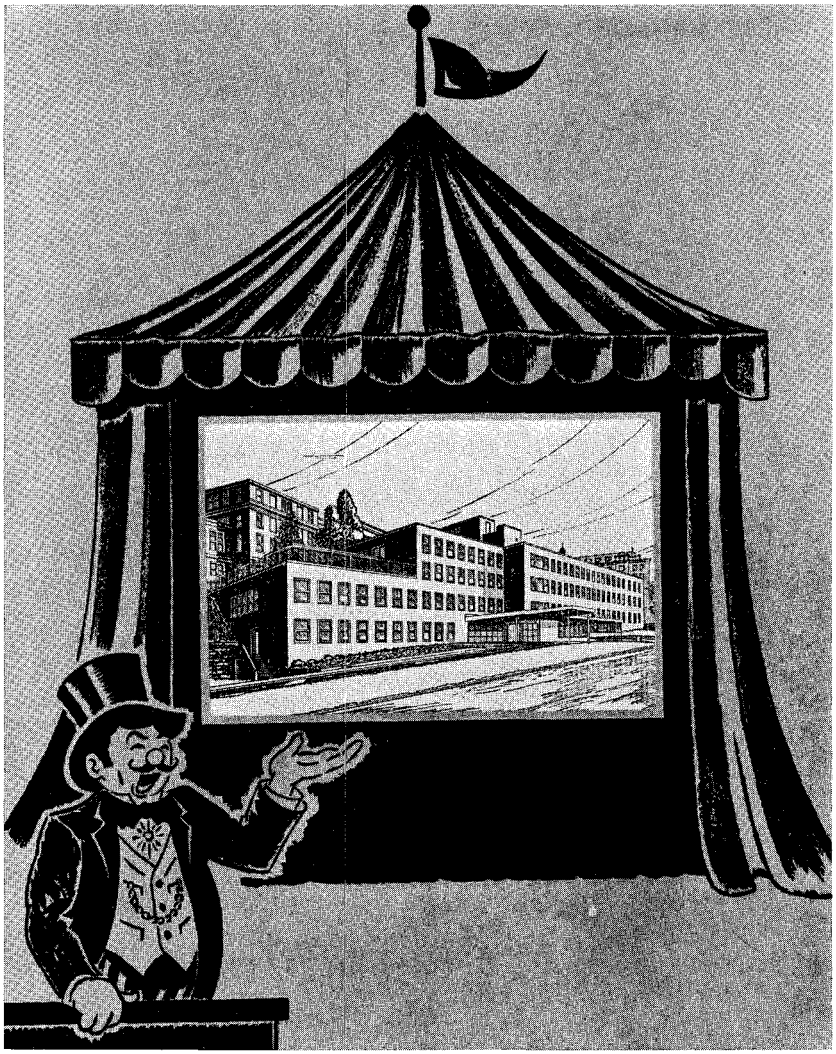
In 1945, Mr. Al Steffes, a Variety Club member, was in the office of Dr. Shapiro for treatment of a heart condition. He became interested in Dr. Shapiro's problem and in the number of children and adults urgently in need of treatment and care for heart ailments and of the need for research. Out of their conversations with each other, and then with members of the Variety Club of the Northwest, the idea of a hospital to be devoted to treatment of heart conditions developed. This organization of show people liked the idea and immediately started to plan. On September 29, 1946, the Variety Club made a progress report at a dinner at which President Morrill presided and the late Mr. Fred Allen was a guest. The purpose of the dinner was to turn over $250,000 to the University and to pledge money for the support of the hospital. This sum later grew to almost $500,000.

In addition to the contribution from the Variety Club, some funds were provided for the new hospital through the National Institutes of Health of the United States, from the Hospital Construction Act (Hill-Burton) administered by the Department of Health, Education and Welfare, and the University. Interested groups and private individuals sponsored research and the purchase of equipment. The site chosen was on the north bank of the Mississippi on a prominence overlooking the river. The hospital is nestled into a hill, connected by a bridge with the University of Minnesota Medical Center and, at the time of its construction, the only hospital in the nation developed exclusively to treatment of heart ailments.

A unique feature in this hospital—built by show people—is a fully-equipped theatre specially designed to accommodate patients in wheel chairs, on litters or in beds. The movies shown every Friday afternoon are provided through the generosity of men of the Variety Club.

The Heart Hospital opened March 18, 1951 with the transfer of patients from the main hospital with open house and dedication March 19 and March 20th.

Actress Loretta Young was at the dedication dinner representing the motion picture industry. The program for the dinner, which was a centennial event for the University of Minnesota, was a colorful one to which the programs can attest—Tent No. 12—The Variety Club of the Northwest—with its Chief Barker (President) and Dough Guy



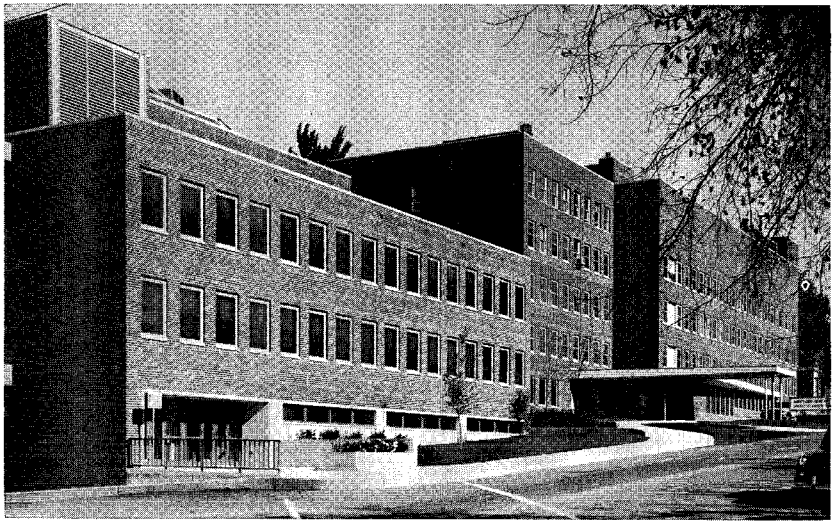
Cover page of brochure prepared for Variety Club Heart Hospital Dedication dinner on March 20, 1951

(Treasurer) and its members drawn from all aspects of show business—theatre owners and managers, radio, television and screen performers, attorneys and distributors have maintained their interest and dedication to the program, asking frequently how they can be of service to patients in their unit, no project being too large for them or their auxiliary.

The origin of the Variety Club is unusual and interesting. Beginning

in Pittsburgh, eleven young showmen met regularly for social reasons. On Christmas eve in 1922, a year after their organization, a baby was abandoned in the theatre, and these young men substituted service for social fellowship and adopted the child. They also adopted the motto, "A Little Child Shall Lead Them," now the motto of the Variety Clubs.

In seven or eight years, research facilities became inadequate, and the members of the Variety Club of the Northwest responded to the need for more facilities for research. On January 12, 1959, the fifth floor, the Arthur W. Anderson Floor, was opened. Mr. Anderson had been Chief Barker in 1945, 1946, 1950 and 1951. The University Citation presented to the Variety Club of the Northwest at that time reads, *"Thus the warm and responsive people of show business became veritable pioneers on the frontiers of medical discovery."*



Large addition to Variety Club Hospital (1964)

Again, in the spring of 1964, the Variety Club provided for construction of a large addition to increase the diagnostic and treatment facilities of the hospital. This addition, costing $1,200,000, was occupied in 1966. Thus, the Variety Club of the Northwest and the University of Minnesota have received recognition nationally and internationally for the fine scientific contributions which made possible the treatment and restoration to health of children and adults with serious heart defects.

THE MAYO MEMORIAL

Concurrently with the planning and building of the Variety Club Heart Hospital, a monument to Dr. Charles Mayo and Dr. William Mayo was being planned.

In 1939, shortly after the Doctors Mayo had died, Governor Harold E. Stassen appointed a Mayo Memorial Commission to propose a fitting memorial to them. The recommendation of the committee was that a center for teaching and research be erected on the Campus. The legislature wished to participate in the memorial and authorized the appointment of a Commission of Founders headed by Dr. Donald J. Cowling. Funds came from successive legislative appropriations, from the United States Public Health Service, and individual donors. On July 5, 1950, when the University's 100th birthday was celebrated, the ground breaking for the Mayo Memorial took place. President J. L. Morrill turned the first shovel of dirt, and Dr. Cowling was the principal speaker. The plans called for a 22-story tower and space for 175 beds. However, because of the rise in building costs due to the Korean War, together with the shortage of labor and material, construction was delayed and the plans changed, the twenty-two story tower being reduced to 14 stories. (See Chapter XVI.)

The dedication brochure for the Mayo Memorial October 21 and 22, 1954 says of the new building:

> "Towering fourteen stories above the University of Minnesota Medical Center stands the Mayo Memorial, Minnesota's newest monument to the progress of medical science. By its physical location, the building forms a structural bridge between the University of Minnesota Hospitals and the Medical School quadrangle. Symbolically, it enhances the 66-year tradition of education, research, and service which has marked the College of Medical Sciences as one of America's foremost medical centers.
>
> "As it stands, the Mayo Memorial comprises a 14-story tower section and three six-story wings that connect with existing hospital and medical school buildings. Its facilities include classrooms, clinical and administrative offices, research laboratories, operating rooms, 104 beds, service departments, a 550-seat auditorium, and a two-level underground garage with parking space for 250 cars. In connection with existing University medical facilities, it forms the heart of a complete medical center virtually under a single roof. (See Chapter XVI.)

"Of the Mayo Memorial, Dr. Harold S. Diehl, Dean of the College of Medical Sciences, has said, "In its uses, present and prospective, it represents a pledge and a living token of the determination of Minnesota doctors and laymen alike to continue the lifelong effort of the Doctors Mayo to provide better medical service for all people."

Dr. Diehl presided at the banquet and Dr. Charles Mayo spoke for the Mayo family. Dr. Alan Gregg, Vice President of the Rockefeller Foundation, was guest speaker, his subject being, "Learning." Public tours were given and lectures were held in the new auditorium, the overall theme being, "Medical Education and Research: Freedom and Progress in the 20th Century."

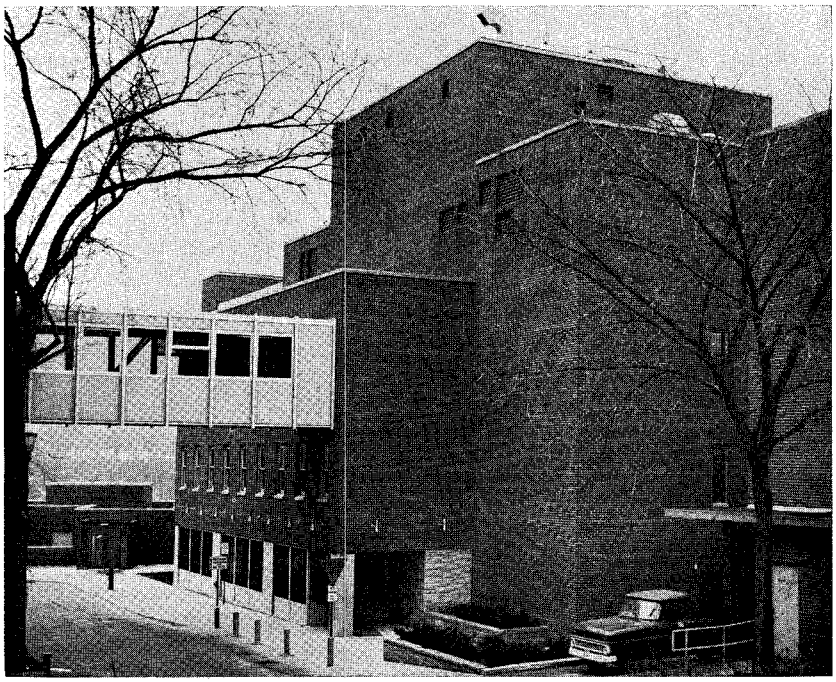
CHILDREN'S REHABILITATION CENTER

Though the Rehabilitation Section on the seventh floor of the Mayo provided excellent facilities for patients, the area was soon outgrown and more room was necessary for the hospitalization and treatment of children and for the training of professional people in the rehabilitation field. The Children's Rehabilitation Center, built at a cost of $2,050,000 was started in the fall of 1962 and completed in the late summer of 1964. Some monies came from the endowment fund of Mr. William Henry Eustis' gift to the University, some from Crippled Child Relief, Inc., some from individual donors, and the balance from the federal Hill-Burton Hospital Construction Act for Chronic Hospital and Rehabilitation patients.

The official opening was on November 7, 1964 with Miss Mary E. Switzer, Commissioner of the Vocational Rehabilitation Administration of the United States Department of Health, Education and Welfare, the speaker. The hospital, located on the East River Road, is seven stories high, connected with the Eustis wing of the Hospitals by an enclosed walkway between the sixth floor of the Children's Rehabilitation Center and the third floor of the Hospitals.

The building was carefully and thoughtfully planned. The surroundings were designed to be as homey as possible, and the treatment facilities to be such that children with physical disabilities could be treated and also taught to be as independent as possible.

It has fulfilled a great need and afforded treatment for children who might always have remained totally dependent.



Children's Rehabilitation Center officially opened November 7, 1964

MASONIC MEMORIAL HOSPITAL

The need for facilities for persons with cancer and other serious long-term illnesses was recognized by Minnesota's Masonic Order. The Administration of the College of Medical Sciences was approached by Dr. Donald Cowling, President Emeritus of Carleton College, with the idea that the Masonic groups in Minnesota were interested in providing a facility for patient care on the University of Minnesota campus.

Early in 1955, Dr. Harold S. Diehl, Dean of the College of Medical Sciences, Mr. Ray Amberg, Director of University Hospitals, the late Chief Justice Mattson, the late Dr. Carlos Del Plaine, and members of the Hospitals medical staff met to discuss the need of such a chronic disease facility. Miss Annie Laurie Baker, Director of the Social Service Department, supported the idea, as it was her department which was involved in the placement of terminal cancer patients, and there were few suitable places available.

The ground for the new hospital was broken on Walnut Street in May

1957, the ceremony being in the tradition of Masonry. The first patient was admitted October 15, 1958.

An article entitled "Three-Year Evaluation of a Subacute Hospital at the University of Minnesota Masonic Memorial Hospital," by Dr. B. J. Kennedy and Mr. John Westerman, describes the facility:

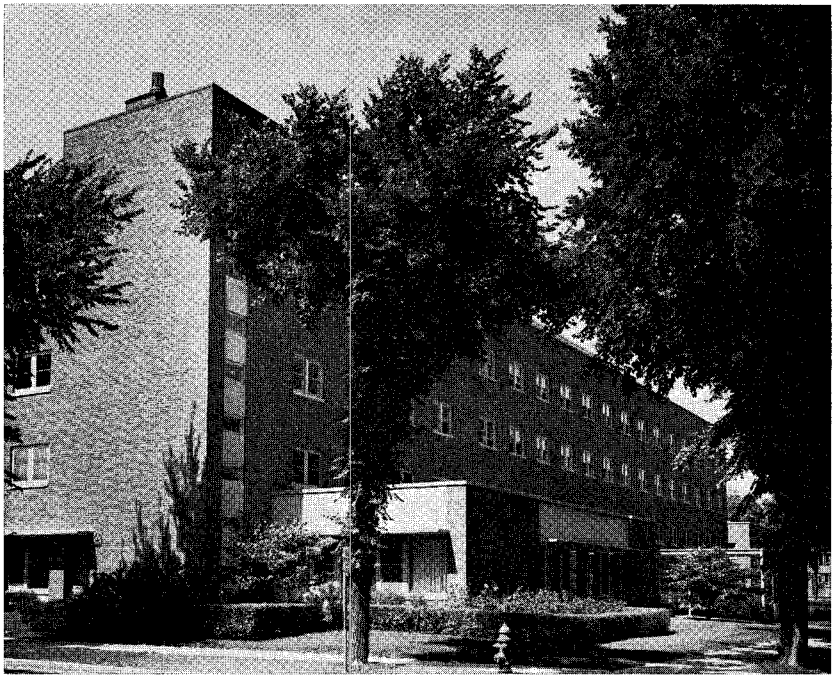
> "The intent of the design was to provide an environment in which the finest quality of medicine could be practiced and a hospital unit with all of the latest diagnostic and therapeutic tools, yet with a design incorporated to create a pleasant atmosphere for patients. To accomplish this the building was constructed as a separate unit of the University Hospitals. A connection to the main hospital by tunnel affords the unit the advantage of centralized administrative and medical services and provides an atmosphere in which good chronic care can be practiced."

The hospital has three floors with 30 beds on the first floor and 50 beds on the second. Special features of each room include a private toilet equipped with handrails, clothes lockers and telephones. In the corridors, there are handrails on each side. There is a large lounge on the first floor adjacent to an occupational therapy room. The lounge, like the patient rooms, is tastefully furnished. It has a piano, television set and a stereophonic record player. The dining area is off the lounge, and the areas share a two-way fireplace which is frequently used.

In May 1963, the Masons, renewing their dedication to hope and wishing to aid in the search for means to alleviate suffering launched another campaign to raise $1 million to build two additional floors—the third floor to house forty patients, including beds for five children, and the fourth floor for new laboratory and research facilities. It was recognized from the first that research, being a stimulus to the staff, was an important part of the operation of the hospital.

"Roof Raising" ceremony for the two additional floors occurred March 17, 1965. Though this was the day of the worst blizzard of the season, the attendance at the reception and the dinner given by the University honoring the Masons, was heart warming.

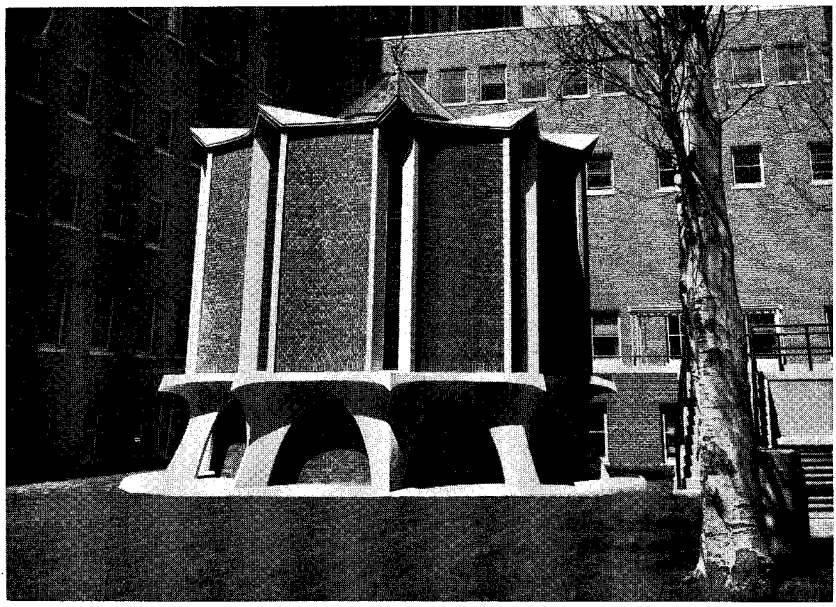
The "Victory Jubilee" on April 19, 1966 was a colorful event. The Masons of Minnesota officially presented a solid gold check of $1,100,000 to the University of Minnesota to pay the full cost of the addition, the second goal of the Masons of Minnesota. Construction was completed in September, 1966.



Masonic Memorial Hospital

The unit has far exceeded the expectations of the staff. Comfort and encouragement have been given to many patients and their families. The Masons have provided a hospital with a cheerful environment for patients while receiving treatment and care for their serious illnesses, as well as facilities in the addition for further research and study.

The most recent addition to the Medical Center complex, finished in the Fall of 1965 is the Meditation Room—joined to the hospital proper by an enclosed vestibule. Funds for the room were given to the University by the family of a patient who had been hospitalized for a considerable length of time before his death. During many anxious hours of waiting, the family felt a need for a quiet place to think and talk, a place apart from the hospital proper, for meditation. It is a room of unusual design and beauty. The donors, who wish to remain anonymous, wanted the room to have a peaceful, religious atmosphere but to be non-denominational in architecture. Groupings of chairs make it possible for several persons to use the room at one time. The two-story interior is ten-sided as were the tabernacles in the Old Testament and

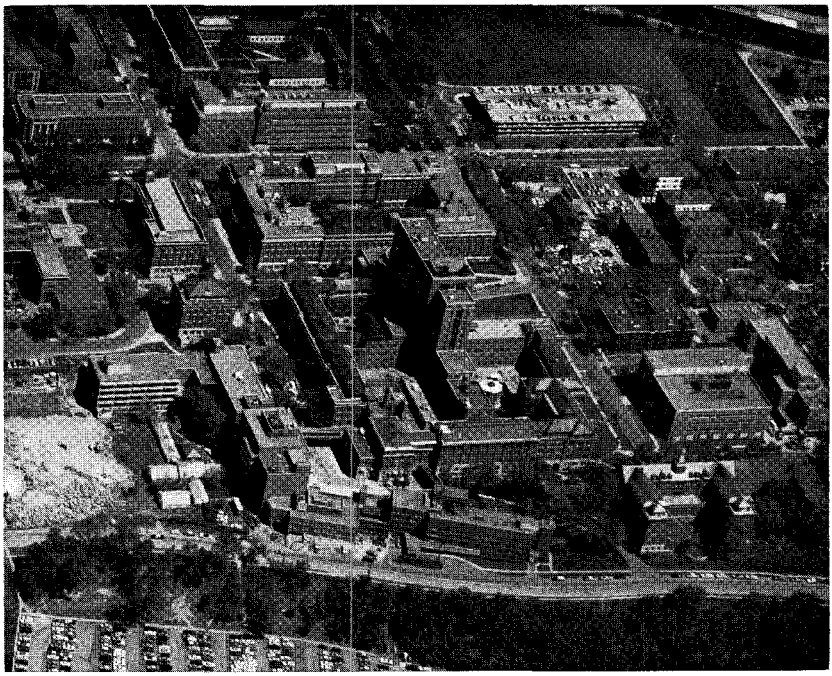


Meditation Room

the places of worship of the Moslems. The walls are of colonial brick separated by narrow windows of stained glass, the color of the glass ranging from green and brown and red to the blue of the sky as one raises his eyes to look upward. A stained glass dome forms the top of the structure with a burning bush, symbolizing hope, on the exterior of the dome.

Though called a Meditation Room, it is actually a separate structure built in an inner court off the Mayo lobby where so many worried families wait hour after hour for news of loved ones who are seriously ill. It fills a real need—a quiet retreat from the busy hospital where one can meditate, talk with physicians caring for patients and with clergyman serving their spiritual needs.

The University Hospitals today consists of 13 units. This large complex of hospitals, designed to care for patients with a wide range of problems, was made possible through the foresight and efforts of many people. Appreciation should be expressed to the members of the legislature in providing funds for building and remodeling over the years, as well as for their understanding and support of the day-by-day operation of the Hospitals. Many individuals and groups of individuals have



Airplane view of *University* Hospitals 1966

contributed most generously of their gifts, their time, their understanding and their cooperation.

The Hospitals have had loyal and competent department heads who have constantly sought improvement in patient care. The teamwork of the staff, both professional and non-professional, that of the volunteers and auxiliary members, their devotion to duty and their cooperation and helpfulness in meeting the exacting needs of patient care have been outstanding and have built the reputation the Hospitals enjoy today.

Because of the vision, generosity and efforts of all the people who have given so much to make the present University Hospitals a reality, patients from far and near will be helped for years to come.

HOSPITAL DIRECTORS

The University Hospitals from its opening in 1909 to the present date have had three acting directors and five directors.

The Minutes of the University Hospitals Committee of March 29, 1909 recommend the appointment of Miss *Bertha Erdmann,* R.N., as

Louis B. Baldwin

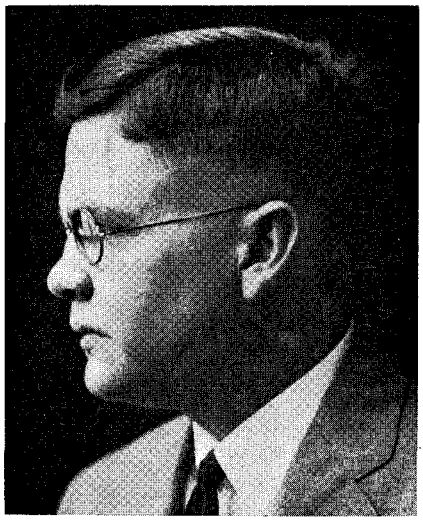
Superintendent of Nurses and Acting Superintendent of the Hospitals until the appointment of a Medical Director. Due to illness, she resigned July 1, 1910. (See Chapter XX.)

Dr. *L. B. Baldwin* was the first superintendent, his appointment dating from August 10, 1910. He was a graduate of the University of Minnesota Medical School and took his internship at City and County Hospital, St. Paul. Dr. Baldwin practiced in Cando, North Dakota for a year or two during which time he became interested in neurology (psychiatry). He served both as physician and administrator at the Institution for Feeble Minded and the State Hospital for the Insane in North Dakota before coming to Minneapolis.

His daughter, Mrs. Helen (Clarence) Tormoen, on a recent visit here when she brought two young men who were interested in becoming physicians, said that her father had entered the hospital administration field because of a sincere desire to have a part in upgrading the management and direction of hospitals. During Dr. Baldwin's tenure as superintendent, the Elliot Memorial Hospital and a service wing were built—also the Todd and Christian wings.

During the World War I, Dr. Baldwin was a colonel in the Army and organized Base Hospital #26 made up of doctors and nurses from the University of Minnesota. After that, he was called to Washing-

Paul H. Fesler



Halbert L. Dunn

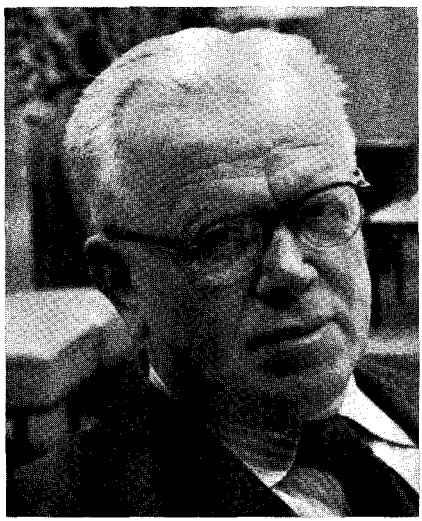
ton to be in the Surgeon General's office in charge of personnel comprising base hospital units.

Miss *Louise M. Powell,* R.N., Superintendent of the Training School for Nurses, was Acting Superintendent of the Hospitals from August 1, 1918 to March 10, 1919 while Dr. Baldwin was in service and in Washington much of the time. (See Chapter XXVIII.)

After an illness of several weeks, Dr. Baldwin died in October, 1926 in Eitel Hospital. From then until January, 1927, Dr. *E. P. Lyon,* Dean of the Medical School, was acting superintendent of the Hospitals. (See Chapter XI.)

In January, 1927, Mr. *Paul H. Fesler,* Director of the University Hospital at Oklahoma City, came to Minnesota. He was Hospitals superintendent from this date until July, 1932 when he went to Wesleyan Hospital in Chicago. Mr. Fesler traveled extensively in the state visiting county commissioners and physicians as this was a time before the organization of welfare board services, and there was need to acquaint commissioners and physicians with the Hospitals' programs.

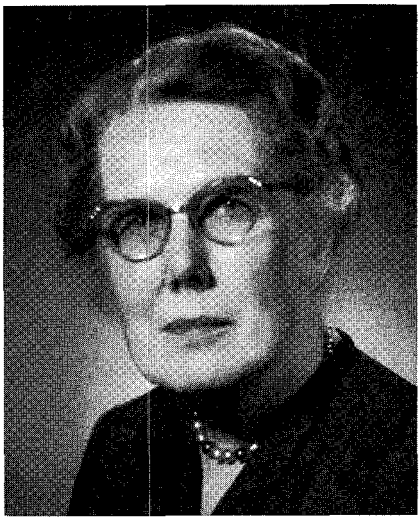
Dr. *Halbert L. Dunn,* an alumnus of the University of Minnesota Medical School, was superintendent of the Hospitals from 1932-1935. He was chief of statistics at the Mayo Clinic before coming to Minnesota. From Minnesota, he went to Washington to become Chief of the National Office of Vital Statistics. He retired in 1961.



Ray M. Amberg

Mr. *Ray M. Amberg* was appointed director of the Hospitals in 1935 and served with distinction in this position until his retirement in July, 1964. The Hospitals had tremendous growth during his administration, increasing from a 400-bed hospital in 1935 to a 760-bed hospital in 1964, with plans well along when he left for a 40-bed addition to the Masonic Memorial Hospital. Mr. Amberg was a distinguished figure in the hospital field locally, nationally and internationally. He received recognition and honors from many organizations. Mr. Amberg was honored by the Minnesota Hospital Association with a special citation. He also received the Distinguished Service Award of the Minnesota Medical Foundation, and the Distinguished Director Award was bestowed upon him by the Board of Regents.

Mr. Amberg was highly respected and well thought of by members of the legislature. He had the reputation of presenting a fair picture of the needs of the Hospitals which is evinced by their splendid support of the Hospitals. As well as representing the Hospitals at the legislative sessions, he spoke persuasively for the University as a whole. Mr. William T. Middlebrook's contribution to a sketch concerning Mr. Amberg closed his remarks with this statement: "Let me conclude with my profound belief that Ray's unique personality, his sincere friendliness, his personal sympathy, and his astute understanding accounted for more financial support in Minnesota legislative halls than the activities of



Gertrude M. Gilman

any staff member of my day," an expression shared by many who knew of his unique efforts for the University and its Medical School.

After his retirement as director of the Hospitals, Mr. Amberg served as executive director of the Planning Agency for Hospitals of Metropolitan Minneapolis (PAHMM). In this role, he has shared his knowledge, ability and skills in local planning.

Three directors of the University Hospitals were presidents of the American Hospital Association. A plaque in the Hospitals' main lobby honors them. The citation reads as follows:

> "For making possible the leadership of Ray M. Amberg, 1959; Paul H. Fesler, 1931; Louis B. Baldwin, M.D., 1921, in advancing the standards of America's hospitals and the health and welfare of the people, as presidents of the American Hospital Association, the Board of Trustees, the Officers and Members of the American Hospital Association present this expression of their appreciation to the University of Minnesota Hospitals."

Miss *Gertrude Gilman,* who prepared the above history of the hospital, was born in Benson, Minn. but while she was still a small child, her parents moved to Minneapolis. After passing through the public schools, she entered the University of Minnesota and was awarded the degree of bachelor of arts majoring in English and Business in 1921.

While a student, she did some work at the University Hospital. Instead of entering the teaching profession as she had planned, she continued with the hospital after graduation. She became familiar with every detail of the operation of the institution and in 1929 she became admissions director for the clinics as well as for the hospital. This is one of the most important positions in the hospital as it carries the responsibility for deciding who is accepted for care and under what circumstances. The position also has to do with the income of the institution, the relationships with physicians, community leaders, patients and other interested people. For many years, she put into practice the policies adopted by the hospital superintendent.

A liberal admission policy was always in vogue which encouraged physicians, agencies and the patients to use the services of the Outpatient Department and the hospital. Moreover, this provided a wide variety of health conditions and diseases for the student teaching program. However, this was not done without difficulty.

County Commissioners were responsible for financing medical care in the earlier years. Miss Gilman demonstrated real ability to interpret the medical needs and responsibilities for providing medical care.

As Miss Gilman was promoted through the ranks from student assistant, assistant director, associate director, senior associate director, and finally to director of the hospital in 1964, she became a valuable teacher in the course in hospital administration and for the hospital administrative students assigned to spend one year of internship in the Hospital. She prepared and delivered formal lectures and thus played a large role in the instruction of many hospital administrators who now hold important positions. She also participated in development of the educational program of the School of Nursing and Medical Technology and the Department of Dietetics.

She worked under all of the University Hospitals administrators beginning with Dr. Louis Baldwin, but for the most part her contributions came under the administration of Mr. Ray Amberg. When Miss Gilman began as student assistant, only the Elliot Memorial Hospital existed with 120 beds. She has seen it grow to 836 beds with many hundreds of staff members.

Miss Gilman holds membership in numerous national and local organizations.

When Mr. Amberg attained retirement age, there was no available

person as well qualified to direct the University Hospitals as Miss Gilman. Indeed, she had previously conducted practically all phases of the administration of the Hospital. Therefore, her appointment as director of the University of Minnesota Hospitals provided the ideal continuing management.

Miss Annie Laurie Baker, professor and director of the Social Service Department has made the following excellent appraisal of Miss Gilman: "To those who have known and worked with her over the years, she has many outstanding personal attributes. The most obvious is her gentle dignity. She is quiet, a lady in the true sense and always in command of herself and the situation in which she happens to be. She is a thoroughly well put together person, who never has to show anger, resentment, or displeasure. She is an excellent executive and gets her points across in a mature way without the need for undue emotion. Miss Gilman is an humble person, sensitive to the needs of others, a person of genuine integrity with no psychological needs that push her out of her own natural self. All through her career in every position she has occupied, her focus has been on patients. She has never let her responsibilities for the development of programs, administrative structures or policies deflect her concern for people. Each promotion she seemed to meet with surprise and simple gratitude. She never pushed or jockeyed for position, but rose to the top on pure merit.

"Another one of Miss Gilman's attributes which has contributed to her success is her phenomenal memory. She seldom forgets a name, a face, or a situation. She has an uncanny quality of accurate recall of ordinary everyday situations.

"Miss Gilman's has been a professional life of sincere devotion to the Hospitals. This has been her consuming interest. In doing this, she has been able to achieve a balance between professional and personal life, which is unique. Her interests outside of her job have been the simple relaxing pleasures of most women—family, home, travel and friends."

As director of University of Minnesota Hospitals from 1964 to 1966, Miss Gilman had the following associate directors: Gerard W. Frawley, Glenn R. Mitchell, and John Westerman. Her secretary, Miss Helborg Gilbertson, is most efficient, as is Miss Ethel Harrington, personnel officer. Space does not permit detailed historical sketches of the 20 divisions and their heads under her direction as listed in the September 1966

Medical Bulletin, University of Minnesota. However, a brief historical sketch of one division—Social Service—is presented as representative.

SOCIAL SERVICE

In the President's report for the year ending July 1913, the establishment of a Social Service Department was urged. The Administrative Board of the Medical School in June 1914 voted that the president be requested to place the proposed appropriation of $250 for the initiation of Social Service work to the credit of the Outpatient Department budget and at the disposal of the superintendent of the Hospital.

On August 6, 1915, a committee was appointed to organize the social service work consisting of Dr. L. B. Baldwin, superintendent of the Hospitals as chairman, Dr. J. C. Litzenberg, and Dr. R. O. Beard. The committee recommended the appointment of Miss *Marion A. Tebbets* to the position of director of the Hospital Social Service Department about to be organized, for one year, salary $1500 per annum.

Miss Tebbets was born in Glencoe, Minn. in 1887. After graduating from the University of Minnesota in 1910, she took special courses in social work sponsored by the Russell Sage Foundation of New York. In due time, she was employed by the Minneapolis Associated Charities.

In her first report in 1915, Miss Tebbets defined the work of the Department as follows: "The recently established Social Service Department of the University Hospital is to minister to the social needs of the hospital population, thus being of service to the patient and to the physician in helping to make the medical treatment more effective. Secondarily, there is made available a practical field work laboratory which, it is anticipated, will eventually afford students in sociology, medicine and nursing an opportunity to see the interrelation of social and physical conditions, and therefore, the interdependence of social and medical work. And finally, in addition to being of service to patients, physicians and students, the Social Service Department has the opportunity of being the interpreter between these and the social agencies already working in the field—of working with them for the common end—the social welfare of the community."

In 1915, when the Social Service Department was established, there were 13,525 patients and 47,347 clinic visits. This was a large group of patients. In 1965-66, there were 23,764 new patients and 119,812 visits.

In April, 1916, Miss Tebbets was promoted from an instructorship to the actual position of director of the Social Service Department following which she became a member of the Dispensary Committee.

Dr. *Litzenberg* requested a social worker to assist patients to continue under medical supervision so as to prevent complications of pregnancy. Therefore, Miss *Caroline Monger* was the first social worker to be assigned by Miss Tebbets. Her assignment was with the obstetrical service where she played a large role in the early reduction of the maternal death rate. In 1915, the maternal death rate was 52 per 10,000 in Minnesota. By 1950, it was down to 6 per 10,000 and in 1962 Minnesota held third place in the United States of 1.5 per 10,000.

Miss *Lydia Christ,* the second social worker recommended by Miss Tebbets (1916), was assigned to the veneral disease clinic. It was a difficult task to keep syphilitic patients on a weekly treatment schedule for a three-year period and also to locate and place under treatment persons responsible for the infection of patients.

Dr. *J. P. Sedgwick,* Chief of the Department of Pediatrics, also requested a social worker. One of his great problems was malnutrition and repeated illness of children because of poverty and ignorance.

Dr. *Olga S. Hansen,* who was in charge of the Cardiac Clinic, also wanted a social worker as she saw so many patients unable to rest, to reduce their responsibilities, or give up heavy manual jobs, essential to their recovery. While Miss *Smith* worked in the Cardiac Clinic, Dr. *Archibald Beard* became interested in what could be done to assist diabetic patients in diet and food preparation and home management.

Dr. *Riggs* requested a social worker for his Neurology Service.

By 1918, the Social Service department was well established with a staff of a director, four social workers, and a secretary, but just as the department was gathering strength for its basic assignment, the United States entered World War I. The University requested the department to take over the inspection of private rooming house facilities for men. The influenza epidemic (1918) was of great magnitude. There was a period when the hospitals in the city admitted only patients with this illness. Deaths of parents whose children needed care and good nutrition presented serious problems.

Later, Miss Tebbets was appointed professor of social service and chief of the Division of Medical Social Service. In her report of the Social Service Department covering the year ending July 31, 1920, she

called special attention to the fact that the department was involved not only in work with patients, but student work as well. She was receiving students from the academic college in sociology and the school for nurses, and the Red Cross training course. That year the department had worked with 1,203 separate families, 2,766 additional patients in the clinic, 3,617 visits had been made, 1,789 reports had been given to agencies and 3,069 letters had been written.

The need for an educational program was early recognized and the teaching was started. In 1919-20, 39 students had spent time in the department. In 1925, 45 spent time in the department. In the same year, there were 29 home economic majors, 7 pediatric nurses and 1 sociology student. Miss Tebbets gave a six-weeks course during the summer session on principles and practices of hospital social work.

A committee consisting of Miss Tebbets, Doctors Beard and Diehl, was appointed to develop a course in medical social service. The committee reported:

1) That courses for the training of hospital social service workers be established as soon as possible under the Department of Hospital Social Service of the Medical School.

2) That these courses in their formulation conform as closely as possible to the recommendations of the committee of the American Hospital Association on the training of hospital and psychiatric social workers.

3) As soon as the necessary psychiatric material becomes available a course for the training of psychiatric social workers also be instituted.

4) That a committee be appointed to make recommendations concerning the training of occupational therapeutists and hospital librarians.

Miss *Elisabeth Gardner* of Boston was appointed to organize and supervise the medical social work sequence in the School of Social Work. Apparently, without warning, and for no sound reason, Miss Tebbets was replaced in 1929.

She accepted a position in the medical clinics of the Wells Memorial Settlement where she remained until the clinics were closed in 1948. Thereafter, she has resided with her sister Edyth at Minnetonka, Minnesota until she died in 1967.

In summary, Miss Baker said, "For her period as director of the Social Service Department, she established a remarkable record. She organized and developed a sound social service department, initiated

the medical social work course which in turn facilitated the School of Social Work, developed a School of Occupational Therapy, and through her interest and that of her staff, the course of public health nursing."

The Social Service Department was reorganized in 1929 and Miss *Frances Money* was appointed director. She was born in Rhode Island in 1898. She graduated from Brown University in 1921 and was awarded the masters degree by Simmons College in 1922. Her social work career was begun at the Boston City Hospital where she attained the position of assistant director of the Social Service Department.

At Minnesota, one of her first acts was to require that each staff member have a master's degree in medical social work. This was accomplished in 1930. This was one of the early departments in the country to have such high professional standards and was the first social agency in the state to require a master's degree.

Up to the time Miss Money became director, the staff had confined itself to obstetrics, venereal disease, pediatrics, cardiac, nutrition, and the neurology clinic. Soon after Dr. William A. O'Brien, director of the tumor clinic, wanted a social worker. He procured funds from outside sources and Mrs. *Helen Eaves* was assigned to his service.

During Miss Money's administration, the social work was less concerned with looking for causes of a patient's social and economic need, the environment, and the situation in which he found himself than to an interest in the patient himself and his relationships. The emphasis shifted from providing changes to that of understanding the person with a problem so as to help him to help himself. The social worker became a part of the total service to which she was assigned. She went on rounds, held conferences, attended department meetings, etc.

At that time, there were very few hospitals and nursing homes in the rural areas of Minnesota. Patients with terminal cancer had to be placed in nursing homes in Minneapolis. On the basis of the experience of the social service staff, Mr. Ray Amberg promoted a bill which was passed by the legislature requiring all nursing homes to be licensed by the State Board of Health. *Minnesota was the first state to have such a law.* Dr. Frank Burch was greatly concerned about blindness in children, and Miss *Lydia Christ* was assigned to the eye service. *Dr. Burch and Miss Christ initiated the organization of the Minnesota Society for the Prevention of Blindness which was effected in 1940.* One of the first accomplishments of the society was to pass a bill through the legis-

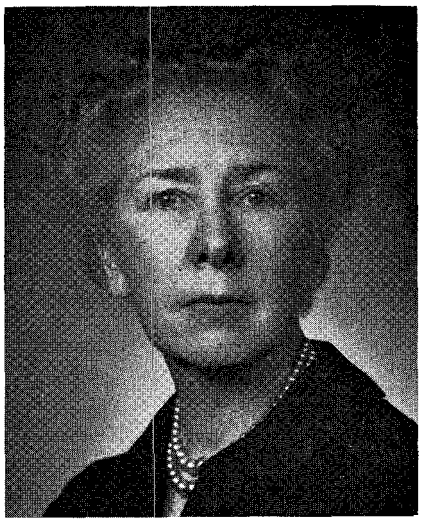
lature outlawing the sale of firecrackers and regulating the types of fireworks.

World War II made serious inroads on the work and development of the Department of Social Services. Recruitment was difficult, work with the various war agencies was taxing, and therefore all services were reduced.

Miss Money died from malignancy in 1946. Concerning her regime, Miss Annie Laurie Baker recently wrote: "She maintained a department at a high level of performance during difficult times. When she had finished the reorganization of the program during her first years, the country suffered from the depression. The social workers with master's degrees left to take over responsible positions of leadership with the relief administration and to help establish the new public welfare program. The depression was followed by World War II and social workers were recruited to work for the Red Cross and agencies concerned with military services. Miss Money modified assignments, but never compromised on standards. She made a contribution to the hospital and social work in Minnesota and to many social workers now practicing in all parts of the country."

Miss *Lydia Christ,* who had been with the department for 30 years was made acting director. She graduated from the University of Minnesota in 1912 after which she took graduate work. She then worked for the Associated Charities of Minneapolis and was employed as a social worker by the University of Minnesota Hospitals under the direction of Miss Marion Tebbets. Over the years, Miss Christ had various assignments in dermatology especially venereal diseases, orthopedics, the program with home economics on diets, etc., medicine, neurology and ophthalmology. She held the record of having worked longer with the Social Service Department than any other person. She died on November 14, 1965.

When Miss Christ retired in 1948, Miss *Annie Laurie Baker* was appointed professor and director of the Social Service Department. Miss Baker was born in St. Paul. In due time, she was awarded the degree of bachelor of arts by the University of Minnesota. Her first assignment in Minnesota was with the United Charities of Dr. Paul. It was this work that encouraged her to attend graduate school at the University of Chicago where she won the degree of master of arts in social service



Annie Laurie Baker

administration. She majored in psychiatric social work and spent an additional summer in medical social work under the direction of Edith Abbott in Chicago.

After completing her work there, she returned to the University of Minnesota Hospital for a five-year period, 1930-1935, where she was the first trained psychiatric social worker in the Social Service Department. Therefore, she was assigned to the Department of Neuropsychiatry and in addition had responsibility for dermatology and heart services. In 1935, she transferred to the State Board of Control and was assigned to the Children's Bureau as district representative of the northwestern part of the state including 16 counties. Here, she dealt with child neglect, dependency, illegitimacy, mental retardation, adoptions, and placements, also with development and supervision of county child welfare boards.

From this position, she was promoted to assistant director of the State Division of the Blind, where she wrote the Minnesota program for the blind to comply with the Social Security Act and requirements of the Federal Bureau of Health, Education and Welfare. This led to her promotion to the directorship of the State Division of the Blind. She initiated the aid to the needy blind program and was responsible for beginning the state program, developing the vocational program for

the blind, and expanding the home teaching program for the blind. There she also assisted in the establishment of the Minnesota Society for the Prevention of Blindness.

During World War II, Miss Baker joined the American Red Cross. Her first assignment was supervisor at Riley General Hospital, Springfield, Missouri, when the casualties from Pearl Harbor were transferred to that hospital. She was transferred as a substitute to McCloskey General Hospital, Temple, Texas, when the casualties from Guadalcanal arrived.

In the spring of 1944, Miss Baker was transferred to England, where at first she was supervisor and assisted in establishing a Red Cross program, and supervised staff in the newly established United States Military Hospital. She later became assistant director of the Red Cross Hospital Program in Great Britain. In the spring of 1945, she became supervisor of the 13th Hospital Center Program, Rheims, France, where with 10,000 beds the United States prisoners were received from the German camps.

She was then transferred to the Pacific area as director of the Red Cross program to military hospitals with headquarters in Hawaii. At first, she was responsible for these services in Hawaii, Guam and the Marianas. A little later, she was made director of the Red Cross program in military hospitals for the Far East with headquarters in Tokyo. Her responsibilities included the programs in Japan, Korea, Okinawa, Guam, the Philippines and China.

On July 1, 1948, Miss Baker was appointed to her present position as professor and director of social service at the University of Minnesota Hospitals. Her numerous and extensive experiences in so many parts of the world under such unusual conditions and her innate ability qualified her admirably for the Minnesota position. In addition to the tremendous volume of work she has done at the University Hospitals, she has been in demand as a leader and counselor in various organizations including the presidency of the Minnesota chapter of the National Association of Social Workers, the Minnesota chapter of the National Association of Medical Social Work, and the Minnesota Welfare Association.

Miss *Frances Flynn,* director of social work at the (Ancker) St. Paul-Ramsey Hospital, says, "The history of social work in Minnesota cannot be written without including the many contributions of Annie Laurie Baker. Those who have enjoyed the privilege of knowing her as an

administrator, a teacher, a supervisor, a caseworker, and a member of community organizations, will recall with respect and affection her contributions over the past years."

JOHN WESTERMAN BECOMES DIRECTOR OF THE HOSPITALS

As time for Miss Gilman's retirement approached, a search committee began combing the country for the best available qualified person to continue the direction of the University Hospital. This search resulted in the appointment of *John Westerman,* who was born in Minneapolis in 1934. He entered the University of Minnesota and received the bachelor of science degree (in law) in 1954.

Mr. Westerman was commissioned Second Lieutenant, United States Air Force, June 1954 and was on active duty from 1955 to 1958 in the Legal Office, Tachikawa Air Base, Japan. In 1961, he became Captain, United States Air Force Medical Service Corps.

In 1958, he was awarded the degree of bachelor of business administration and the master of hospital administration degree in 1960 by the University of Minnesota. During the school year 1959-1960, he was administrative resident, University of Minnesota Hospitals. The next year he was administrative assistant and instructor in the School of Public Health. From 1961 to 1964, he was assistant administrator

John Westerman

and instructor, Department of Health Services, at the University of Rochester, Strong Memorial Hospital. From 1964 through 1966, he was research associate in the College of Medical Sciences, University of Minnesota Planning Office. For some time, he had been coordinator of the Committee for Long Range Planning in the Health Sciences and played a large role in planning new programs for dispensing and shaping health care and education at the University.

Mr. Westerman has published excellent articles on various phases of hospital administration. Now at the age of 33 years, he is the youngest university hospital director in the United States with an institution of more than 2,000 employees and a daily patient census of nearly 1,300.

When Mr. Westerman was appointed to the directorship of the University Hospital, Dean Howard said, "Mr. Westerman possesses a combination of attributes and assets that will enable him to give particularly effective leadership to University Hospitals during the years ahead. Since the entire field of medicine, including hospital care, has just embarked on a period of intensive change that will border on the revolutionary, Mr. Westerman's imaginativeness, flexibility and facility for composing conflicting views are especially desirable traits as the new director of University Hospitals."

Chapter XXVIII

School of Nursing

EARLY IN 1900, there was a very unhealthy growth of training schools for nurses. The schools grew like mushrooms. Why did many hospitals start a training school for nurses? Then, and for many many years to come, it was for economic reasons only. The administrators of these institutions realized very early that the services of pupil nurses were less costly than any other type of service. Also, in addition to the economical type of service, the student nurse created a wholesome atmosphere in the institution.

At the beginning of the 19th century, the nursing scene shifted to the Middle West. A small, determined man, *Richard Olding Beard,* a member of the faculty of a little-known medical school persuaded himself that it must be his contribution to the history of education in America to prompt, urge and stubbornly insist upon the creation of a top-level *school* for nurses. Between 1905 and 1908, Dr. Beard used

Bertha Erdmann

every possible forum available to him to urge the necessity of elevating the education of the nurse to the professional level in a university school.

On October 1, 1908, the Board of Regents of the University of Minnesota authorized the establishment of the first university school of nursing in the world as an integral part of the university system. The original name of the school was the University of Minnesota School for Nurses. On April 14, 1920, the Board of Regents authorized a new name, School of Nursing, which emphasized that its function was the education of the nurse.

Miss *Bertha Erdmann* was tentatively appointed superintendent. She accepted the suggestion of the advisory committee and took some graduate work at Teachers College, Columbia University before taking up her post.

ADMISSION REQUIREMENTS

Early requirements for admission and the general plan for the University of Minnesota School for Nurses:

1. Requirements:
   a. Physical fitness as shown by a physical examination by a physician named by the school following her tentative acceptance by the Enrollment Committee.
   b. Graduation from a first grade high school with a course of four years. Preference to be given to women of superior education. (Two members of class, Mary Marvin and Mary Mark, were sophomores in the University.) This requirement was the same for the SLA students.
2. General Plan:
   a. Four months preliminary course instruction.

WEEKLY SCHEDULE 1909-1910

Day	*8:30*	*9:30*	*10:30*	*11:30*	*1:30*
Monday		Materia Medica	Physical Culture	Physiology	Hospital Economics
Tuesday	English	Anatomy	Bacteriology	Bacteriology	Hospital Economics
Wednesday	Chemistry	Chemistry	Materia Medica	Anatomy	Hospital Economics
Thursday	English	Anatomy	Medica Materia	Physiology	Hospital Economics
Friday		Physiology	Physical Culture	Physiology	Principles of Nursing
Saturday	English				

b. First semester the student to be in independent residence at her own expense. Tuition fee $25.00 and a laboratory fee to be returned if not used.
c. Second semester the student to be on probation for two months in hospital residence. General instruction in hospital duties. At the end of six months, the superintendent of nurses and the Committee on Training School to determine the fitness of the student to enter permanently the hospital part of the program.
d. A limited hospital service and class period of eight hours a day to be assigned to each student during her entire course of training.

3. Clinical Experience for the three years:
   a. Preliminary course—6 months.
   b. Surgical Nursing including Gynecology, Special Senses, Dispensary and Night Duty—7 months.
   c. Medical Nursing including Nervous, Skin, Dispensary, and Night Duty—7 months.
   d. Pediatrics including Dispensary—4 months.
   e. Obstetrics including Dispensary—3 months.
   f. Operating Room including Dressings—3 months.
   g. Diet Kitchen—1 month.
   h. Vacation—2½ months.
   i. Elective—2½ months.

After the first semester, lectures in the clinical courses were given by medical faculty clinicians. Head nurses in their specialty attended the lectures and with the assistance of the superintendent of nurses taught the nursing classes following the lectures. They were also responsible for the supervision of the clinical experience of the students. At Commencement the superintendent of nurses presented the graduating class for a special professional degree—Graduate in Nursing—just as the other deans in the colleges presented their students to the president.

Nursing students had the privileges of the University the same as other students, such as a section in the *Gopher,* the University junior annual and the use of Shevlin Hall for their dances and parties. They were eligible on a student basis to concerts, football and basketball games. Emphasis was placed on making them feel that they were a part of the University student system.

The first class of four students, Mary Marvin, Mary Mark, Olga Skonnard and Margaret Ames was admitted on March 1, 1909. The

second section of this class, Caroline Schwarg, Lena B. Stewart, Elizabeth Burns, C. Adelaide Madsen was admitted in September 1909. At this writing, only one of these original eight students, Mary Mark, Fergus Fall, Minnesota is living.

The first uniform of the school was a plain blue chambray with a white bib, apron and cap. The material was furnished by the school but the student had to provide for the making of her uniforms. The collar was a straight one, which after continued wear left a brown streak on the wearer's neck. For the first two months, the student wore the blue uniform and white apron. At the end of the probationary period of two months, the white bib, cap and cuffs were added to the uniform. The sleeves were long and the cuffs had to be worn at all times with the uniform. There was never an excuse for removing them even when giving a bath. About 1925, a cape was added—this was made of a flannel material—maroon on the outside and gold on the inside. The letters "U of M" were embroidered on the collar.

On June 9, 1909, the second meeting of the American Society of Superintendents of Training Schools for Nurses was held in Minneapolis, Minnesota. In his address, "The University Education of the Nurse," Dr. Beard said, "It is at this juncture in the history of the profession of nursing that the opportunity has come in the State of Minnesota to establish a Training School for Nurses in connection with the University hospital service as an integral part of the University of Minnesota. This is the first, I believe, under university maintenance and control and a school moreover, which is unique in the fact that it exists, not for the sake of the hospital service to which it belongs, but for the sake of the education of the nurse." Later, Deborah MacLurg Jensen, an historian, said, "The establishment of the first university school of nursing was a step of the greatest consequence for nursing education. It changed the status of the fledgling nurse from that of a 'pupil nurse' to that of a student. The final step in the creation of the nursing *profession* has been taken."

It is sad to relate that Miss Erdmann, the first superintendent of nurses was able to stay at her post only from May 1909 to July 1910. "Personal tragedy took her to the hospital as a patient where, far too young, she died of tuberculosis." During the time she held the post, she was able to inaugurate a three-year program.

On September 10, 1910, Miss *Louise M. Powell* took Miss Erdmann's

Louise Powell

place as superintendent of nurses. She had taken the graduate course at Teachers College, Columbia University and was recommended to Minnesota by Miss Adelaide Nutting, the head of the Department of Nursing.

The problems which Miss Powell, Dr. Beard, and Dr. Baldwin, Superintendent of the Hospitals, struggled with were of several kinds. First, that of attracting the kind of "quality student" whom a university school for nurses could accept; second, that of establishing the curriculum and broadening facilities of instruction; third, that of making do with inadequate housing for nurses; fourth, that of the formidable load of their own responsibilities; and fifth, that of countering objections to the program which came sometimes even from members of the medical staff, and sixth, that of securing qualified members of the nursing faculty.

Miss Powell was the administrator of the school, teacher, housekeeper, dietitian and counselor. She made out the menus for both patients and personnel, did her own marketing by telephone and attended all the doctors' lectures so that she could prepare the final questions at the end of each course. She taught the first nursing classes in a small room at 417 Delaware Street. Much of the equipment for the teaching of nursing procedures had to be gathered before class from a hospital building. Then it had to be returned after the class.

Miss Powell could never represent the militaristic, autocratic type of

leader. Her human sympathies and understanding always made her a respector of personalities. When a faculty member was selected or a student enrolled, each received the respect and confidence befitting her position. It was this characteristic in addition to her integrity that made it possible for members of the staff and of the student group to receive criticism at her hands and to leave her office with confidence unshaken. Her students loved her dearly. She was their staunch and loyal friend. From chief of staff to interne and from patient to porter, every one had a high regard not only for Miss Powell's ability but for Miss Powell herself.

In an illustrated Announcement of the School of Nursing for 1921-1922 there is a picture of the "Student Council of the Nurses Self-Government Association, University of Minnesota School of Nursing, 1920." This organization was an innovation in a school of nursing. Established in 1919, it assisted the faculty in all student affairs which pertain to off duty hours.

When the associated hospitals became a part of the school's plan, there was a self-government branch of the association in each hospital. Representatives from these branches made up the Central Council of the organization at the university. At this time, the organization usually sent a representative to the meetings of the American Nurses Association, the National League of Nursing Education and the Minnesota State Association meetings. On April 9, 1934, the first Union Capping was held at Powell Hall to bring together the students from all the associated hospitals for this occasion.

Louise Powell was vice-president of the National League of Nursing Education for several years. In a paper published in the 1913 Annual Report of the League, she wrote, "There were 120 beds and only 21 student nurses, nine of whom were affiliating student nurses from St. Mary's Hospital in Rochester, Minnesota. These nurses were paid $10.00 a month. With an eight-hour day for student nurses, which was less than in the other schools in the Twin Cities, adequate nursing care for patients looked very discouraging." Miss Powell finally prevailed upon the authorities to employ as many graduates as were necessary to take care of the patient load. Eleven were employed at a salary of $50.00 a month and full maintenance.

Although there were many problems through the years, the greatest one seemed to be the need for adequate housing for faculty and stu-

dents. No finer or a more true description could be written of this situation than the one in the history of the school by James Gray: "When the school first opened, nurses were told that their housing arrangements were 'temporary.' But the years 'like black oxen' plodded doggedly on and on without any changes being made. The nursing population was still scattered through many houses—the final count was 13, all equally unpleasant. The full capacity of the homes on Delaware and Church Streets was reached and as classes increased in numbers, the superintendent never knew from semester to semester where students would lay their heads. Thirty-two nurses lived at one moment in what had been a modest family residence; ten of them slept in five tiny rooms, eleven feet square each with one window, no door transom and one closet. Sixteen more young women lived in quarters made over from dining room and kitchen and they had no closet space at all. In a grotesque tenement parade, nurses moved back and forth daily through each other's room to reach bathroom and storage areas. The building was lighted by gas and even this concession to modern luxury was made without lavish generosity. There was only one burner to a room."

The struggle for adequate housing for faculty and students continued on and on. Many times Miss Powell was heard to remark that the cattle at the Agricultural School were better housed than the faculty and students in the School of Nursing. In 1931, the Alumnae Association of the school stepped almost enmasse into the situation. A committee of nine, headed by Minna Schultz Kief and including Anna Jones Mariette was appointed to explore the possibility of getting action. "Miss Densford, who had recently become director and whose loyalty to the University was intense but who considered that in this matter it was the right of a democrat to speak up for himself agreed that it would be proper for members of this committee to appear before the joint committee of the House and Senate of the State Legislature acting on appropriations for the University. On a March day in 1931, they had their hearing. " 'What we ask,' said Mrs. Kief, 'is an appropriation which will be available immediately. Now,' she suggested, 'would be just barely soon enough.' And her committee got it."

The appropriation was secured in the depth of the depression. The legislators decided that the building of the Nursing Hall would provide work for many. Before the end of the year 1931, ground had been broken. The Hall was dedicated in October 1933. Present for this

service was Miss Powell, Miss Vannier, Dr. Beard, the President of the University, director of the School and all the deans of medical science.

Miss Powell returned in 1936 to give the Richard Olding Beard Lecture and she presented a fine picture of her stewardship. "I feel great pride in what has been accomplished by my successors in the school. I am thankful for the close contact I had with the faculty and students, for the fine teamwork we had with the medical staff and internes when we were all working for the good of the patient as well as for the education of students. One of the great compensations that has come to me since my retirement from active work has been continued love and loyalty of all those students who graduated from the school between 1912 and 1924."

On the 30th anniversary of the school, 1939, the Hall was renamed for her, "Louise M. Powell." It was the first time that the University had named a building in honor of a living person.

In September 1915, Miss *Elizabeth Pierce* of Columbia University came as assistant teacher. She remained only one year, but she returned at a later date.

Miss Powell had a very devoted group of young women as head nurses. Just to mention a few of them—there was *Katherine Dougherty* who in later years became superintendent of nurses at the Minneapolis General Hospital. *Janet Benton,* another member of this staff, was devoted to students and was a good teacher. The first operating room supervisor was Mrs. *Gertrude McBrien* (Mrs. Franklin Wright), a meticulous person who certainly knew operating room technique. *Alma Dieson* and the *Tweeten sisters* were young women of quiet, professional dignity. Mrs. *Sue Naysmith* was night supervisor for a number of years. She left to become superintendent of nurses at Glen Lake Tuberculosis Sanatorium where she remained until her retirement. Miss *Elizabeth Fox,* a graduate of Johns Hopkins Hospital Training School, was one of the first head nurses on 2nd floor of the Elliot Building. She left to enter the public health nursing field. From 1918-30, she was with the American Red Cross in public health nursing.

Following the resignation of Miss Elizabeth Pierce the first time, the position of instructor was filled by Miss *Marion L. Vannier,* a graduate of Johns Hopkins Hospital Training School. Miss Vannier was imbued with the finest ideals not only in nursing but in every other phase of living. She had a very impartial mind and regardless of who it was who

had contact with her or had association with her she gave to that person unstintingly of herself if she could help.

The University of Minnesota Base Hospital No. 26 was organized for World War I, and between April 1917 and April 1918 every head nurse in the hospital who was physically able had been accepted to go with the unit. As usual, Miss Powell met this emergency—she had to provide head nurses for the vacancies. Miss Powell became "acting superintendent" of the University Hospital to replace Dr. Baldwin who had been borrowed by the Surgeon General in Washington, D.C. Miss Elizabeth Pierce was persuaded at this time to return to the school.

A new teaching experiment was then thrust upon Miss Vannier. A large group of young hospital corpsmen, detailed by the United States Navy for instruction came from Mare Island and Goat Island. These men were given a well-rounded course in the care of patients from dietetics by Gertrude Thomas to courses in other colleges as well as a thorough series of instruction in bedside nursing by Miss Vannier.

By now, it seemed that the school could not survive another calamity but one came in the fall of 1918 in the form of the influenza epidemic. Imaginations, physical strength and endurance were stretched to the breaking point. Nursing and medical personnel pushed on and with Miss Powell, Miss Vannier and Miss Pierce, the school weathered another crisis.

Three contributions to the history of nursing education are important in the School of Nursing during the War and for some time thereafter. The first and most significant was the establishment at Minnesota of one of the first five-year programs leading to the degree of bachelor of science in nursing. The second was the addition of more clinical facilities in other hospitals in order to provide clinical experience for an increasing number of students in the school, and the creation of a course in public health nursing.

For quite some time Miss Powell had been studying the requirements for the "degree" from the three-year course and making a comparison with those for a degree from the arts college.

On June 9, 1919, the committee was ready to announce that a course which combined work "pursued in the College of Science, Literature and the Arts with work done in the School for Nurses" was ready. The program was designed to give the student general education plus the professional training. It required an applicant to have earned 75 Uni-

versity credits before she matriculated in the School for Nurses. The general plan for the entire course was as follows: the first five quarters in the SLA College, the next 2½ years in the school for nurses and the last three quarters in specialized work either in public health nursing or in nursing education. This program did not at this time take the place of the three year program. At first, enrollment in this new program was very meager—two out of seven who enrolled in 1919 stayed to complete the course, and only twelve were graduated from the program in its first five years. Even though the number of graduates was small, this program was the beginning of preparation of nursing leaders in the Midwest. Many of them distinguished themselves. *Mary Marvin Wayland* one of the first graduates of the school was on the nursing staff at Teachers College, Columbia. *Mildred Montag,* a more recent graduate with a doctor's degree is at present a professor on the college staff. She is the originator of the Associate Degree program in nursing which has met with so much favor since its establishment.

About 1922 or shortly before, there were some changes in admission requirements. Originally, an applicant had to be 20 years old. This was changed to not less than 18 years. The recommendation was that if possible the student apply for the five year course. At this time, too, intelligence tests were urged but not necessarily required. A more thorough physical examination was also done by members of the clinical staff in their specialty.

For some time, there had been recognition that the shortage of hospital beds in the University Hospital was limiting the enrollment of student nurses for lack of sufficient clinical training experience. All other facilities except housing for nurses were adequate. Then a new development in nursing education—the reaching out for more clinical experience in other hospitals in order to take care of the additional students who were applying for admission to the school. Dean Lyon had seen this type of development in medical education and was convinced that a center of nursing education could be established. The merger of the clinical facilities of two hospitals in St. Paul (Miller and Northern Pacific) and two in Minneapolis, including the University Hospital and the Minneapolis General Hospital was proposed in March 1920. The plan was approved by the Board of Regents of the University, December 14, 1920. On February 26, 1921, the Board of Regents reached an agreement with the hospitals whereby the clinical facilities of these hos-

pitals would be used for the experience of student nurses in the University of Minnesota School of Nursing.

Under the limitations of the hospital's apportionment, students in the order of their scholarship were permitted to choose the hospital of their principal residence, from which they were rotated to special services in the associated hospitals and dispensaries so as to secure for them the most complete and varied experience these institutions could offer. The rotation was approximately reciprocal for specified periods of time.

In the office of the school of nursing on the campus, there was a list of all students in the various hospitals and a chart showing all assignments with the dates to and from each hospital. One person in that office was responsible for the rotations in the whole school and each month a copy of the rotations was sent sufficiently ahead of the first change to each hospital. If these schedules were not followed carefully by the hospital to which the student was assigned a difficult situation resulted—it became necessary to replan the student's program and later send the student back to that hospital to complete her assignment.

The expense was jointly allocated—the hospitals sharing the ones on maintenance and publicity, the cost and conduct of the teaching by the University. To all students, the University gave on completion of the course the degree of graduate in nursing to three-year students and to the five-year students the bachelor of science in nursing education or in public health nursing which ever course was the student's major.

In 1917, the advisory committee of the school had approved an affiliation of two months in the care of tuberculosis patients at Glen Lake Tuberculosis Sanatorium. On February 19, 1925, an agreement was signed with the Hennepin County Sanatorium Commission reducing the experience to six weeks for all University of Minnesota nursing students.

The administration of the school with the associated hospitals was governed by three committees namely:

1. *Administrative Committee*—composed of four representatives from the Medical School faculty and four representatives from the School of Nursing faculty. This committee decided all matters of educational policy and general conduct of the school.

2. *Student's Work Committee*—composed of the director of the school, and the superintendents of nurses of the associated hospitals. This committee determined the policy as regards the individual student,

her acceptance into the school, continuance, discipline, graduation, etc., and made recommendations concerning the curriculum and the general conduct of the school.

3. *The Advisory Committee*—composed of the first two committees, and the administrators of the associated hospitals. This committee decides the expenditure of hospital funds.

The first students were admitted to the new organization on March 30, 1921, and the new arrangement was officially announced in the University of Minnesota School of Nursing Bulletin. Six months later, Miss Powell who was still superintendent of nurses of the University Hospital as well as director of this enlarged school was granted a six months leave of absence to complete work for her bachelor of science degree. On January 1, 1923, Miss Powell returned to assume the new title as full-time director of the School and the office for the School was moved from the University Hospital to Millard Hall. Miss Powell's staff consisted of one full-time stenographer. Also, she had a place to keep the school records and it was in this office that she met with her committees.

In the early years of this new organization, the supervision of students in the care of patients was very difficult because the instructors in each hospital taught different techniques. To solve this problem, a committee was formed which was made up of the nursing arts instructors from each hospital with Barbara A. Thompson (Sharpless), who was the nursing arts instructor at the University Hospital, as chairman. After a great many meetings, this committee prepared a mimeographed manual of all nursing procedures. Copies of the manual were placed in every unit in each of the associated hospitals and all students were furnished with a copy. Differences in equipment and/or facility which could not be solved were noted in the procedure. Later, this manual was put into book form and published for the first time in 1929 by the University of Minnesota Press under the name, *A Textbook of Nursing Technique* by Vannier and Thompson. There were several editions of this book, all of which were prepared by a committee of the faculty. This book had many fine reviews, and one from England was no exception: "It is doubtful whether any of our textbooks for English nurses covers so completely the field of nursing duties as this American Book . . . This book is a perfect mine of information for any nurse interested in her profession . . ." (*Nursing Mirror,* London, June 1937).

The first inkling of the third contribution, that of a course for teachers and workers in the field of public health was made by Dean Lyon in 1918. *Dorothy Slade Kurtzman,* a graduate of the school, set about the job of creating the first course in public health in the University. This first course consisted only of a four-months schedule devoted to discussion of social hygiene, rural nursing and visiting nursing. A strong influence in the development of the course in social hygiene was Dr. *Mabel Ulrich,* a graduate of Johns Hopkins University Medical School. Her contribution was a model of insight into the essential problems of that day.

When the Department of Preventive Medicine and Public Health was established in 1922, several of the graduates of the School of Nursing, namely Anna Jones Mariette, Hortense Hilbert, Alma Haupt and Pearl McIver were active participants and made important contributions to the history of the rapidly growing young unit. Mrs. Mariette and Alma Haupt were responsible for the teaching of several courses.

Before continuing with the progress of the merging of the clinical facilities of the associated hospitals with those of the University, a short statement relative to the storm which blew across the United States and made a terrible gash in nursing education for the time being is vital. The subjects under discussion were "Girls for Sub-Nurses" and wages for nurses. The participants in this program were Dr. Charles Mayo, Dr. R. O. Beard and Dr. George Vincent. The latter was, at this time, President of Rockefeller Foundation in New York City. It was under his direction that the Committee for the Study of Nursing Education was appointed.

This committee made the first extensive survey of schools of nursing in the United States. The findings were very revealing and were published in a book, *Nursing and Nursing Education in the United States.* The final conclusion was that the best hope for the future of nursing education lay in the development of university schools of nursing. Dr. Beard lent his prolific writing zeal to the cause by supporting university education of the nurse, against Dr. Mayo's urgency that to have sufficient nursing personnel the standards must be lowered. The Goldmark Report really saved the day but Dr. Beard, Miss Powell and others connected with the school were confident that the school's standards would never go down. The report also recommended the encouragement of training for subsidiary workers. These workers were called "nursing

Marion Vannier

aides or attendants." Several years later, nurses aides were trained to make beds, dust, etc., and provision was made for a longer period of training for vocational nurses. These are known today as Licensed Vocational Nurses.

In 1924, Miss Powell was pursuaded to become Dean of the Western Reserve University School of Nursing in Cleveland, Ohio. She had spent 14 years as head of the Minnesota school—first as superintendent of nurses of the University Hospital and director of the school and from 1923 as director of the school only.

Miss *Marion L. Vannier* again took Miss Powell's place as director of the School. Miss Vannier's administration this time lasted six years. At the beginning, there were three outstanding challenges with which she was faced. These were not entirely unfamiliar but the time had come when they had to be recognized in relation to the future of the school. The first was to demonstrate that a superior type of training for the nurse yields dividends in terms of service to the public. Second, there is a need for faculty members to improve their qualifications thereby broadening opportunities for students. And finally, a more conscientious effort should be developed to attract outstanding students.

The first challenge was a severe test in the summer and fall of 1924. There was a virulent hemorrhagic smallpox epidemic. The School of Nursing met the situation and the entire personnel including students

demonstrated by their fine spirit and unselfish service that the superior type of training does yield dividends in terms of service to the public.

In 1925, a full-time secretary, Miss *H. Phoebe Gordon,* was secured for the school. Miss Gordon was a Wellesley graduate and well qualified to assume an academic role as well as secretarial work in the school.

Another addition to the faculty at this time was *Deborah MacLurg* (Mrs. Julius Jensen). She taught the course in nursing education to the college group of students and was responsible for the introduction of the case method of assignment as well as being a fine adjunct to the nursing faculty in many other ways.

Miss *Eula Butzerin* came in 1924 from Teachers College, Columbia, and replaced Mrs. Mariette as head of the public health nursing course. This was the real beginning of an outstanding course in Public Health Nursing at Minnesota. Miss Butzerin remained as its head for 13 years. Miss Mary Beard of the Rockefeller Foundation said of Miss Butzerin, "I have heard it said often and I believe it to be true that the course in public health nursing given at the University of Minnesota fits a nurse for rural nursing better than any other. When a school has such a reputation as this, one nearly always finds that some one person connected with it has unusual qualities of leadership. I should like to pay personal tribute to her and to the admirable course which she directs. Thoroughly grounded in principles and practice, this course has consistently grown with the changing needs of the public health field."

In 1928, Miss Vannier took a sabbatical leave. Miss Barbara Thompson (Sharpless) was acting director during her absence. That summer, two graduate courses were added to the nursing curriculum: Administration in Schools of Nursing and Ward Teaching and Administration. Shortly after Miss Vannier's return, Deborah MacLurg resigned to be married. In 1929, Miss *Lucile Petry* accepted Miss Vannier's invitation to come to Minnesota. She had recently received her master of arts degree from Teachers College, Columbia, and had spent the summer as assistant supervisor of clinical instruction at Yale University School of Nursing. Miss Petry was a graduate of the University of Delaware and from Johns Hopkins Hospital School of Nursing.

Dean Lyon of the Medical School came into the picture in 1913. It was at this time that there was considerable discussion relative to the best way to attract outstanding applicants for the School of Nursing, which was Miss Vannier's third major concern. Dean Lyon was

thoroughly interested in nursing education and had availed himself of every opportunity to learn about all the facets of the Minnesota school. He said, "Until we are sure of our raw material, more exacting in our inspection of it, more clear about what our product should be, the medical profession will average lower than it should in the great field test that goes on today in the fight for better health."

At this time, the end of Miss Vannier's tenure was imminent. She had been connected with the school since 1916. In her gracious and sympathetic manner, she had weathered many a storm which hovered over the school, but in every instant she had come out the victor and with her fine faculty, Dean Lyon, Dr. Baldwin, Dr. Beard and many others had developed the school within a pattern already established. Her three major concerns moved upward—that a superior type of training yields dividends in terms of service to the public, the level of the faculty achievement rose and finally there was constant improvement in the type of material selected as students. History will show that no school of nursing connected with a university fulfilled these concerns more magnificently.

Miss *Katharine J. Densford* succeeded Miss Vannier, her stated goals on taking the reins at Minnesota were: "(1) to maintain the standards already established, (2) to build up a faculty of superior academic achievement, (3) to reform curriculums in acknowledgment of the increased responsibilities of the nurse."

Miss Densford was fortunate to have been greeted on her arrival by Miss Lucile Petry who had the same thoughts as she for the type of faculty for the school. Miss Petry spent 12 years at Minnesota and truly helped to lay the foundation for nursing education and for the preparation of teachers and administrators. In 1941, Miss Petry went to Washington, D.C. as Nurse Education Consultant in the Public Health Service. Two years later, she became head of the Division of Nurse Education and Director of the United States Cadet Nurse Corps through which thousands of students were recruited and trained in World War II. Because of this record during the war, Miss Petry was promoted June 7, 1949 to the rank of an Assistant Surgeon General in the Public Health Service Commissioned Corps.

In the position of Chief Nurse Officer, she directed the work of 2,500 nurses in the United States Public Health Service, being the first woman to achieve this rank. Honors which she has received are:

one of the 25 Women of Achievement in 1951; American Legion Auxiliary Award, 1955; Lasker Award, 1955; University of Minnesota Award to outstanding faculty member, 1959; Teachers College Medal, Columbia University, 1959; Florence Nightingale Medal, International Committee of Red Cross, 1959; Honorary Doctor of Science, University of Delaware; Doctor of Laws, Syracuse University; Doctor of Humane Letters, Adelphia College; Doctor of Letters, Wagner College. Miss Petry was a member of the United States delegation to the first assembly of the first World Health Organization in Geneva in 1948, the only nurse to attend. In 1959, she was elected President of the National League for Nursing and she served three terms.

Even with very stable purposes set, the early 1930's was an inopportune one for advancing nursing education. There were positive and negative attitudes toward nursing education and the imprint of the 1929 depression was still being tremendously felt everywhere. There were reduced budgets, shortages of staff and numerous other problems to impede progress of any kind. There were hundreds of people unemployed including many nurses. Miss Densford encouraged many young nurses to return to school. Some of these nurses either worked in a hospital for three hours a day for meals, or five hours a day for full maintenance. Funds were also secured from the state and federal governments to help these nurses. Under another arrangement, the graduate nurse who wished to further her education, if she met all University requirements, could be assigned to 30 hours of clinical experience in any one of the associated hospitals for the first ten months of her preparation and for 48 hours a week during a two-month period of administrative experience. In return she received full maintenance plus $10.00 a month, and the University enrolled her tuition-free. Four quarters of work under this plan earned for the student 20 and 30 academic credits which she could apply toward a baccalaureate degree. This, indeed, gave impetus to nurses to continue their education. Later, this arrangement became known as the "Learn-Earn Plan." One further benefit of this plan was the addition of giving other hospitals the opportunity of paying $200.00 a month for a qualified teacher—the director and her faculty making the selection. The result was that the hospitals were better staffed and by graduates of a higher type.

The first major change in the University curriculum was made at this time by Miss Densford and her faculty. They closed the gap between the

phases of theoretical and practical instruction. This was accomplished by giving all class and lecture instruction parallel with the clinical experience in the service. Emphasis, too, was always on the patient—the patient was the important one. "Total care" became a part of the curriculum.

At about this time, the nursing organizations realized the great need of knowing something of the trend in the education of the nurse. Studies were recommended. The Committee on the Grading of Schools of Nursing was created by the profession itself, made up of representatives of the nursing organizations. This study under the direction of Dr. *May Ayres Burgess* began in 1926 and closed in 1934 when the final report appeared under the title *Nursing Schools Today and Tomorrow.*

At the University of Minnesota School of Nursing a study of the criteria for the selection of students was made by *Ruth Merrill* in her doctoral thesis. This study was very beneficial to the school and resulted in fewer failures in the first quarter. At this time, too, new opportunities were opened up for five-year students. Dean Lyon's desire to see the development of nursing instruction closely integrated with the larger pattern of a liberal education was being realized.

To enhance the quality of instruction in the care of patients, clinical instructors were added to the faculty on some of the services. The first of these was Miss *Myrtle Hodgkins* (Coe) with a bachelor of arts degree from Brown University and a graduate in nursing from Walter Reed Hospital School of Nursing. Following graduation, she had been a teaching supervisor in medical nursing under Mary Tobin. Texts in this field identify Miss Hodgkins as the "first clinical instructor." For five years, she had been a ward instructor in Walter Reed Hospital School of Nursing. In 1932, Miss Hodgkins accepted the position of clinical instructor in medical nursing at the University of Minnesota with assignment at the Minneapolis General Hospital. She received her salary from the City of Minneapolis, but was officially an instructor and supervisor in the University of Minnesota School of Nursing.

Two other instructors, Miss *Ruth Johnson* for the Communicable Disease Department of the Minneapolis General Hospital and Miss *Evelyn Schoen* for the Obstetrics Department of the same hospital were appointed about the same time as Miss Hodgkins. Miss Johnson was a Walter Reed Hospital School of Nursing graduate with a baccalaureate

degree and Miss Schoen was a graduate of Johns Hopkins Hospital School of Nursing, also with a baccalaureate degree.

The next step in the revision of the curriculum was to improve the graduate program and to broaden the range of clinical experience in public health nursing. The increase in the number of students for the five-year program was quite noticeable. It is interesting to note that between 1909 and January 1932 there had been 847 graduates from the diploma course and only 84 of this number were from the degree course. Up to January 1934 there were 1,026 graduates from the diploma course and of this number 122 also received their bachelor of science degree. With the increase in degree students, there was the first consideration given to dropping the diploma course in the school.

In September of 1930, Dr. Walter List, the administrator of the Minneapolis General Hospital resigned. He had been a wonderful champion of nursing education as well as a very unusual and outstanding administrator. Dr. List was replaced by Dr. E. C. R. Remy.

In October 1931, postgraduate courses were started in the following departments of the Minneapolis General Hospital: pediatrics, obstetrics, surgery, operating room, medical nursing and communicable disease nursing. The courses were well planned, not only to give added experience, but also to prepare nurses for positions of advancement. During this year, also, the Kardex system of assigning patients to students and to show treatments and medicines for each patient was started. Today, this system is used in almost every hospital in the United States. It originated with the faculty of the University of Minnesota School of Nursing at the Minneapolis General Hospital.

Two types of awards to graduating seniors were established in the early 1930's. The first was the *Louise M. Powell Prize* of $25.00 by the Alumnae Association to the senior student who had attained the highest degree of efficiency in clinical experience, and the second, the *Marion L. Vannier Scholarship* of $100.00. This was an award for postgraduate training given annually by the Nurses' Self-Government Association of the School of Nursing.

The Depression had another effect on the School of Nursing. Wage levels of graduate nurses had fallen and the hospital seemed better able to employ more graduate nurses. Also, the hospitals felt that they should give employment to the graduates.

Late in 1932, the Northern Pacific Beneficial Association Hospital decided to discontinue its association with the School of Nursing on January 1, 1933 in order to do their part in employing graduate nurses. This was approved by the Board of Regents "with the understanding that the hospital agree to accept on a part-time basis a reasonable number of graduate students desiring to take academic work at the University." Similar action was taken by the Charles T. Miller Hospital a year and a half later. After June 1934, with the exception of the period of World War II, first-year students were not assigned to the Miller Hospital from the University. There was, however, one link with the University: all students were given three months clinical experience in the care of private patients.

A project which was very meaningful to the school at the time was the photographing of a few of the nursing techniques—the bed bath, making of a bed, etc. in June 1934. The photographing was done at the Minneapolis General Hospital. Miss Louise Waagen, a graduate of the school was the demonstrator and Barbara Thompson supervised the demonstrations. Eight of the elementary procedures were photographed and the pictures were used for some time to teach beginning students in Nursing Arts.

On February 15, 1934, the nursing program was further enriched when students were assigned for a period of six weeks clinical experience in the field of public health nursing.

"Getting the profit out of nursing" was a theme which had always been present in schools of nursing. The University school was better than many hospital schools but it was still an offender in its use of the student to help with the financial end of the hospital administration. Studies were made at Minnesota and at other places throughout the country, among them an outstanding one at the Massachusetts General Hospital, Boston, in 1932. Dean Lyon was very vocal on this subject and said that the service which the student nurse contributed to this profit was a "racket." Fortunately, the University school was able in 1932 to shift toward nursing education for the student rather than student service to the hospital. Hours of service assignment were reduced from 48 to 44, then 40, and later to 30 a week. Another faculty member in the Medical School, Dr. Richard Scammon, took an opposite view to Dean Lyon. To the director of the nursing school, he said, "It is your job to supply the hospital with nurses."

The history so far of the School of Nursing at the University of Minnesota can be measured in epochs, each of which has within it an event foreseen and consummated by its founder, Dr. Richard Olding Beard. In addition to the founding of the school, the establishment of the first five-year course in nursing education, and the utilization of the clinical facilities in four hospitals in the Twin Cities, the building of endowment for the school was begun. The establishment of this fund was as close to the heart of Dr. Beard as anything he ever did. The fund has brought noted educators to the University to give the Richard Olding Beard Lecture. The first lecture was presented by Annie Warburton Goodrich, R.N., D.Sc., Dean Emeritus of the School of Nursing, Yale University, on November 24, 1934. If Dr. Beard had been asked to name his memorial, it would be that each alumna not only contribute to the fund but do everything in her power to increase it for future benefits to nursing education.

Barbara A. Thompson Sharpless who prepared the above historical sketch of the first 25 years of the School of Nursing was born in Sault St. Marie, Michigan on November 1, 1889.

In 1910, she entered the University of Minnesota School of Nursing where she graduated in 1913. The next year she did private duty nursing after which she was supervisor of the operating room in the St. Andrew's and the Minneapolis City Hospital. In 1915, she took

Barbara Thompson

a three-months postgraduate course in the Lakeside Hospital, Cleveland, Ohio. The next year she did private duty, and from 1916 to 1918 she was head nurse on the women's floor at the University of Minnesota Hospital. From April 1918 to August 1919, she was an Army nurse attached to the University of Minnesota Base Hospital 26. However, shortly after arrival in France, she was detached from the Base and transferred to Evacuation Hospital No. 7. This hospital moved with the battle lines and in December 1919 became a part of the army of occupation. She was in five of World War I campaigns and received the Victory Medal.

After returning to the United States in June 1919, she supervised two surgical floors and taught nursing arts to beginning student nurses at the Research Hospital in Kansas City, Missouri. Then she returned to Minnesota where she was nursing arts instructor at the Charles T. Miller Hospital in St. Paul 1920-21. She spent the summer session of 1920 at Columbia University Teachers College. For the next four years, she was with the University of Minnesota Hospitals in administration and teaching. From 1926 to 1928, she was assistant to the director of the University of Minnesota School of Nursing.

In 1932, she was awarded the degree of bachelor of science in nursing education by the University of Minnesota College of Education. After spending a year with the Presbyterian Hospital in Chicago, she became director of nurses with the Minneapolis General Hospital. In 1934-38, she was director of the Bureau of Nursing Education and secretary of the Board of Nurse Examiners for the State of Wisconsin. The next two years she was assistant in the surveying of schools of nursing in the United States for national accreditation by the National League of Nursing Education. From 1940-43, she was educational director for the Board of Nurse Examiners, State of Missouri. During the year 1943-44, she was director of nurses and director of the School of Nursing of St. Luke's Hospital in Denver. The next two years she was with the United States Cadet Nurse Corps in Washington D.C. as nursing consultant for 250 schools of nursing. She then went to California where she was director of nurses, Santa Barbara General Hospital, instructor in the Extension Division, University of California at Los Angeles, director of nurses, Cottage Hospital and dean of Knapp College of Nursing, Santa Barbara, California 1948-51 and 1953-54 respectively.

At the 50th Anniversary of the School of Nursing, University of Minnesota, 1959, she received a 50th Year Anniversary Citation.

Miss Thompson and Mr. Samuel F. Sharpless (in the architectural field) were married in 1951. Since marriage, they have made their home in Woodland Hills, California.

Mrs. Sharpless has published extensively. In 1929, in collaboration with Marion L. Vannier, she published a volume entitled *Nursing Procedure* which was a manual used in the teaching of the principles and practice of nursing in the associated hospitals in the University of Minnesota School of Nursing. This went through four editions, the last being in 1945. She has also written a number of magazine articles, one entitled "A Combined Treatment and Assignment Sheet" which was published in *The American Journal of Nursing* in April 1932. This was done while she was director of nurses at the Minneapolis General Hospital. This treatment and medicine card, one for each patient, is placed in a visible file on the nurses station. This type of card is used in practically every hospital ward in the United States. The general plan of every card is the same as the original one used first at the General Hospital in Minneapolis. It has proved to be a godsend on the busy wards where head nurses were spending hours recopying the medicine and treatment sheet every day.

From February 1962 to November 1963, she wrote a series of articles entitled "History of Nursing Almanac for Tomorrow's Nurse"—*The Journal for Student Nurses.* These were sketches of outstanding nurses whose birthdays occurred in the month the magazine was published. Mrs. Sharpless is an honorary member of Alpha Tau Delta Sorority and also of Sigma Theta Tau Sorority. She is also a life member of University of Minnesota Alumni Association.

1934 - 1959

Katherine Jane Densford, who continued to direct the School of Nursing, spent her childhood on a farm in Indiana. High motivation toward a life of service characterized her from an early age. The early death of her mother called the teenaged Katherine to full management of the family's household.

Miss Densford was awarded the degree of bachelor of arts magna cum laude at Miami University in 1914 and the degree of master of arts in

Katherine Densford

history at the University of Chicago in 1915. High school teaching of Latin and German in Michigan, and of history in North Dakota absorbed the next three years.

When war came to the United States, Miss Densford decided to enter nursing. She completed her study of nursing at the University of Cincinnati School of Nursing and Health and later was head nurse there.

In 1925, she became assistant dean and associate director of the Illinois Training School (later the Cook County School of Nursing). During her subsequent administration as professor of nursing and director of the University of Minnesota School of Nursing from 1930 until 1959, Miss Densford became world renowned as a school administrator and professional leader.

The faculty grew and the school maintained its position of leadership as the world's first university school of nursing. Miss Densford held firm to the conviction that nursing and nursing education holds a key position in the advancement of medical sciences and improved health care of people the world over. Emphasis was given to the role of nursing students in campus activities. Miss Densford felt it mandatory that they feel themselves to be an integral part of the total student body. She made a sincere effort to maintain a personal relationship with as many of her students as possible and with their professional and student organizations.

In developing her early plans for the School of Nursing, Miss Densford had the keen insight to establish a new dimension of nursing education, —that of clinical instruction. Up to that time, the teaching of students at the patients' bedside had been limited to what could be provided by head nurses and nursing supervisors whose principle concern and responsibility was administration. In this development, Miss Densford combined the objective of establishing educational programs in the clinical areas with that of bringing to her faculty women who had earned liberal arts degrees before entering nursing. She believed this to be absolutely necessary for building an appropriate foundation for a professional school. The University of Minnesota thus became the first university school of nursing in the world to appoint faculty members for clinical instruction. Myrtle Hodgkins Coe was the first appointee, followed soon thereafter by Evelyn Schoen and Rutta Johnson.

During the 1937-38 academic year, Miss Densford took sabbatical leave, appointing *Lucile Petry* as acting director to assist with the teaching duties. With *Cecelia Hauge, Miss Densford* spent several months studying nursing throughout the world in large centers of Europe and Asia including Dr. Schweitzer's hospital in Africa. When she returned to her desk in 1938, the country was moving out of the period of catastrophic depression but the problems and opportunities of that era were to be replaced by those growing out of the world struggle against those who would rob man of his freedom.

By 1940, the enrollment in the nursing education major had burst the seams of the current schedule for practice teaching being offered once annually. Henceforth, the schedule was doubled even within the framework of an already overcrowded faculty load. Alternate solutions were considered; —some, such as an increase in the numbers of clinical nursing faculty, seemed like wishful dreams—and others seemed impractical or a rather poor compromise. The problem was later more nearly solved by having student teachers assigned to selected instructors in other schools of nursing in the Twin Cities for their "practice" teaching. Since these instructors had been students of Miss Petry with whom they had done their practice teaching they were aware of desired objectives and outcomes. The Smith-Hughes Act and much later, the George-Dean Act provided money for bringing to the school an additional faculty member in teacher education.

Already the faculty was recommending that the diploma programs

be discontinued and that students pay for their complete education as did other students in the University with the state furnishing additional needed subsidy as in other fields of education. But the war was to postpone the fulfillment of these plans as it brought to the school and its faculty a challenge which would prove these women's true metal under the leadership of a woman who believed the adage "if you can't find a solution, make one."

A very significant advance was made in school policy when in the spring of 1938 only students in the degree program were admitted to the School of Nursing.

The need for a larger faculty increased more rapidly than the supply of nurses adequately prepared for university teaching. The numbers of graduate and undergraduate nurses enrolled in senior courses in nursing education increased to a point where additional faculty was required to assist Lucile Petry and Katharine Densford. The major responsibility for teaching nursing education courses including the supervision of student teaching had been carried by Lucile Petry since 1929 when she joined the University faculty.

When *Miss Petry* was to be away from the University in the spring of 1939, Miss Densford followed her usual pattern of appointing to the faculty a woman who had experienced the discipline of a college education before studying nursing. She found such a person in *Ruth Harrington* who had received her degree from Radcliffe College in 1929, after which she studied nursing at the Massachusetts General Hospital School of Nursing.

In the fall of 1939, from the 16th to the 21st of October, the school celebrated its 30th anniversary with the theme "The University and the Preparation of the Nurse for Community Service." A calendar of most important milestones during the first thirty years was prepared by a faculty committee—

> 1909—The University of Minnesota School of Nursing, the first school of nursing to be a part of a university founded by Richard Olding Beard. Superintendent of Nurses, Bertha Erdman.
>
> 1910—Louise M. Powell appointed superintendent of the University of Minnesota School of Nursing.
>
> 1912—The first graduating class of eight students presented to President Northrop with recommendation for the degree of graduate in nursing.

1913—First meeting of the University of Minnesota Nurses Alumnae.

1917—Affiliation with Glen Lake Sanatorium established for experience in tuberculosis nursing.

1918—First public health course offered.

1919—Introduction of the 5-year curriculum in nursing leading to the degree of bachelor of science and diploma of graduate in nursing. Nurses' Self Government Association organized.

1920—Central School including University of Minnesota Hospitals, Minneapolis General Hospital, Charles T. Miller Hospital of St. Paul and the Northern Pacific Beneficial Association Hospital of St. Paul established. First *Alumnae Quarterly* published.

1921—Beta chapter of Alpha Tau Delta, now national nursing sorority for 5-year nursing students installed.

1922—Department of Preventive Medicine established at the University with Dr. Harold S. Diehl as head. Public Health Nursing courses under the direction of Anna Jones (Mariette) and Dorothy Kurtzman.

1923—Louise M. Powell appointed first director of the University of Minnesota School of Nursing. Office of the School of Nursing established in Millard Hall. Nursing superintendents and their assistants, and members of the teaching staffs of the affiliated hospitals given faculty rank.

1924—Marion L. Vannier appointed as Miss Powell's successor. Eula Butzerin appointed to teach public health nursing courses.

1930—Katherine J. Densford appointed director of the school.

1931—Postgraduate curricula in clinical services established with university credit. Decrease of hours from 54 to 48 (later 42) approved.

1932—Group method of rotation of students to various clinical services introduced. Position of instructing supervisor for clinical instruction established carrying faculty rank of instructor.

1933—New nurses' hall on the University campus dedicated by Richard Olding Beard.

1934—Epsilon chapter of Sigma Theta Tau, national honorary nursing sorority installed. Field practice in public health nursing in Minneapolis and St. Paul included in undergraduate curriculum for all students.

1937—Practice in psychiatric nursing added to undergraduate curriculum.

1938—The University nurses' hall officially named Powell Hall. First of annual admission in spring quarter of five-year students only began.

1939—The 30th anniversary of the University of Minnesota School of Nursing.

THE WAR YEARS

In August 1940, the University accepted sponsorship of Base Hospital Unit 26 of the United States Army with *Cecelia Hauge* graduated in the class of 1929 as its chief nurse. Prior to this time, Miss Hauge had been associate professor and director of nursing at University Hospitals. In appreciation of the base hospital's valor and outstanding service to the Army's combat troops in the Mediterranean Theater of Operations, it later received a citation for meritorious service and the University received a certificate of appreciation from the War Department.

While the University of Minnesota School of Nursing was preparing students for service to their country, the federal government was drawing upon University faculty members to assist with special assignments. *Lucile Petry* became director of the cadet corps, first in 1941 on leave from the University. In 1943, she resigned her position in Minnesota to become dean of the Cornell University School of Nursing but instead remained permanently in the United States Public Health Service where she later became Chief Nurse Officer.

Others in federal services included *Louise Waagen, Jean Taylor, Caroline Rosenwald* (Blanchard), *Lucile Halvorsen, Dorothy Sutherland, Pearl Shalit,* and *Rosalie Peterson.* Numbered among those serving as officers in the Army were *Cecelia Hauge*, who achieved the rank of Colonel, *Ellen Rasmussen, Hortense McKay, Georgia Nobles, Irma Block, Irene Kemp, Myrtle Kitchell, Beatrice Lofgren, Marjorie Sorenson, Cecelia Lediger, Marriet Grimes, Maida Hewitt, Gladys Saterbak, Anne Hauger Towen, Helen Walch,* and *Ellen Church.* Those named constitute only a small segment of the total number who volunteered their services to provide nursing for the hosts of men in the Armed Services.

The school received federal support for a number of its programs during the war period. Thirty-two faculty members were added to the staff in the Cadet Nurse Corps program, and financial aid for postgraduate and refresher study was provided in order that the full nurse power of the country might be made available for military and civilian service.

Rural Nursing. Minnesota is one of the nation's rural states with many rural hospitals of varying size and quality of patient care. In the belief that more nurses would be attracted to rural hospital service

if they were given the opportunity as students to realize the satisfactions of working closely with patients, their families, and doctors in this kind of a setting the faculty was led to a consideration of this problem. The faculty decided in June 1943 to use federal aid to inaugurate a demonstration project whereby Senior Cadet students from the University school would be sent for supervised experience into communities having small hospitals of about 50 beds. This demonstration was the first of its kind to be offered in the country and served as a sound basis for rural nursing experience for students not only during the war but later in an expended form as a program available to students in all schools of nursing in Minnesota. It also served as a model studied by other states interested in instituting similar programs.

In the beginning, Mrs. *Mabel Larson Roach,* a member of the University faculty, was appointed to act as coordinator between the school of nursing and the rural communities. The hospitals chosen were the Itasca County Hospital, Grand Rapids, Minnesota, and Wesley Memorial Hospital, Wadena, Minnesota. They were both among hospitals approved by the American College of Surgeons. A nurse on each hospital staff was appointed to be in charge of the hospital instruction, but the student's experience was to take them beyond the hospital walls into the life of each community. Accompanying the public health nurse in her daily round of activities, attending church and farm meetings, —in other words, becoming acquainted with all facets of rural life with emphasis upon those concerned with the community's health characterized the planned rural experience. Assignment of the first students was preceded by most complete orientation of all persons involved in the project. Nurses from the rural hospitals were brought to the University to become acquainted with the students' learning prior to this experience and to become familiar with the nursing techniques used at the University.

No doubt the painstaking preparation had much to do with the success of not only the project but the continued rural hospital experience in the curriculum. In 1948, people from the rural communities interested in the project and urban schools of nursing began to plan for a continuation of rural experience after the termination of the United States Cadet Nurse Corps. The Minnesota League of Nursing Education was asked to appoint a committee to make available rural experience for students in all schools desiring to participate. The University of Min-

nesota School of Nursing was asked to administer the plan. The instructor who had been employed with support from the W. K. Kellogg Foundation to develop a program in rural nursing for graduate nurses carried the additional assignment of coordinating the program for students in basic professional curricula. This affiliation was initiated in the fall of 1948 under the leadership of *Marjorie Low*.

During this period of history, the spotlight was also focused upon the plight of nursing care in *hospitals for the mentally ill.* Psychiatric nursing was included in the curricula of very few schools, and there was a complete lack of opportunity for graduate nurses to become prepared in this nursing specialty. In answer to a request from the American Psychiatric Association in 1945, that the University of Minnesota be the first school of nursing to conduct experiments in advanced training of psychiatric nurses, Mrs. *Ione Slough* was added to the faculty to develop necessary facilities and program. The School of Nursing, the College of Medical Sciences, the Mayo Clinic and the Rochester State Hospital worked in close partnership to provide students with a most excellent experience. During their period in Rochester, students worked with patients at the Rochester State Hospital, and also followed patients in neurosurgery at Mayo Clinic through their operative and postoperative period. Members of the medical staff at the clinics conducted classes and personal conferences which enriched the course in a remarkable way. When Mrs. Slough resigned at the end of the war, the program was continued by *Cecelia Lediger*. She had been engaged in psychiatric nursing in military service after receiving the degree of bachelor of science at Temple University and the master of arts degree at Teachers College, Columbia University. When the National Committee for Mental Hygiene prepared a group of radio scripts to dramatize for the general public the positive effects of care, the State Hospital at Rochester, Minnesota, was chosen as a setting for the first one and the University students appeared in this significant documentary. During the late 1940's, Miss Lediger conducted programs in Rochester and at the University simultaneously and since larger numbers of graduate nurses were choosing the curriculum on the University campus the certificate program in Rochester ended in 1950.

While the School of Nursing was losing outstanding faculty members to other wartime services it was also striving to meet the educational challenges presented by a country preparing for, and later engaged in,

war. Student enrollment increased rapidly from the 1939 level to the point where an additional class of three-year students was admitted in January of 1942, and in June of 1942 college graduates were admitted to a special two and one-half year curriculum. The school was presented with the responsibility of preparing a greatly expanded number of graduate nurses to meet mounting needs in military service, industry, hospitals and homes. A nation must be kept well and so public health agencies were recruiting nurses for programs in preventive medicine. Nurses must be better prepared than ever before to work with a minimum of supervision in any one of the broad areas of nursing. These objectives the school set out to achieve. But it must receive help.

The University of Minnesota School of Nursing did not wait for assurance of needed financial assistance before launching upon an expanded wartime program for both undergraduate and graduate nurses. They had already increased enrollment and the number of times each year when students might enter the school. The curriculum now included the war aspects of nursing and three new major sequences were added in the degree curricula. They were ward administration, teaching of sciences in schools of nursing, and physical therapy. Faculty members taught home nursing and first aid to civilian groups and provided instruction for volunteer and paid personnel who would supplement nursing service in hospitals. The faculty continued advanced study including courses and staff education. Studies relevant to the improvement of the school's policies and curriculum were continued.

In 1941, the Congress had appropriated a very small sum to assist in nursing education. In 1942-43, the amount was raised to $3,500,000. But this was still wholly inadequate to meet the overwhelming task which schools of nursing must undertake. In the summer of 1943, Representative Frances Payne Bolton of Ohio who had been closely associated with nursing education at Western Reserve University authored the legislation which led to the establishment of the United States Cadet Nurse Corps. It provided the glamour and the funds necessary to attract into nursing any young woman for whom so crucial a wartime service to fighting man or to civilians held any appeal. The Bolton Bill was passed in June of 1943 and funds were made available to approved schools of nursing on July 1st.

In the face of a rapidly increasing student body and the associated increase in programs of study offered by the school, there was need

for expansion of certain facilities which must be met. These included dormitory space, teaching space, and personnel, and clinical facilities for student practice. The number of students admitted increased from 120 in 1939 to 591 in 1944. The total enrollment in 1939 was 285, in 1944 was 982.

Army Nursing Corps. These teaching arrangements required new teaching techniques but the faculty accepted the need for adjustment and improvisation in the same spirit as did the military personnel. The question was not "can it be done" but rather "how best can we do it?" The Army Nurse Corps continued to reduce the number of graduate nurses in civilian hospitals and so an ever increasing burden fell upon clinical instructors and students alike. Since the Bolton Act was designed to pay the entire cost of education for the students in the Cadet Corps in addition to furnishing the uniform and a graduated stipend from 15 to 30 dollars a month granted each student, availability of qualified nurses rather than money was the limiting factor in enlarging the faculty. Thirty-two additions were made to the faculty, some in the central office and others in the hospitals.

In addition to assisting undergraduate education, the Bolton Act also paid maintenance and tuition costs for postgraduate students and instructional costs for refresher courses.

Students were admitted to the Corps upon entering the School of Nursing.* When they enrolled they signed statements agreeing that after graduation they would remain actively engaged in either military or essential civilian nursing for the duration of the war. This did not exclude marriage. The program of the three-year course was accelerated so that the last six months, called the senior cadet period, students were free to provide full-time nursing service in a civilian hospital or in one of the federal services. These included Army, Navy, Veterans Administration, Indian Affairs or one of the Marine hospitals of the United States Public Health Service. The student was free to make her own choice.

The University's group of cadets became outstanding in the nation. The University received recognition "between halves" at the Iowa-Minnesota football game in November of 1943 when a telegram from Surgeon General Thomas Parran, United States Public Health Service

*At this time, 5-year students entered the School of Nursing upon completion of five quarters of study in the College of Science, Literature and the Arts.

was read to all attending the game and answered by University President Coffey. The telegram read:

> "Congratulations to the School of Nursing at the University of Minnesota for the magnificent effort it is making towards winning of the War. You have enrolled in the United States Cadet Nurse Corps the largest number of student nurses of any institution in the country. To make this record possible, you have greatly expanded teaching and housing facilities. The Cadet Nurses at Minnesota through their pledge to do military or civilian nursing are engaged in an essential war service. My grateful appreciation to you, your faculty and students for your outstanding contribution."

President Coffey replied:

> "I wish to thank Surgeon General Parran. The University of Minnesota feels greatly honored by this congratulatory message. Congress, in creating the Cadet Nurse Corps, hoped to relieve the trained nurse shortage by insuring that every qualified girl who wished to prepare herself to be a nurse could do so regardless of her financial situation. May I express publicly my appreciation to Miss Katharine Densford, Director of our School of Nursing, to members of her staff, and to the others who assisted in bringing this important war recognition to the University."

A total of 1,215 cadet nurses were prepared at the University of Minnesota.

Public Health Nursing. With Miss Densford's own interest and experience in public health nursing, it is not surprising that in December 1933, after two years of effort, approval was given for a six week period of experience in public health nursing in the private agencies of Minneapolis and St. Paul. Contingent upon this was agreement that the students would pay their own maintenance during their first quarter in the School of Nursing. The hospitals would provide substitute nursing service for students as they were rotated to public health nursing. During this biennium, public health experience was also initiated in the postgraduate courses.

The five-year course of study leading to the bachelor of science degree was broadened to include more elective subjects and was enriched in the area of the social sciences, especially sociology and psychology.

Research, a most essential facet of any progressive university program, became a vital activity of the School of Nursing even during the depres-

sion years when the Federal Government through the Civil Works Administration (later, the Works Progress Administration) assigned workers from the rolls of the unemployed to serve as assistants in research projects. The School of Nursing employed many graduate nurses as well as others to work with Miss *Phoebe Gordon,* a long time member of the School of Nursing staff, to conduct time and activities studies, evaluations of techniques, comparisons of curricula, relation between achievement of students and certain personality traits, qualities of three hundred graduate nurses from all fields of nursing, evaluation of criteria for the selection of students and other research projects.

Much was left to be accomplished in the opinion of the faculty in spite of the encouraging progress already achieved. The philosophy of the school in the mid-thirties was expressed at the conclusion of the 1934 President's Report: "What the public and the nursing profession both need at present is quality, not quantity, in nurses. To provide this quality should be the aim of every university school. To insure it, the school must require quality in faculty, in students, and in all other factors which go into the making of a nurse prepared adequately to give preventive and curative nursing care not only in the institution but also in the community which she will be expected as a graduate to serve."

In 1937, *psychiatric nursing* was added to the undergraduate curriculum when a psychopathic unit was established at the University Hospital under the progressive leadership of Dr. J. C. McKinley. Later, when the visiting nurse agencies became overwhelmed with graduate nurse students and three-year diploma students were forced to lose this valuable facility for learning experience, assignment to the University nursery school and additional experience in the outpatient departments were substituted. In order to bring public health concepts into all parts of the curricula and to the care of all patients, a public health nurse was added to the faculty of each hospital.

POST WAR ERA

When World War II ended, attention was again focused upon plans interrupted by the war. While the enrollment was still high in the basic curricula, the time seemed opportune for discontinuance of the three-year program, a milestone which was reached in July 1947. Soon after

this time, the students were withdrawn from the Minneapolis General Hospital as a "home" hospital.

Course for Practical Nurses. Because of such factors as the economic condition of the country and the number of graduate nurses decreasing, it was becoming necessary to supplement professional nurse service with that which could be provided by trained practical nurses. Schools of practical nursing were rapidly appearing upon the horizons of hospital education.

As upon many occasions in the past, Miss Densford's sensitivity to need and current trends coupled with her determination that anything worth doing was worth doing well led her to the conviction that the University had an obligation to establish a course for practical nurses. A committee of the school headed by *Thelma Dodds* and including *Ruth Harrington, Beatrice De Lue* and *Agnes Love* prepared a blueprint for the creation of a course of study and in 1947 it was approved by the faculty, by Dean Diehl and the Board of Regents.

As practical nurse schools have increased in number, they have required a growing number of teachers. The university course has served as a laboratory for practice-teaching in practical nurse instruction. Thus, the school has prepared the practitioner and the teacher at one and the same time.

Eugenia Taylor, who has been in charge of the program throughout the years of development and refinement, has brought an unusually deep interest and enthusiastic belief in its value.

The School of Nursing has always regarded the programs in practical nursing as experimental demonstrations to be reviewed periodically for appraisal of their place in a university setting. In fact, this has been the principle underlying the establishment and continuation of all programs of the school.

Course for Graduate Nurses. Graduate nurses being separated from military services at the conclusion of the war desired programs of education which would enable them to provide patients with a new dimension of care. Replies to questionnaires reflected the dissatisfaction of nurses coming home from wartime activities with the type of nursing which they felt qualified to give. They were eager to establish nursing upon new foundations and asked universities for help.

The W. K. Kellogg Foundation had become interested in new edu-

cational experiments for graduate nurses and complied with Miss Densford's request for support of this significant innovation. It agreed to a grant of nearly $30,000 a year for a period of experimentation which actually lasted for five years.

The first two programs in advanced clinical nursing, developed in the areas of medical and pediatric care, were offered in 1948. Mrs. Myrtle Coe was placed in charge of all clinical programs and was specifically responsible for the one in medical nursing. A striking example of Minnesota's international tradition was personified in the instructor appointed to take charge of the program in pediatrics. Mrs. *Ching-ho Liu Chu* had been educated in a Chinese university where students of nursing and medicine were registered together in the same courses. She was persuaded to interrupt her studies at Columbia University where she had matriculated for her doctorate degree. She was unusually well prepared in the field of child care including child psychology and child education. During her year of participation in the course, she built a broad and strong foundation to which her successors could continue to contribute. The program attracted considerable attention on the part of nurse leaders and attracted able instructors to the faculty. *Myrtle Brown* succeeded Mrs. Chu. *Ruth Weise* inaugurated the course in operating room nursing, *Katherine Kendall* became responsible for obstetric nursing, *Cecelia Lediger* for psychiatric nursing, and *Alma Sparrow* joined the faculty to coordinate and strengthen the social and community aspects of nursing in all curricula of the school. Each faculty member was already a specialist in her chosen clinical field at the time of her appointment and was able to bring creative inventiveness to her program. Fresh energies continuously swelled the enthusiastic enterprise of these leaders as others joined the original group of instructors. *Helen Hanson* took charge of the surgical course, *Marjorie Low* developed the rural nursing field and the staff in psychiatric nursing was augmented by *Helen Bowditch, Helen Linehan, Edith Newhart, Lois Anderson* and *Kathleen Black.* Miss Black later became director of the mental health and psychiatric nursing advisory service of the National League for Nursing.

Revision of Curricula. The year 1949 brought major changes in the basic professional program. Up to that time, the degree had been granted by the College of Education or the School of Public Health

depending upon whether the student chose her fifth year major in nursing education or in public health nursing.

Complete revision of the curriculum resulted in the elimination of the fifth year of study with resulting reduction of the time required to earn the bachelor of science degree to 16 quarters. The degree thereafter has been granted by the College of Medical Sciences. This step held far greater significance than appears to the casual observer. It marked the coming of age, so to speak, of the school of nursing. The University now recognized that the course content in nursing had reached such value in both general academic dimension and professional depth as to be worthy of earning a degree without the overlay of a major either in education or in public health.

Since 1954, this curriculum has been directed by *Dorothy Titt,* a deeply dedicated and excellent teacher of brilliant mind and creative ability. Having received her bachelor of arts degree from Huron College in South Dakota, she was teaching high school history, her college major, at the outbreak of the war and entered the School of Nursing in the all-college-graduate class of the summer of 1944. Instead of graduating with the rest of her class, she elected to spend an additional year and a half in order to complete requirements for the double major in nursing education and public health. She came to the faculty originally to direct the practical nurse program.

NEW HORIZONS

As World War II came to a close, all of the curricula of the school of nursing came under the scouting of the faculty to make sure that everything possible was being done to keep them abreast of current developments in the medical and nursing fields and to enrich their educational value to the students.

In 1950, a new dimension was added when the school of nursing offered for the first time a master's degree in nursing education. Candidates are registered in the College of Education. In addition to courses appropriate to the graduate school level of study, the students act as associate teachers during their quarter of teaching experience and are expected to be more self-directing.

The need for nurses with a high level of preparation in education and administration was recognized by the federal government. As a

result of the Health Amendments Act, passed by Congress in 1956, the School of Nursing received $107,744 in 1956-57 and $134,212 in 1957-58 for traineeships to prepare nurse educators and administrators.

In 1954, the School of Nursing added a new international dimension to its scope of activities. Miss Densford had always injected this flavor into the school's concerns, and throughout her directorship students and faculty had enjoyed the company of people from foreign lands. Students from countries north and south of the equator and from both hemispheres kept the school's horizons broad and its awareness sensitive to nursing developments in all sections of the world.

It was therefore not a difficult step for the School of Nursing when Harold Stassen, a University of Minnesota alumnus, requested the University to accept from the United States Foreign Operations Administration the assignment of providing major assistance in the rehabilitation of the Seoul National University which had been devastated by the Korean War. Nursing educators from the Korean school came to the Minnesota campus for a period of observation and study. Miss *Marjorie Low* of Minnesota's faculty went to Korea to help the hospital nurses there put into practice the philosophy that all medical advancements, nursing education, and administrative policies are purposeless except as they improve patient care and national health. Miss Low was replaced in 1958 by *Joan Williams*. Total replacement of equipment removed by the Communists made necessary a shipment of supplies worth $16,000 to give nurses the tools with which to set up the school once again.

With the strong international interests surrounding students in nursing at the University of Minnesota, it is not difficult to explain their interest in service to faraway lands. Graduates and faculty have accepted overseas assignments in Japan, Korea, India, Tripoli, Greece, Iran, Iraq, Thailand, and in countries of South America. There are no doubt others who could be named if knowledge were complete.

Throughout her administration, Katherine Densford always interpreted to the schools and nursing organizations of the state each contemplated change in curriculum or new program to be undertaken. She always worked very closely with the alumnae of the school in whatever plans the school was contemplating. As a result, she always received strong support and assistance from the School of Nursing Alumnae Association. For many years, the association had been independent of the University's Alumni Association carrying on its own program in

behalf of its members. One of its activities has been to raise funds for the Endowment Fund initiated by Dr. Richard Olding Beard. In 1958, the alumnae, numbering nearly four thousand, took action to become members of the University's General Alumni Association and to direct their benefactions into the University of Minnesota School of Nursing Foundation. With the assistance of Mrs. Walter W. Walker and Mrs. Frank Bowman, Miss Densford was instrumental in the establishment of the Minnesota School of Nursing Foundation in November of 1958—the realization of a thirty-year dream.

The role played by the school throughout the years of Miss Densford's directorship as the nation has moved through periods of depression, war, post-war recovery and rapid expansion of health programs and facilities. Throughout her years here, she gave most devoted service to the University of Minnesota School of Nursing. She saw its function as that of providing the highest standard of education for students preparing to meet the specific nursing needs in Minnesota or anywhere else in the world whether they be in hospital or public health nursing service, research, or education. To this end, she studied, traveled, read, and worked. Her life was lived for nursing.

Her activities took her throughout the world as her interest and influence in global health care grew. "America could have found no better representative than this tall, poised woman who, in the early years of her maturity and ever thereafter, looked like the Greek ideal of womanly intelligence." But it was not her personal beauty that continued to hold people after the first attraction. It was her sense of humor, her kindly treatment of everyone, her dignified air of competence without ostentation. In 1937 and 1938, during a sabbatical leave from the University of Minnesota, she attended a meeting of the International Council of Nurses in London and followed it by a journey around the world studying and investigating nursing conditions in each of the countries visited. She had previously studied conditions abroad in 1922 and in 1933.

Perhaps her manner of dealing with one important period of her life can illustrate her attitudes, character, and self discipline. Her last year as director coincided with the school's 50th anniversary. Much attention was given to the occasion. Having majored in history, Miss Densford, and the faculty under her leadership, spent two to three years in preparing for the celebration.

While she was director of the School of Nursing, she held many important offices in state and national nursing organizations. These included first civilian nurse consultant, Army Nurse Corps; first nurse member, Special Medical Advisory Group, Veterans Administration, and consultant in nursing, national co-chairman, American Nurses' Foundation campaign and co-chairman of the Foundation's Advisory Council. She served on the Executive Committee of the National Health Assembly, the National Commission on Hospital Care, the National Nursing Advisory Committee of the Red Cross, the Mayor's (Minneapolis) Health Advisory Committee, and is presently a member of the Minnesota Governor's Commission on the Status of Women and of the Minnesota State Board of Health.

She has served as president of the Minnesota League of Nursing Education, the Minnesota Nurses' Association, the American Nurses' Association; national president of the Alpha Tau Delta and Sigma Theta Tau; second vice-president of the International Council of Nurses; observer at the San Francisco United Nations Conference.

She is co-author of *Ethics for the Modern Nurse* and *Counseling in Schools of Nursing.*

Miss Densford's honors include: Phi Beta Kappa; honorary degree of Doctor of Science (Baylor University) and Doctor of Laws (Miami University); American Nurses' Association Honorary Pin for Outstanding Service; and citations from the Minneapolis Red Cross, AAUW and YWCA, from Hamline University, the Minnesota League for Nursing, and the Minnesota Nurses' Association. She was the first woman to give the University of Minnesota Cap and Gown Day address.

Perhaps further insight can be gained by examining some of her own statements of her philosophy as we find them in "This I Believe about Nursing in a Changing World," written for the *Nursing Outlook* in 1964. First, a general statement of faith: "My most basic beliefs through the years have clustered around the principle of faith: faith in God, in country, in people.

"Faith in country . . . recognizes the 'inherent dignity and equal and inalienable rights of all members of the human family.' This ideal is one in which I have an abiding faith, and it is one which I have tried to promote in all my nursing activities." About people, especially young people, she has this to say: "Having faith in people has its rewards—this I strongly believe. Deeply committed to the belief that people of

ability, especially young people, can do anything to which they set their minds and concurring with Emerson that 'our chief want in life is somebody who will make us do what we can.' I have wanted them to trust themselves, to set and achieve their goals. The objective? That these young people shall be prepared to give leadership to nursing as practitioners, administrators, teachers, researchers."

Her convictions in regard to education are expressed thus: "I subscribe to the belief that education of youth (and adults) is the foundation of the democratic way of life. For this reason, I believe in our efforts to liberalize the education of professional people, including nurses. All this in order that they may have not only the tools of their profession, but also the general education needed for responsible citizenship, and the informed judgment needed in a world community in which professions are playing increasingly important parts."

During her last year on the faculty, many of her friends were deeply concerned about what Miss Densford would do after retirement. Her physical, intellectual and emotional conditions were those of a very much younger person and she still had a most valuable contribution to make to society. But where and how? Finally, the day of retirement came and she closed the door of her office upon her completed work. A short time later she was married to Carl Dreves.

During the period from 1959 until the present, she has been serving as a member of the Minnesota State Board of Health, as a member of the Minnesota Governor's Commission on the Status of Women and has been very busy with the duties of several committees of the St. Paul City Women's Club. She has also learned to type, to drive a car and is now becoming a Grandma Moses. Requests that she make herself available for offices in professional organizations have always received the same response, "New young blood is needed to cope with questions of today's profession. Those who are actively engaged in nursing are those to carry the current responsibilities." Most recently, Mrs. Dreves was elected to receive the outstanding Senior Citizen of the Year Award by Ramsey County.

Since her retirement, she has held the rank of professor and director emeritus of the University of Minnesota School of Nursing.

Mrs. *Myrtle Hodgkins Coe* who prepared the above sketch of the School of Nursing from 1934 to 1959 was born in Providence, Rhode Island. After graduating from Classical High School there, she entered

Myrtle H. Coe

Pembroke College in Brown University where she completed the premedical program in addition to the requirements for the bachelor of arts degree. She then graduated from the Army School of Nursing at the Army Medical Center in Washington, D.C. where she was awarded the Rhea Medal. She then became a member of the faculty of the Army School of Nursing to initiate a new concept in nursing education. Miss Hodgkins was then appointed instructor on the faculty of the University of Minnesota School of Nursing.

In 1937, she was promoted to an assistant professorship. One year later, she asked for demotion to rank of instructor in the Department of Physiology in order to pursue graduate study.

No sooner had she completed her course work and launched upon her research project than the United States declared war. She was then assigned to teach physiology with additional teaching responsibilities in physiological chemistry. In both of these courses, nurses were registered from most Minneapolis Schools of Nursing. While in the physiology department, she met John Coe, a graduate student in physiology and married him while he was in medical school.

At the end of the war, she returned to the School of Nursing faculty to be in charge of specialized clinical nursing courses for graduate nurses

registered for the bachelor of science degree. She taught courses in medical nursing and also introduction to medical science and later pathology.

In 1961, she resigned from the University. A year or two later she taught a television course in anatomy and physiology to the students in several Schools of Nursing in Minneapolis and St. Paul. In 1965, she organized a program to prepare operating room technicians at the Hennepin County General Hospital and since then has been in charge of the program.

Mrs. Coe has held many offices in nursing organizations beginning in 1931 with the secretaryship of the Graduate Nurses Association in Washington, D.C. In Minnesota, she held offices in the League of Nursing and in the district and state levels of the nurses association. From 1948 to 1952, she served as president of the Minnesota Nurses' Association and in 1956 became first vice-president of the American Nurses Association.

In 1944, Mrs. Coe was appointed by the American Nurses Association as its representative to the newly organized Council on Rheumatic Fever which was closely allied with the American Heart Association. It included in its membership representatives of the American Hospital Association and of medical specialties especially concerned with the need to bring about a drastic decrease in the incidence of rheumatic fever if deaths from heart disease were to be significantly reduced. Shortly thereafter, the American Heart Association broadened its program and membership to include those outside the medical profession. Thereupon, the Council on Rheumatic Fever became an integral unit within the association. During the ensuing years until 1966, Mrs. Coe served as nurse representative on committees of several councils of the American Heart Association and on the executive committee of the Council on Community Service and Education. She was an original member of its Committee on Nursing.

From 1958 until September 1963, she was a consultant to the Advisory Council on Nursing of the Veterans Administration Nursing Service. Since 1955, she has been a member of the Editorial Board of the *Journal of Chronic Diseases.*

Some of the other professional offices in which she has held membership include: The Governor's Advisory Committee on Nursing, The

Board of Directors of the Minnesota Heart Association, The Executive Committee of the Committee on Cardiovascular Clinics of the American Heart Association, The Education Committee of the Council on Rheumatic Fever and Congenital Heart Disease of the American Heart Association, The National Joint Commission for the Improvement of the Care of the Patient. She has also been secretary of the American Nurses Association Counselling and Placement Service, Inc., and The Board of the American Nurses Foundation, Inc.

Mrs. Coe has had many articles published and has written three nursing texts, *Physiology Laboratory Manual, Introduction to Medical Sciences* and *Introduction to Pathology.*

1959 - 1965

In 1959, Katharine J. Densford retired as director of the school. She left her post after 29 years of service to the University only to assume new duties as Mrs. Carl A. Dreves and as a champion for nursing always. This same year, the curtain opened on the School's new director, *Edna L. Fritz.* Reminiscent of the School's earlier leaders such as Miss Powell and Miss Vannier, Miss Fritz's graduate studies were at Teachers College, Columbia. Arriving with an almost completed doctorate and rich experiences in nursing, Edna Fritz was more than ready to assume her new responsibilities.

Also during 1959, a review board for accreditation (by the Department of Baccalaureate and Higher Degree Programs, National League for Nursing) visited the school. Their criticisms echoed areas for improvement that had concerned the faculty for some time. It was obvious that many changes were necessary for the school to keep up with the best known ways of providing nursing education. One fundamental revision was the discontinuance of required services by nursing students in the University Hospitals in exchange for room and board. Back in 1912, Dr. Richard Olding Beard had commented that the University Hospital would need more graduate nurses than other hospitals since the nursing students were to be educated rather than used for service. However, it wasn't until 1962 that nursing students could join the ranks of other university students and enter the school without having to move into Powell Hall. The gradual transition continued until 1965 when the last class working thirty hours a week in the hospital graduated in March.

A NEW BACCALAUREATE CURRICULUM IN 1962

When the faculty began preparations for the baccalaureate program revisions, they chose to take giant strides toward futurity. Even though at one point the entire nursing faculty was ready to resign rather than continue teaching in a situation not compatible with their beliefs, plans for curriculum revision surged forward with a mighty swell of intensive, creative thinking to develop a new 13-quarter program.

Encouraged by Miss Fritz's drive and imagination, the faculty shook off all the trappings of existing nursing programs and framed a new statement of philosophy. During 1959-1960, the faculty drafted a statement which described baccalaureate education in the School of Nursing compatible with beliefs and purposes of the University. Statements of philosophy, purpose, and objectives were developed for each of the School's programs—practical nursing, baccalaureate and masters.

To allow time for necessary curriculum revision, a decrease in faculty work load was mandatory. In August 1961, the last small summer class graduated and overlapping instruction stopped as only one class was admitted a year during the fall quarter. Over a period of time, the school gradually discontinued providing instruction and experience for students in other nursing programs. The University of North Dakota nursing students obtaining instruction and experience in pediatric and neuropsychatric nursing stopped their affiliation winter quarter 1962. St. Olaf College students also obtained instruction in pediatric nursing elsewhere after 1962. Students in a number of hospital diploma programs continue studies in several non-nursing university courses, but the Extension Division acts as the liaison for these arrangements.

THE DEVELOPMENT OF THE INDIVIDUAL

In 1909, Dr. Richard Olding Beard wrote that the purpose of the University education for the nurse was primarily the development of the individual. Secondly it was to secure adaption of the individual to some purpose. Since then, nursing has become much more complex, and in general demands much more from the individual. It seems unlikely that this trend will diminish. Esther Lucille Brown recently proposed that nursing education require even greater development of the individual than ascribed by Dr. Beard, a complete liberal arts education at the baccalaureate level prior to nursing preparation. In this manner, the individual can grow, intellectually, socially, and emotionally without

the pressure of making immediate application of the knowledge gained.

The new baccalaureate curriculum does not go as far as Esther Lucille Brown suggests, but it does allow considerably more time for academic pursuits in non-nursing fields. In fact, with the new program, enterprising students can, and do, obtain academic minors. Thus, in addition to a major in nursing, they may minor in such fields as sociology, art, zoology, political science, etc.

To allow students more time to study electives during their junior and senior years, nursing content is presently introduced in the second academic year at the University rather than in the third.

With the exception that a required nursing course is offered only during the summer of the junior year, the new curriculum is comparable in length to other baccalaureate programs in the University. Required courses are programmed so students may enroll for electives every quarter except one during their undergraduate studies. This provision enables nursing students to acquire depth in areas other than nursing by taking upper division courses in an elective field during their junior and senior years.

THE ADAPTION OF THE INDIVIDUAL TO A PURPOSE

After March 1961, new approaches were introduced to teach nursing students about the prevention and control of tuberculosis, as well as the care of patients who contract the disease. The students no longer went to Glen Lake Sanatorium for experience. Further changes in the programs necessitated the discontinuance of rural nursing experience. The last group of students to spend a month in small rural hospitals completed their work there in the winter quarter 1963.

For years, nurse leaders and educators had pointed out that the unique role nurses had in the health profession was being smothered by increased emphasis on administrative and technical tasks. In their race to keep up with the knowledge explosion, nurses failed to focus on those nursing skills desperately needed for better patient care and not provided by others of the health team. The nurse needed more than the knowledge and skill to do necessary practical and technical work of nursing. She also needed tools to provide the best milieu for each patient in varying situations. Further, her entire approach in providing nursing care needed radical shifting. Rather than viewing her work as the application of water, medication, sponges, and equipment to many different sick

people, she should first and foremost be concerned about the sick person to whom all the applications are made. Attention has been given over the years to teach nurses about patients individual needs. But it was, and is, difficult for a nurse to apply this emphasis under the prevalent system of "to do's."

The major stumbling block to teaching a new approach in nursing was that it had to be developed first. In 1935, Anne Goodrich gave the first *Richard Olding Beard Lecture* and quoted some of Alfred Whitehead's comments on education, "The proper use of a university is imaginative acquisition of knowledge—a university is imaginative or it is nothing. It (imagination) can only be communicated by a faculty whose members wear their learning with imagination." In 1960, as in previous decades, the School of Nursing faculty exemplified Dr. Whitehead's beliefs. It developed, or perhaps more accurately is creating a new approach to nursing. After a recent visit of the National League for Nursing accreditation review board during the spring of 1965, the school was commended for pioneering in nursing education. In keeping with its tradition, the School took the lead once again by doing what others were still talking about. As with most change, many eyed the new program with mixed feelings. The developing curriculum received many criticisms ranging from doubt to outright disbelief that it could accomplish its purpose. Alumni of the School and nurses throughout Minnesota and the country pressed the faculty for explanations. What were they doing? How could students taught this way ever hold a job?

The faculty continued their search. Although Miss Fritz shielded them from many attacks, the faculty knew the change met much resistance. Students reported accounts of rebuff. At times it seemed as if the whole project would succumb to conservative pressures. History has shown, however, that progress is fostered through the dedication of a few to a worthwhile cause. The progress of the new curriculum was no different. The faculty devoted hours and days of their so-called "free-time" to develop the new approach. They sacrificed much in their personal lives to initiate the nursing process.

THE NURSING PROCESS

The new nursing courses leave behind the division of nursing content according to clinical topics. Instead, the nursing student faces what she does in terms of patient contact. At first, she considers many different

ideas, conflicting and otherwise, about what nurses do or should do. In addition, students study the behavior of patients and how the nurse's observation of this behavior can help her understand the patient better.

Progress in the area of medical treatment has increased the nurse's work in providing technical aids to restore health to the sick. Until recently, parallel progress in the social sciences, particularly psychology, has not been as well utilized by nurses to assist patients. As the student nurse learns about medically-diagnosed disease entities, she also studies techniques to make a nursing diagnosis. Part of the student's practice in the hospital at this time is to discern what the patient feels his needs are, and what she sees them to be.

Child psychology, laboratory psychology, abnormal psychology and cultural anthropology are required courses as well as chemistry and biology. Consequently, in learning to make a nursing diagnosis, students apply knowledge gleaned from the social sciences as well as physical sciences. Since many technical aspects of her work are pre-determined by physicians, more effort is spent teaching nursing students what she needs to do independently. After considerable practice in making a nursing diagnosis, the students develop nursing treatments according to each patient's needs at any one time. Because of the systematic approach, analysis, and structuring taught to determine nursing therapy, the student must necessarily consider each patient separately and repeatedly as his situation changes.

During her last two years in the School of Nursing, a student learns to combine nursing therapy with the care prescribed by the patient's doctor. By her senior year she assumes responsibility for all the nursing activities needed for a patient's nursing care. Her practice is guided into the synthesis of many factors involved in nursing care and how the nurse can most effectively utilize them.

Nursing care in the community applies the nursing approach in Public Health nursing. This in addition to practice in working with others of the nursing team is included in the students' senior year. The curriculum, though sprinkled with some familiar trappings, is as different in its time as the University School was in 1909.

THE DIPLOMA NURSE GETS HER DEGREE

In the ten-year prospectus prepared in 1961, the faculty stated that "Increasing complexity in nursing practice requires baccalaureate prep-

aration in nursing as a foundation upon which to prepare for the more expert practice of clinical nursing, teaching and administration." Supporting this belief, the program leading to the bachelor of science degree in nursing education and the one in nursing administration were discontinued. Thereafter, specialization in nursing became part of the realm of graduate studies.

Since registered nurses enrolling in the baccalaureate program present varying backgrounds, their study is individually planned. During their senior year, the registered nurse students and undergraduate basic nursing students enroll in the same nursing courses. In keeping with the School's philosophy, all graduates at the baccalaureate level are prepared to assume first level positions in professional nursing.

THE BACCALAUREATE FACULTY

In educational circles, the term "team teaching" describes a method in which several faculty members teach the same course simultaneously, sharing in course planning and the use of testing materials. When the School of Nursing faculty developed its basic curriculum, it also applied this well established teaching technique.

Dorothy Titt, chairman of the baccalaureate program, bears the main responsibility for the present curriculum. Because the faculty worked together in a close-knit group, it is difficult as well as premature to indicate who made the major contributions. Consequently, recognition must be given to the entire body.

The following faculty members have taught in the baccalaureate programs during the interval 1959-1965:

Assistant Professors:

Florence M. Brennan*
Myrtle H. Coe
Nancy L. Cook*
Dorothy P. Geis
Margaret F. Grainger*
Cecelia R. Lediger
Margery Low
Frances D. Moncure*
Ruth F. Pennebaker
Helen J. Peterson*
Dorothy E. Titt*
Elizabeth A. Whitney*

Instructors:

Barbara J. Anderson
Mary Ann L. Baas
Irene Bryant
Beverly Brostrom†
Rosalie Caffrey*
Patricia Cano*

*Currently on faculty 1965-66.

†Nursing Service Staff of University Hospitals who directly participated in instruction of students in Plan A, the 16-quarter basic professional nursing program.

Instructors: (Cont'd)

Margaret Clipper†
Agnes B. Dempster*
Jean F. Ellison
Grace M. Frejlach
Edna H. Gilstad*
Gudrun G. Knutson†
Cecile Kume†
Ruth O. Leo*
Yvonne S. Lysaker
Adele H. Miller
Irene A. Martin*
Dorothy A. Parnell*
Muriel B. Ryden
Valatrice E. Shrimpton
Marilyn Sime*
Peggy B. Stivers*
Marian J. Town*

The following faculty members taught in the specialized baccalaureate programs discontinued in 1964:

Doris Miller
Hannah K. Walseth
Ruth D. Weise

PRACTICAL NURSING AT THE UNIVERSITY

Since 1947, the 4-quarter practical nursing program operates in the School of Nursing, utilizing some courses in the General College. In 1960, the School Discontinued the 6-quarter program in practical nursing and home management offered in conjunction with the School of Agriculture.

Nursing leaders predict the evolution of professional nurses, prepared at the baccalaureate level, and technical nurse probably registered nurses with two years training. The introduction of two-year associate degree nursing programs in Minnesota in 1964 may influence all practical nursing. It is too early to tell. However, the faculty believes the continuance of a practical nursing curriculum at the University needs to be reevaluated. The shortage of nurse specialists, prepared only at the University, seems more acute than the shortage of practical nurses who can be prepared at many schools in this area. Since the Practical Nursing Program was initiated as a pilot study to develop similar courses in the state, Minnesota's score or more practical nursing schools would indicate it had well served its original purpose. Perhaps University resources could be more effectively serving the public now.

Eugenia Taylor, nationally known in the field of nursing for her work in teaching practical nursing, chairs the University of Minnesota School

*Currently on faculty 1965-66.

†Nursing Service Staff of University Hospitals who directly participated in instruction of students in Plan A, the 16-quarter basic professional nursing program.

of Nursing Practical Nursing Program. Since 1959, she has been assisted by Helen B. Hansen, Karen Geddes. Muriel Hudak, Bette Solheim and Clarine O. Grefe.

The University of Minnesota is one of 30 universities with accredited graduate nursing programs. Consequently, once the basic nursing curriculum revisions were past, the faculty formulated tentative statements of philosophy and purpose of graduate education. In addition to the belief that sound, general nursing education on a baccalaureate level should precede graduate studies, the statements express the conviction that advanced clinical nursing courses provide depth in nursing practice for post-baccalaureate students.

The faculty considered master's programs patterned after the Graduate School requirements for students in the Plan B, Master of Science studies. They designed a program of 45 quarter credits, course work in at least two related fields instead of a minor, and papers in the major course work rather than a thesis. At the master's level in addition to studies in nursing and related fields, the programs emphasize a nursing specialty and research.

Master of Science in Psychiatric Nursing. The masters programs in nursing have existed at the University for only 15 years. Eventually, the faculty hopes to accomplish two goals: (1) to provide advanced programs of study in nursing acceptable to the Graduate School and incorporated in it, and (2) to develop graduate programs in areas of clinical nursing specialties. Both of these goals were finally realized in 1962 when a grant of more than $25,000 from the National Institute of Mental Health enabled the School of Nursing to establish a 5-quarter curriculum in Psychiatric Nursing leading to a master of science degree, the first clinical nursing program in the University Graduate School. Garland Lewis assumed major responsibility for the new program when she joined the faculty and is assisted by Mrs. Joann Hubbard and Benita Cowlishaw.

Master of Science in Medical-Surgical Nursing. In 1964, the School approached another milestone in its efforts to offer advanced clinical nursing programs. Mrs. Grace Sarosi joined the faculty specifically to design a curriculum for specialization in medical-surgical nursing. The plan for this major stresses dynamics in nursing requiring logical and, at the same time, imaginative application of knowledge gleaned from many disciplines. In September 1965, the 5-quarter program began,

offered through the Graduate School and the School of Nursing. Nurses completing the course receive a master of science degree in the field of medical-surgical nursing.

The University of Minnesota School of Nursing has cooperated with the College of Education in preparing nurse teachers since 1922. The master of education program in nursing education was initiated in 1950. Since it remains the only program in several states around Minnesota preparing nurses to teach, it holds an important place in the graduate curriculum. Students taking this program matriculate in the College of Education, although the School of Nursing faculty are responsible for the major course work in nursing education. Frances Dunning and Marilyne Backlund worked with other faculty of masters programs in developing a new curriculum to better equip nurses to teach nursing.

Besides the master degrees granted nurses through the Graduate School and the College of Education, the master of nursing administration has been awarded by the College of Medical Sciences upon recommendation of the School of Nursing. This professional degree program began in 1951, but as of 1965, no longer admitted new students. Isabel Harris had held major responsibility for this curriculum.

In 1962, the School of Nursing co-operated with the School of Public Health in establishing an experimental program to prepare public health nursing faculty. A grant from the United States Public Health Service to the School of Public Health supported the program in which students enrolled in the Graduate School. The students have a major in public health and study in the related fields of nursing, education, statistics and social science. Upon completion of the 5-quarter program, the nurses receive a master of science degree.

Research in nursing is one of the most rapidly growing areas within the profession. During the summers of 1961 and 1962, a course titled "Research in Nursing" was offered by visiting faculty. A similar course was offered over two quarters in 1964 and 1965 for students in the graduate psychiatric nursing program. Research in nursing has the potential of being a required course for all students in graduate nursing programs. The School has also received grants for the development of faculty research.

Special Programs at Home and Abroad. During 1959-1960, the School of Nursing continued participation in a study on teaching nursing in mass casualties. The study, supported by the United States Office

of Civil and Defense Mobilization and co-ordinated by the National League for Nursing was terminated in September 1961.

Faculty Services. In July 1960, Dr. O. Meredith Wilson succeeded Dr. Morrill as president of the University of Minnesota. In the following years, considerable work on the organizational structure of the University brought about several changes. For example, the College of Sciences, Literature and Arts dissolved and the College of Liberal Arts and the College of Biological Sciences came into existence. In 1961, legislative and administrative action allowed some increase in nursing faculty salaries and also added four new faculty positions and two clerical positions. Although the slight salary increases and new positions bolstered faculty morale, Miss Fritz still had the exhausting job of searching throughout the country looking for qualified nurses willing to accept faculty positions at Minnesota.

For a year or two, until 1961-62, the faculty had to focus its attention largely inward. The sweeping changes robbed the faculty of precious time to communicate with nursing at large. Many practicing nurses, accustomed to participating in the school's activities, felt somewhat estranged. Their fears were unfounded for they soon got special treatment in the form of a School of Nursing Committee on Faculty Service, formed in the fall of 1962. This group serves several areas: the development of non-credit extension courses; consultation service provided by faculty and service in local, state, and national organization work.

Since July 1962, one full-time faculty member, *Helen B. Hansen*, has had major responsibility for short-term courses designed to assist nurse practitioners. Of the nurses attending such courses from 1963 to 1965, 77 were from the Twin Cities, 113 from other communities in Minnesota and 22 were from other states. The school also co-operates with outside groups in planning programs for nurses in Minnesota and the entire upper midwest.

Mrs. *Florence Carlin Elliott Marks, R.N.,* who prepared the above sketch of the School of Nursing from 1960 to 1965, was born in Louisville, Kentucky in 1928. She received the degree of bachelor of science at the University of Cincinnati in 1949 and the degree of bachelor of science in professional nursing from the University of Minnesota in 1953. Three years later she was awarded the degree of master of nursing administration. From 1953 to 1954, she was general staff nurse and assistant head nurse, University of Minnesota Hospitals. The next year she was

Florence E. Marks

general staff nurse at the Marselisborg Hospital, Aarhus, Denmark. She then returned to the University and from 1956 to 1961 she was Variety Club Heart Hospital nursing supervisor.

In addition to rearing a family, Mrs. Marks has continued to practice her profession on a part-time basis. She was special assistant to the director of Nursing Services at the University of Minnesota Hospitals in 1962. At present, she is a research assistant for "A Community Research and Institute Education Project in Staffing for Hospital Nursing Services" at St. Luke's Hospital in St. Paul.

Chapter XXIX

Department of Pharmacology

When the College of Medicine and Surgery was established at the University of Minnesota in 1888, Dr. *H. M. Bracken* was appointed professor of materia medica and therapeutics. He continued in this capacity but in the summer of 1906, he urgently recommended that a chair of pharmacology be founded.

During the meeting of the Executive Committee in November 1906, Dean Wesbrook reported that establishment of a Department of Pharmacology had been approved. On December 11, Dr. Wesbrook nominated Dr. *E. D. Brown* of Western Reserve University to be assistant professor with a salary of $2000 per year beginning January 1, 1907. Dr. Brown arrived late in 1906 and took up his work January 1, 1907. In June, 1907, he was promoted to acting professor of materia medica and pharmacology. In March 1909, the Executive Committee recommended that he be promoted to professor of pharmacology. Establishment of a department was not consummated. Instead, pharmacology was added to physiology under the name Department of Physiology and Pharmacology with Dr. *R. O. Beard* as professor of physiology and director of the department, with Dr. Brown a professor in the department. The following history of The Department of Pharmacology, up to 1962, was prepared by Dr. *Raymond N. Bieter.*

Dr. Brown was born in Albion, New York, in 1869. In due time, he received the degree of doctor of pharmacy from the New York College of Pharmacy. He later enrolled in Western Reserve University School of Medicine and was granted a degree of doctor of medicine in 1902. The next year was devoted to an internship at St. Vincent's Hospital in Cleveland. He then opened an office and practiced medicine in Cleveland, but simultaneously studied pharmacology under Dr. T. Sollmann at Western Reserve University. In 1906, Dr. Brown was appointed to

Edgar D. Brown

an instructorship in pharmacology at Western Reserve and late the same year he accepted the Minnesota position.

On arrival at Minnesota, he was given a modest space assignment under the amphitheater of the old Millard Hall, and told to begin teaching and research. His first task was to outfit a laboratory. He was authorized to make a list of the items he needed, some of which were purchased for him. He was an expert glass blower and a clever and skilled worker in wood and metal. He and Mr. Boyle, mechanic for the Department of Physiology, made much of the necessary equipment.

Within a few years, he was invited to include toxicology and shortly thereafter he was asked to carry out analyses of autopsy material in cases of poisoning. The demand for this service increased greatly and soon the University assumed the obligation of carrying out these analyses for the three largest counties in the state, free of charge. This responsibility was given entirely to Dr. Brown. The number of these toxicological analyses became so great that one man alone could not handle all the work. The graduate students in the department during the 1920's took toxicology from Dr. Brown and they helped to carry out these services.

When President Vincent reorganized the faculty, Dr. Brown was demoted from a professorship to an associate professorship and Dr. Beard, Director of the Department of Physiology and Pharmacology was de-

moted to associate professor of physiology. Similar demotions occurred among nearly all of the laboratory faculty members. Over the years, Dr. Brown taught pharmacology to medical, dental, pharmacy and nursing students in his excellent manner. He was popular among students and fellow faculty members, having been appointed to serve on several important committees.

Dr. Brown's early research activities at Western Reserve were on ergot, ethyl chloride, suparenal preparations, phenol poisoning and thorium. At Minnesota, although his research interests were greatly harrassed by toxological services, his investigations were chiefly on poison ivy and the preparation and study of copper salts and fatty acids for the treatment of fungus infections.

For many years, Dr. Brown devoted considerable time to three hobbies—growing many varieties of flowers, collecting clocks and sea shells. He reached retirement age in 1936 and died in 1961.

In July 1913, the Board of Regents appointed Dr. *Arthur D. Hirschfelder,* Johns Hopkins University, professor of pharmacology and director of the department.

In undertaking this position, Dr. Hirschfelder attempted to develop the application of chemistry to pharmacology and chemotherapy. Again, this ideal has a modern and present day sound.

Within the first year of Dr. Hirschfelder's tenure, the University Graduate School of Medicine was begun, inaugurating instruction homalogous with that in other University departments. As a beginning, the Medical School offered three-year teaching fellowships with stipend, to be given to students studying for the doctor of philosophy degree in the medical sciences. By the mid-twenties, pharmacology had two of these fellowships. These fellowships were awarded to individuals who wished to become research workers and remain in academic medicine.

Dr. Hirschfelder was born in San Francisco, California, on September 29, 1879. He was the only son of Dr. Joseph Oakland Hirschfelder, the first white child born in Oakland. After obtaining the bachelor of science degree from the University of California in 1897 as its youngest graduate, Arthur Hirschfelder began the study of medicine in Europe. He returned to America and entered Johns Hopkins Medical School from which he received the doctor of medicine degree in 1903. The next year was spent as an intern under Osler, and the following year as a resident in medicine under his father at the San Francisco General

Hospital, and as an assistant in medicine in the Cooper Medical College. In 1905, he returned to Hopkins to organize and direct the Physiological Laboratory of the Medical Clinic under Dr. Llewelyn F. Barker. This was the first pure research position in clinical medicine in the United States.

His early research was carried out on the circulation. He made some of the first determinations of human blood pressure using the wide cuff. Under the guidance of his father, he began a study of the venous pulse and an analysis of cardiac arrhythmias. Upon his return to Hopkins, he studied experimental heart block in mammals with Joseph Erlanger, also paroxysmal tachycardia, and he was among the first in America to make electrocardiographic studies in man. Just before coming to Minnesota, he was studying the chemotherapy of experimental pneumonia in rabbits with M. C. Winternitz. Special mention should be made of his book, *Diseases of the Heart and Aorta,* first appearing in 1910, which attracted considerable attention. He made all of the drawings in this book.

During Hirschfelder's first years at Minnesota, an organic chemist, Merrill C. Hart, was a member of his department. Hart synthesized a series of organic compounds that were studied for antiseptic and local anesthetic actions. Dr. Hirschfelder had tremendous admiration for Paul Ehrlich and he believed that bacterial chemotherapy was possible. He had a deep interest in this field and a remarkable store of ideas. When the sulfonamides were introduced in the early 1930's for the treatment of bacterial infections, he accepted this work completely.

An outstanding contribution of Hirschfelder and Hart was the synthesis and discovery of the local anesthetic action of saligenin. This local anesthetic—the least toxic of all local anesthetics up to now—proved effective on injection and on local application to a mucous membrane. Its only drawback was that the anesthesia was of too short duration for clinical usefulness. In directing the studies on this compound, Hirschfelder antedated many of his colleagues by the clinical pharmacological studies on this drug. This showed his interest in clinical medicine, as one would expect from his training, which was likewise evident in his lectures to medical students on digitalis.

An interesting sidelight on his dedication to basic pharmacology and his withdrawal from clinical medicine perhaps is associated with his inability to obtain a license to practice medicine in Minnesota. Minne-

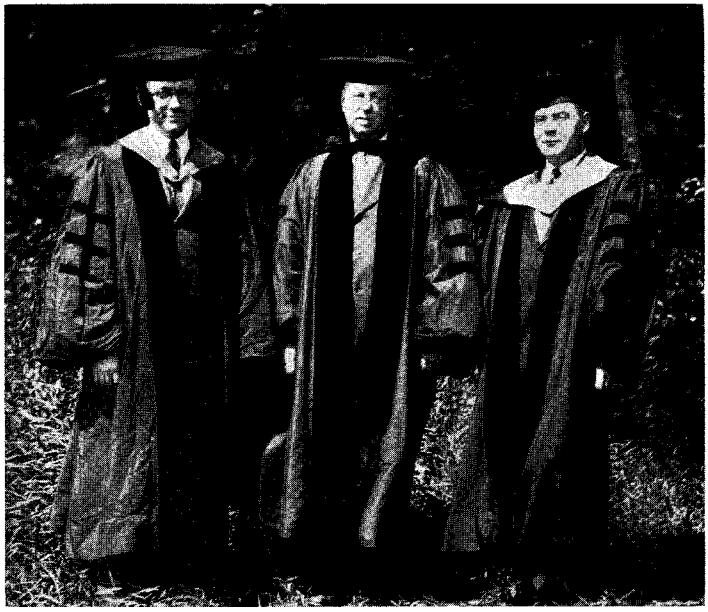
sota had established a Medical Practice Act in 1887 which, as Dr. Beard said, "that, except for South Carolina, was a model for all the medical practice acts of most of the states. It was a challenge to the efficacy of the medical diploma as a test of the fitness of a candidate to practice and did more to elevate the standards of medical education than any other single factor." When Dr. Hirschfelder was a medical student there was no formal course given in physical diagnosis at Hopkins. The Minnesota Medical Practice Act required a course in this subject. Consequently, the Board of Medical Examiners would not give him a license to practice either by reciprocity or on the basis of taking their examinations.

During the first ten years of his professorship at Minnesota, Dr. Hirschfelder had very few graduate students. In their place, he encouraged medical students to take electives in pharmacological research problems with him. On his publications of this era one finds the names of the following medical students who worked with him: J. M. Arnson, R. Houde, G. H. Merkert, M. J. Shapiro, W. Cantwell, J. Bicek, F. J. Kucera, W. Hanson, A. Lundholm, H. Norrgaard, A. E. Lange, A. C. Feaman, H. C. Maxwell and L. J. Pankow. The writer owes his friend, Dr. L. J. Pankow, a special debit of gratitude. When the writer was a freshman medical student, Pankow invited him to visit his laboratory in the Department of Pharmacology where he explained and demonstrated his work on antiseptics. This work of Dr. Pankow and his friendship stimulated the writer to go into pharmacology.

The contributions to the World War I effort that were asked of Dr. Hirschfelder indicated his national reputation as a pharmacologist. At the University of Minnesota he helped organize and teach in a School for Pharmacists Mates of the United States Navy. Through a National Research Council project he synthesized a number of brominated and chlorinated cresols. When cloth impregnated with these compounds was worn next to the skin, louse-killing vapors were given off for 13 days, whereas ordinary cresol and naphthol lost this ability in one day. At that time, this was an outstanding contribution. In the latter part of 1918, he was called to serve as pharmacologist to the Johns Hopkins Research Unit of the Chemical Warfare Service. From 1922 to 1925, he was a member of the Board of Consultants of the Chemical Warfare Service at Edgewood Arsenal.

In 1925, he was a symposium speaker for the American Chemical

Arthur D. Hirschfelder



Graduation Day, June 1929, University of Minnesota.
Raymond N. Bieter, Arthur D. Hirschfelder, Harold N. Wright

Society at a meeting in New Haven when the Sterling Chemistry Laboratory was opened.

Dr. Hirschfelder's first four graduate students were: J. Paul Quigley (who later became professor of physiology at the University of Tennessee); and the following three men, who obtained the degree of doctor of philosophy: Herman H. Jensen, who later became a radiologist in California, Harold N. Wright, and the writer.

To his graduate students and to the many medical students who worked in his laboratory he was "The Chief." But, to those of us who were intimately associated with him he will always be "*Our* Chief."

Dr. Wright's principal interests were in the pharmacology of the organic arsenicals and in toxicology. His most recent grant in toxicology was for a study of the toxic effects of the drugs used as insulin substitutes.

Later, when Dr. Elizabeth M. Cranston was taken into the department, she chose to work on hormone pharmacology and cancer. She was the first investigator to find a substance that would inhibit oestrus in mice. This was found in an Indian medicinal plant, Lithospermum ruderale. However, to date, the pure principle that produces this hormone-like effect still continues to elude the chemist's search.

During the decade of the Depression, several unusual academic and scholarly opportunities were offered, as described below.

During the summer of 1929, the Medical School sponsored a kidney symposium under the direction of Dr. Hilding Berglund, Professor and Head of the Department of Medicine. The writer and Dr. Wright both participated in this program.

The second opportunity had to do with a research grant from the Civil Works Administration. This institution was a forerunner of the Works Progress Administration of President Franklin D. Roosevelt. With one of the first grants in the Medical School from this administration, the writer began a study of spinal anesthesia in the Chinchilla rabbit. From this work came comparative anesthetic and toxic concentrations of Procaine HCL and other local anesthetics. For many years, these tables were guide-lines in the search for new and safer local anesthetics—especially for spinal anesthesia. However, none safer than Procaine has been found to date. Graduate students and physicians who worked on this project were Raymond W. Cunningham, Elizabeth M. Cranston, Oa Lenz and Milan Novak.

The third program had to do with a pharmacological study of Indian

Medicinal Plants. This project came into being through Frederick D. Ritchie, Chief of the Bureau of Plant Industry, United States Department of Agriculture, and Secretary of Agriculture, Henry Wallace. A field station for this work was set up in the Department of Pharmacology. In Washington, the responsible individual was B. Y. Morrison who was in charge of the Bureau of Plant Exploration and Introduction. Indian medicinal plants were obtained from Nevada Indian Medicine Men in their native environment. While the plants and their uses were being described by the Medicine Man, a botanist from the University of Nevada was present to make the proper identification. The plants were later collected at the height of the growing season, dried, and sent to the University of Minnesota.

To carry out this study, a Memorandum of Agreement was drawn up between the University and the United States Department of Agriculture. The program was started, primarily, in three directions: 1) a pharmacological search aimed at effects on circulation, respiration, nervous system, smooth muscle and toxicological possibilities for a rodenticide; 2) a search for antibacterial substances, both chemotherapeutic and antiseptic; and 3) a pharmaceutical chemical study to isolate active substances. Cooperating in these studies were Dr. W. P. Larson, Professor of Bacteriology, and Dr. Glen L. Jenkins, Professor of Pharmaceutical Chemistry, and after his resignation, Professor Ole Gisvold. In each of these areas, several graduate students were assigned to the various problems from which came many acceptable theses for graduate degrees. During the few years that this project was in existence, several suggestive actions were found, namely a blood pressure raising plant, a cutaneous antiseptic action and a mild chemotherapeutic action against the pneumococcus in mice.

Nordihydroguaiaretic acid was isolated from the creosote bush by Coy Waller and Professor Gisvold. A most surprising action of this compound was found by Drs. Lauer and Halvorsen. This was a marked antioxidant action on fats. Therefore, the acute and chronic toxicity of this compound was studied and the Food and Drug Administration released it for use in fats for human consumption. The use patent was assigned to the Department of Agriculture. The isolation patent, however, under the direction of Mr. Middlebrook, was assigned to the University and was not a Public Service Patent. As a result, the United States Department of Agriculture terminated the Memorandum of

Understanding. No complete study of any plant was ever finished. Thus ended a research project that Mr. Ritchie and Secretary Wallace had hoped would go on for a century.

All of the medical students ultimately completed medical school. These included J. Gordon Beaton, Teresa Brey, William Lindblom, John T. Litchfield, Jr., Anthony J. Miltich, J. Adelaide Moren, Burton A. Orr, Anthony J. Ourada, Elizabeth Troxil and James F. Zagaria. These men also were graduate students who worked on the project in pharmacology. Those who obtained degrees were Elizabeth M. Cranston, doctor of philosophy; Thomas M. Seery and James M. Shaffer, master of science. Those in bacteriology were Charles H. Drake, Milton Levine and William F. McLimans. Those in pharmaceutical chemistry and who obtained graduate degrees under Drs. Jenkins and Gisvold were Charles V. Netz, Willard J. Hadley, Winifred A. Keyes, William F. Debelak, Allen I. White, Curtis H. Waldon and Coy Waller.

During the first few years of the 1940's, the growing extent of World War II brought many and new problems into medicine. For the most part, personal research problems were set aside and all the members of the department joined hands in the problems presented by the Armed Forces. In addition to the writer and Dr. Wright, the department included Dr. Elizabeth M. Cranston, assistant professor, and Dr. John T. Litchfield, Jr., instructor. Through the remaining war years, this group worked in complete cooperation with each other and with the Washington headquarters of the Office of Scientific Research and Development.

One of the first problems presented to the department concerned the toxicity of American-made Quinacrine (Atabrine). At this time, American atabrine was being made entirely by the Winthrop Chemical Company. It was reported to be more toxic to man than other atabrines. Samples of atabrine were obtained by the Army from various parts of the world. The writer, with the help of *Dr. Elizabeth M. Cranston,* joined with workers from other medical schools and found that there was no difference in toxicity of the various samples studied.

A more extensive and difficult problem was concerned with a search for a chemotherapeutic drug in the worm infestations, Schistosomiasis which was studied in the mouse, and Filariasis, studied in the wild Florida cotton rat. With little available information on how to attack these problems, the entire department went to work and soon was carrying out

satisfactory therapeutic trials. For help in maintaining the worm infestations, the pharmacologists had the help of several parasitologists. During the first year, the parasitologist was Dr. *Dominic de Guisti* and one of his biology students, Willard Becklund, from the College of St. Thomas. Later, when he moved, Dr. *Ashton C. Cuckler* from the University of Minnesota gave the group his help. Several cyanine dyes were found to be highly curative on the filarial infection in the cotton rat. Before any further work on new derivatives could be initiated, the war ended and the American interest in tropical infections dropped to zero. With lack of interest went a disappearance of funds for this type of research.

After the war, a severe polio epidemic spread over the United States, and funds for an extensive study of this disease were made available by the National Foundation for Infantile Paralysis. Dr. Wright and the writer began a study on chemotherapy using the MM virus given by intraperitoneal injection in mice. Almost 400 compounds were studied. No striking beneficial effect was found. These data were presented at the First International Poliomyelitis Conference in New York in July 1948. Graduate students who worked on this program and who earned degrees were Thomas Pachol, master of science; and Thomas B. O'Dell, doctor of philosophy.

At the end of World War II, there suddenly became available a host of new compounds for clinical trial, which during the war were held in abeyance because of more serious duties. The writer at this time arranged with a group of pharmaceutical firms to make contributions to a fund called the Pharmacology Research Fund to be used for clinical trial studies for possible introduction of drugs into human therapy. This might be called the second clinical pharmacology program at Minnesota. This program helped introduce into medicine, methadone, artane, nitrogen mustard, banthine, several antihistaminics and other drugs. The clinicians who held appointments in clinical pharmacology were Elizabeth M. Troxil, Stanton Hirsch, William E. Peterson, and James M. Shaffer.

In connection with the analgesic studies with methadone and other related compounds, the writer served on the Committee on Analgesic Drugs, now known as the Committee on Drug Dependence, of the National Research Council. This committee, now under the chairmanship of Dr. *Dale Cameron,* has stimulated research both on addiction and on

non-habit forming strong analgesics. Under this latter heading, the committee has seen the introduction of Darvon and an application for release of Pentazocine submitted to the Food and Drug Administration.

In the late 1950's, the department staff decided to apply for suitable grants to add investigators in neuropharmacology. Applications were made and grants obtained from the National Institute of Neurological Diseases and Blindness, and from the Hill Family Foundation of St. Paul. Two investigators were obtained, namely, Dr. *Kenneth Exley* from the University of Leeds in England, and Dr. *Wilbur Benson* from Hoffman-LaRoche. Coincident with these appointments Dr. *E. M. K. Geiling* from the University of Chicago was given a one-month professorial appointment in the department to lecture on the history of pharmacology and the importance of the Food and Drug Administration. These appointments became temporary and before anything further could be done about this expansion, the writer moved into another position.

Despite the fact that for most of the past 15 years important and essential research problems were the chief concern of the staff, there was still time to train other graduate students. Many of these individuals selected Dr. Wright as their major advisor. The list of these graduate students who obtained degrees is as follows: Floyd Rodman, Lawrence Peters, Louis D. Fink, Ewart Swinyard, Leo M. Jones, Leon Kanegis, Edward McManus, George Edds, Joseph Graca, Arnold Ostegerg, Charles Nash, Frank Zabranski, Frank Roth, Clarence M. Stowe, Abdel Ghazal, Paul Hammond, George Roche, Larrimore Howard, Eleanor Berman, Millard Ruether, Edward Jiminez, Robert McConnell, John Palmer, William King, Siret Ener, Masa Oki, Y. K. Lim, Harlan Fayle, Charles H. Pierce, Theodore Gram, and Robert Galway. This list is proof of the increasing interest in graduate training in pharmacology that has occurred during the tenure of the writer and his associates.

Dr. *Raymond N. Bieter* was born at Heron Lake, Minnesota in 1900. He graduated from the College of St. Thomas in 1919. In 1924, he was awarded the degree of doctor of medicine, University of Minnesota, after which he immediately entered the Graduate School and earned the degree of doctor of philosophy in pharmacology which was granted in 1929. From 1925 to 1929, he was also instructor in pharmacology. After receiving the degree of doctor of philosophy, he was promoted to an assistant professorship in pharmacology. The year 1930-31 was spent

Raymond N. Bieter

as an associate in physiology at the Johns Hopkins School of Medicine. There he demonstrated that the aglomerular kidney would secrete urine against a pressure higher than that of the blood. This, naturally, was interpreted to mean that forces other than simple diffusion were involved. Upon returning to Minnesota, work on the aglomerular kidney was continued. That year he was promoted to an associate professorship and was advanced to a full professorship in 1940.

In 1929, *Dr. Hirschfelder* developed a cardiac problem which greatly limited his work capacity. Dr. Bieter promptly took over the greater part of the administrative work of the department on request of Dean Lyon. Therefore, when he was named professor and head of the Department of Pharmacology to succeed Dr. Hirschfelder in the spring of 1943, he was thoroughly familiar with the operation of the department.

In 1962, he relinquished the position of head of the Department of Pharmacology and assumed a new position, that of director of special educational services in the office of the dean of the College of Medical Sciences. However, he retained the professorship in pharmocology.

Dr. Bieter holds membership in a number of organizations including the Committee on Narcotic Drugs (now, Problems of Drug Dependence) of the National Research Council.

He has published approximately 80 articles in medical and scientific journals. He stated that the staff tried to maintain the ideal that what was

taught would be the best knowledge for the men and women in the practice of their various professional fields. "During this time, this was believed to be the chief responsibility of the department. This ideal was striven for in the teaching of graduate students, medical students, dental students, pharmacy students, nursing students, and for a few years, veterinary medical students."

When Dr. Bieter resigned, Dr. *Frederick E. Shideman* was chosen professor and head of the Department of Pharmacology. He wrote as follows: "In the Fall of 1962, on moving to the University of Minnesota, I was accompanied by Drs. Gilbert J. Mannering, Jack W. Miller and H. Augusto Campos as well as some 15 pre- and post-doctoral students." Dr. Mannering, appointed as professor, had received the doctor of philosophy degree in biochemistry at the University of Wisconsin in 1944. Following six years as a research biochemist in industry, he then served four years (1950-54) as a consultant to the Chemistry Department of the 406th Medical General Laboratory located in Tokyo, Japan. In 1955, he was appointed assistant professor and subsequently promoted to associate professor in the Department of Pharmacology at the University of Wisconsin. There he began his studies on the metabolism of the narcotic analgesics and alcohols, which have received worldwide recognition and have resulted in his being looked upon as an authority in these areas. He also served as a consultant and toxicologist to the State Crime Laboratory of Wisconsin, where he gained a widely recognized reputation in the field of toxicology.

Dr. Miller also was appointed to the staff, as an associate professor, in 1962. After receiving the degree of doctor of philosophy in pharmacology in 1954 from the University of California he joined the Department of Pharmacology at the University of Wisconsin as an instructor. Subsequent promotions to assistant and associate professor followed. Throughout his scientific career, Dr. Miller has been interested in the pharmacology of smooth muscle and the action of narcotic analgesics. His outstanding ability as a teacher was recognized in 1965 when he received Minnesota Medical Foundations Distinguished Teaching Award for outstanding teaching in the basic sciences at Minnesota.

At the beginning of the Fall quarter in 1962, there were nine members on the staff in the Department of Pharmacology including Drs. Mannering, Miller, Raymond N. Bieter (professor), Harold Wright (professor), Wallace White (professor, School of Pharmacy), Normon Holte (pro-

fessor, jointly appointed in the School of Dentistry), Elizabeth Cranston (assistant professor), and H. A. Campos (instructor). That year saw a revision of the courses offered by the department and the use of the teaching laboratory in the Department of Physiology for laboratory instruction in pharmacology. A large increase in the number of graduate students necessitated the introduction of a more formal graduate program in certain areas of pharmacology. A new course dealing with the physiological disposition of drugs was offered for the first time and an expansion of the seminar program to include lectures by pharmacologists from other institutions was undertaken. Also, a course in forensic medicine and medical jurisprudence was offered to students in the fourth year of medicine.

The Fall of 1962 saw the initiation of 6 new research projects in the department. These were supported by grants from the National Institutes of Health and the Air Force Office of Scientific Research. Two scholarship awards from the American Cancer Society provided support for one predoctoral and one postdoctoral trainee. However, even the expanded research support fell far short of meeting the financial needs of the expanded training program. Fortunately, a grant was procured from the National Institutes of Health which provided stipends for 18 predoctoral and 3 postdoctoral trainees. It was activated in the spring of 1963, at which time there were 25 predoctoral and 4 postdoctoral students in the department.

In 1963, Dr. Campos became professor of pharmacology at the University of El Salvador. However, there was at the same time appointment of three new members to the staff, Drs. *Akira Takemori* and *Travis Thompson* as assistant professors and Dr. Ben Zimmerman as instructor. Dr. Thompson was appointed jointly in the Department of Psychiatry and Neurology. Dr. Takemori, whose major research interest was on the effects of narcotic analgesics on intermediary metabolism, had received his baccalaureate degree from the University of California in 1951 and was granted the degree of doctor of philosophy in pharmacology by Wisconsin in 1957. After two years as a postdoctoral fellow of the American Cancer Society at the Enzyme Institute in Madison with Dr. Henry Lardy, he accepted an assistant professorship in the Department of Pharmacology at the State University of New York in Syracuse where he remained until coming to the University of Minnesota.

Dr. *Zimmerman* graduated from the pharmacy school of Columbia University in 1956. Four years later he received the degree of doctor of philosophy in pharmacology from the University of Michigan where his research on the peripheral vascular and autonomic nervous systems was begun. Following a year at the Lederle Laboratories working on hypertension, he moved to the University of Iowa to study under Dr. J. W. Eckstein in the Cardiovascular Laboratories until 1963. Coming to Minnesota in that year, he continued to pursue his studies on the influences of nerve stimulation and various drugs on segmental resistance in the peripheral portions of the vascular system.

Dr. *Travis Thompson* obtained the degree of doctor of philosophy from the University of Minnesota in 1961. Following completion of his graduate studies in physiological psychology, he moved to the University of Maryland to work in the laboratories of Dr. Joseph Brady where his studies on the effects of drugs on behavior, begun as a graduate student under Dr. Gordon Heistad, were continued. While his attention was directed to a considerable extent to factors relating to physical dependence on the narcotic analgesics, he later began to be concerned with behavioral dependence on drugs, extending these to include other types of agents such as the hypnotics and stimulants of the amphetamine type.

With the addition of new staff members to the department there was naturally an increase in the number of research projects and research support. By the end of the year, there were 13 research grants from the National Institutes of Health, the Air Force Office of Scientific Research and the Minnesota Heart Association. Seven people were receiving postdoctoral training and 27 students were working toward the degree of doctor of philosophy. Three from the group received the doctoral degree during the year. A laboratory course in advanced pharmacodynamics was added to the graduate offerings and further changes were made in the teaching of medical, dental, pharmacy and nursing students.

Efforts to develop an interdisciplinary graduate research training program in psychopharmacology culminated in submission of an application to the National Institutes of Health for its support. Funding of the grant was realized on July 1, 1964 with amounts sufficient to support an additional staff member and several predoctoral and postdoctoral trainees. With the addition of Dr. *Amedeo Marrazzi* to the department in 1964

as the Hill Professor of Neuropharmacology the program was strengthened. He brought with him Dr. *Michael Halasz,* a psychologist, who was appointed an assistant professor.

Dr. Marrazzi came to Minnesota following many years in government and academic laboratories where he had established an outstanding reputation in neuropharmacology and, more recently in psychopharmacology. Following receipt of the degree of doctor of medicine from New York University in 1928 and an internship at Bellevue Hospital, he practiced medicine for five years in New York. During this time, he was also instructor in pharmacology at New York University. Giving up his practice in 1935, he then devoted his full time to academic pharmacology, serving as an assistant professor at New York University until 1943. From then until he joined the staff at the University of Minnesota, he served successively as professor and head of the Departments of Pharmacology at Loyola University and Wayne University, chief of the toxicology branch of the Chemical Corps Laboratories, assistant scientific director of the Chemical Warfare Laboratories, staff member of the Veterans Administration Neuropsychiatric Hospital in Pittsburgh and professor of physiology and pharmacology at the University of Pittsburgh.

Also arriving in 1964 was Dr. *Nelson Goldberg,* after two years of post-doctoral training in the laboratory of Dr. Oliver Lowry at Washington University. This training, after receipt of a degree of doctor of philosophy in pharmacology from the University of Wisconsin in 1962, provided him with knowledge of and experience with microtechnics for his investigations on the effects of drugs on metabolic control in the central nervous system as well as other tissues and organs. Appointed as an instructor, he was promoted to assistant professor the following year.

In 1964, Dr. Elizabeth Cranston, who had served the department and the Medical School for many years, left to accept a position with the Food and Drug Administration. This was followed the next year, 1965, by the retirement of Dr. Harold Wright. However, Dr. Wright continued to maintain his research activities and to contribute to the teaching functions of the department.

During the year 1964, 38 pre- and postdoctoral trainees were working in pharmacology, five students completed the requirements for the degree of doctor of philosophy and grants supporting research increased

from 13 to 16, with additional support deriving from four pharmaceutical companies. Additional research support continued during the next two years, the total research grants in the department reaching 18 by 1966, deriving from such sources as the National Institutes of Health, the National Science Foundation, the Air Force Office of Scientific Research and the Minnesota Heart Association. Graduate and postdoctoral student enrollment went from 46 in 1965 to 51 in 1966, 7 in the latter case being associated with the interdisciplinary psychopharmacology training program. Of particular note, indicating increasing recognition of pharmacology at Minnesota assuming a truly high caliber research endeavor, was the increase in number of postdoctoral trainees, going from 4 in 1962 to 20 in 1966.

While 1965 saw the retirement of Dr. Wright, it also saw the addition of two new staff members, Dr. *Edward Cafruny* and Dr. *Harvey Kupferberg,* appointed as professor and instructor, respectively. Dr. Cafruny came to Minnesota from the University of Michigan where he had been associate professor. He received the degree of doctor of philosophy in pharmacology at Syracuse University in 1955. Between 1955 and 1960, he served as an instructor in the Department of Pharmacology at the University of Michigan and completed the requirements for the degree of Doctor of Medicine in 1959. He was advanced to assistant professor in 1960 and associate professor in 1963. Work begun in renal pharmacology as a graduate student at Syracuse gained him an international reputation in this field.

Dr. Kupferberg obtained training in pharmacy at the University of Californa, receiving the degree of doctor of pharmacy there in 1959. Continuing his graduate studies at the same institution, he was granted the degree of doctor of philosophy in pharmacology in 1962. His postdoctoral training took him to the National Institutes of Health to work under Dr. Lewis Schanker. His studies on the biliary excretion of drugs, begun there, were continued after his move to Minnesota.

The beginning of 1966 marked the loss of Dr. Michael Halasz from the staff but addition of three individuals with joint appointments in pediatrics or psychiatry and neurology. Two of these were particularly noteworthy since they represented the beginning of modern clinical pharmacology at the University of Minnesota. One of these was Dr. *Bernard Mirkin,* appointed assistant professor jointly in the Department of Pediatrics. He had received the degree of doctor of philosophy in

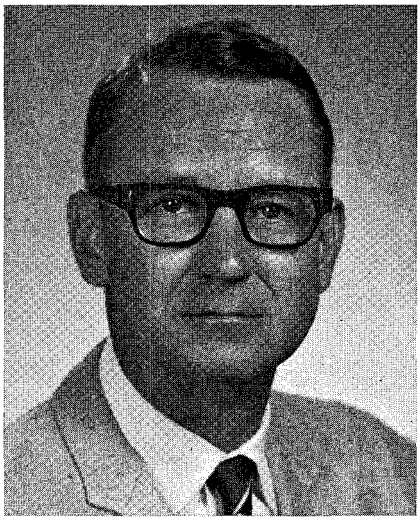
pharmacology from Yale University and experience in teaching this subject at the State University of New York in Brooklyn, came to the University of Minnesota in 1962. After receipt of the degree of doctor of medicine in 1964, he interned at the University Hospital and served a year as resident in the Department of Pediatrics. His interest in the autonomic nervous system continued throughout his medical training and provided a base for his investigations in clinical pharmacology.

The other or joint appointment was Dr. *Frauk Abuzzahad,* designated an instructor in the Department of Psychiatry and Neurology as well as the Department of Pharmacology. He received his medical training in Lebanon, being granted the degree of doctor of medicine from the American University in Beirut where he also interned. Residency training in psychiatry at Johns Hopkins and Minnesota was followed by board certification in this specialty. Graduate study leading to the degree of doctor of philosophy in pharmacology was pursued at the University of Minnesota where his research on the effects of drugs on development of behavior was begun.

The third member added to the staff in 1966 was Dr. *Roy Pickens,* who received the degree of doctor of philosophy in psychology from the University of Mississippi in 1965. His ability as an independent investigator, interested in studies on behavioral dependence on drugs, was strikingly demonstrated as a postdoctoral trainee in the psychopharmacology program at the University of Minnesota in 1965 and 1966 and was followed by his appointment to the staff on July 1, 1966.

Dr. *Frederick E. Shideman,* who compiled the post 1962 portion of the above sketch was born in Albion, Michigan, on October 16, 1915 of German parentage. He was awarded the degree of bachelor of arts by Albion College in 1936 having majored in chemistry and biology and minored in mathematics. During his graduate training at the University of Wisconsin, he was the recipient of a Wisconsin Alumni Research Foundation assistantship in the Department of Pharmacology and this started him on his career in that subject.

Between 1936 and 1941, working under the direction of Dr. Maurice H. Seevers at the University of Wisconsin, he completed the requirements for the degree of doctor of philosophy in pharmacology and the first two years of medical school. The following year was spent as a



Fredrick E. Shideman

postdoctoral fellow on a Wisconsin Alumni Research Foundation grant. During that period, his studies on changes in intermediary metabolism as a result of chronic poisoning with narcotic analgesics, which were the basis for his doctoral thesis, were continued. Following Dr. Seevers to Michigan in 1942, Dr. Shideman immediately began his third year of medical school, receiving the degree of doctor of medicine in 1946, after several interruptions for teaching and participation in the large antimalarial drug research program which was then closely tied in with the war effort. The first year at Michigan, Dr. Shideman was a research associate, after which he held the title of instructor in pharmacology. In 1947, he was promoted to assistant professor and two years later to associate professor.

During the years at Michigan Dr. Shideman's research interests shifted. Studies on the metabolism of the thiobarbiturates led to the demonstration of the liver as the major site of their metabolism. This was followed by an investigation of the nature of their metabolic products, culminating in the finding that they underwent conversion to their barbituric acid derivatives. Also at this time, a routine toxicity study of dehydroacetic acid revealed this compound was capable of suppressing the renal tubular transport mechanism for acidic compounds and, furthermore, that it was an inhibitor of the enzyme, succinic dehydrogenase. This led to a series of papers on the metabolic character-

istics of renal tubular transport processes. In the course of these investigations, a new diuretic substance, chlorazanil, was examined for activity. Research on this compound was continued at the University of Wisconsin where it was shown to be capable of inhibiting certain effects of adrenal cortical steroids at their peripheral sites of action.

At the University of Michigan, Dr. Shideman's association with Dr. Gordon K. Moe led to an intense interest in cardiac pharmacology. After ten years at the University of Michigan, Dr. Shideman was offered the position of professor of pharmacology at the University of Wisconsin to be followed in two years by appointment as chairman of the department upon retirement of Dr. Arthur L. Tatum. Continuing his studies on the kidney and chlorazanil, it became apparent that this and related diuretic agents had the capacity to inhibit certain responses to adrenal cortical steroids. These ten years at Wisconsin included time for him to actively pursue his interests in cardiac pharmacology. Many interesting findings regarding the role of catecholamines in the response of the heart to drugs were uncovered. From the studies on catecholamines, an interest developed in the functions of these and related compounds insofar as the role they might play in the effects of drugs on behavior. These studies were only begun toward the latter years at Wisconsin but were continued and expanded later.

During the period at Wisconsin, federal support for graduate training in the health sciences became available. Through this support, the graduate program at Wisconsin was greatly expanded with the result that there was a marked increase in the number of doctor of philosophy degrees in pharmacology granted by that institution. The staff also increased in size during this period, from three in 1952 to six in 1962.

Dr. Shideman holds membership in numerous organizations and has been treasurer and president of the American Society for Pharmacology and Experimental Therapeutics. His professional and honor societies number 18. He has published more than 175 articles in appropriate journals in his field. (See Appendix J for staff list.)

Chapter XXX

Department of Pediatrics

GROWTH AND DEVELOPMENT IN THE DEPARTMENT OF PEDIATRICS

DIDACTIC TEACHING in the diseases of children was offered in the Medical School of the University of Minnesota as early as 1887 by Dr. *Charles L. Wells,* the first professor of diseases of children, but it was not until 1915 that a Department of Pediatrics was established under Dr. *Julius P. Sedgwick.*

Dr. Sedgwick was a graduate of Rush Medical College in Chicago and took post-graduate training in Chicago and Berlin. After two years as a mining surgeon in Eveleth, Minnesota, he established a pediatric practice in Minneapolis in 1905 and joined the clinical pediatric faculty in 1907. Sedgwick had a strong orientation in the basic sciences and in laboratory activities, as indicated by a joint appointment in the

Julius P. Sedgwick

Department of Physiological Chemistry. In 1915, Dr. Sedgwick was appointed associate professor in the Division of Pediatrics, at that time a part of the Department of Internal Medicine. Later the same year, he was made professor and head of the Department of Pediatrics, newly established by Dean Elias P. Lyon.

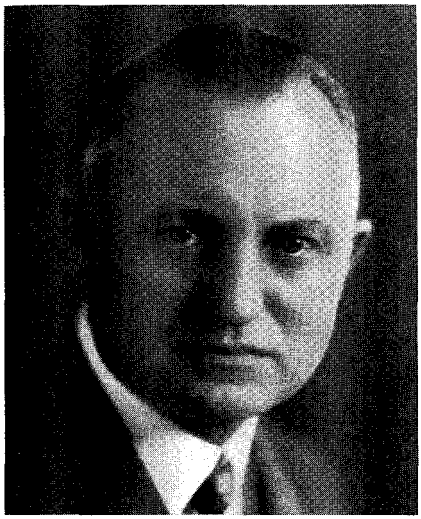
Dr. Sedgwick was a man of imposing physical appearance and a fluent and effective speaker. He was also an accomplished clinician and investigator. He conducted studies on gastric acidity, blood sugar and uric acid levels in newborns and introduced dietary innovations in the management of diabetes. Poor health precluded regular military service during World War I, but Dr. Sedgwick led a Red Cross mission to France near the end of the war to study the nutritional and emotional deprivations of children living in the war zone. This experience, no doubt reinforced by the high infant mortality from gastrointestinal disorders present in the community and in the United States, motivated Dr. Sedgwick to establish what was called "the most successful crusade of its kind in America," the promotion and study of breast feeding in the city of Minneapolis. There is clear evidence of a significant decline in infant mortality in this community over the subsequent years. To emphasize the values and the palatability of human breast milk to his students, Dr. Sedgwick is said to have passed a beaker-full, freshly collected, for them to taste during the pediatric lecture hour.

Under Dr. Sedgwick, a sound teaching program was established. Although he was the only senior full-time faculty member in pediatrics, he gathered a growing and distinguished clinical faculty from the practitioners in the community. With Dr. *Jennings C. Litzenberg,* Head of the Department of Obstetrics and Gynecology, Sedgwick was responsible for transferring the care of the newborn infant from the obstetrical to the pediatric service. It was also during his chairmanship that the graduate program in pediatrics was established. This program provided opportunities for young physicians to study and conduct research in the clinical and basic science disciplines. The first graduate degree (Ph.D.) in pediatrics was awarded to Dr. Rood Taylor. An important feature of this program was the establishment of an exchange of fellows and senior staff members with the Mayo Foundation in Rochester. This exchange strengthened teaching in both institutions and established a cordial relationship between the two departments. Dr. Sedgwick firmly

believed that basic research, knowledge and competency were responsibilities of those in clinical pediatrics. This established a tradition which persists today, as evidenced by the number of graduate degrees awarded to individuals in the Department of Pediatrics and, more significantly, by the engagement in basic laboratory research by members of the department over the past 50 years. A most important role in the development of this tradition was played by *Mildred R. Ziegler, Ph.D.,* whose appointments (1914-1959) span most of the department's history. Dr. Ziegler was primarily responsible for most of the laboratory research conducted under Dr. Sedgwick and his successor, laying the groundwork for the remarkable burst of interest and productivity in metabolic and biochemical studies which was to occur in the 1930's under *Irvine McQuarrie.*

Dr. Sedgwick's premature death from progressive cerebrovascular disease in 1923 was a severe loss to the medical school. It was followed by a brief and curious episode.

Under the leadership of Dean Lyon, vigorous efforts were made to attract a pediatrician of international stature to the chair at Minnesota. Dr. *Clemens von Pirquet,* head of the department at the University of Vienna and director of the famous Vienna *Kinderklinik,* was an internationally known investigator, clinician and teacher, best remembered for the adaptation of the tuberculin test which bears his name, for his original description of serum sickness and for his contributions to the concept of allergy. In later years, Pirquet worked in the field of nutrition, particularly as it concerned war victims, and devised a systematic method for the diagnosis and treatment of malnutrition. His acceptance of the chair at Minnesota in the summer of 1923 coincided with the announcement of a gift of 1¼ million dollars by Mr. William Henry Eustis for the construction of a children's hospital at the University. These events were believed to herald the development of a nationally prominent department. Dr. Pirquet arrived in October of 1923 and two weeks later shocked the medical school by announcing his resignation to return to Austria. His reasons were not convincingly stated (other than the pressure of his research interests and the illness of his wife) but a popular supposition held that Pirquet had disagreed with his associates in Vienna and had accepted the Minnesota position in a moment of pique, but was now swayed by nostalgia, discomfort in the new surroundings and



Frederic W. M. Schlutz

climate and reconciliation with his old colleagues. He resumed the chair at Vienna but his life ended tragically by suicide in 1929.

With the departure of Dr. Pirquet, the University turned to local resources and appointed Dr. *Frederic W. M. Schlutz* as head of the Department of Pediatrics in 1924. Schlutz graduated from the University of Maryland School of Medicine and, after four years of general practice, took intensive pediatric training in several European centers. He enjoyed a highly successful practice in Minneapolis and served on the clinical faculty from 1910 until assuming the chair. Under Dr. Schlutz, there was further growth of the clinical faculty, the housestaff and the departmental budget. He traveled extensively, visiting pediatric departments in South American medical schools and establishing ties which Dr. McQuarrie later utilized in his exchange programs. Schlutz engaged in studies of calcium and nitrogen balance in the newborn and in attempts to identify the antirachitic properties of cod liver oil. He was evidently a leader who evoked either intense loyalty or strong antagonism, seldom a neutral response. Dr. Schlutz's reputation as a consultant grew immeasurably between 1924 and 1930, when he departed to become chairman of the pediatric department at the University of Chicago.

In 1930, the course of the pediatric department took a highly significant turn with the appointment as head of Dr. *Irvine McQuarrie.* McQuarrie was born in Utah into the family of a metallurgist and

Irvine McQuarrie

mine supervisor, which explains his selection of the University of Utah School of Mining. Following his graduation in mining engineering, he turned to medicine and entered the University of California for two years of medical school and two additional years of research leading to a doctor of philosophy in experimental pathology and biochemistry. Dr. McQuarrie then transferred to Johns Hopkins University to complete medical school and there was influenced by some of the leading figures in American medicine including, in pediatrics, Drs. John Howland, Edwards Park, Grover Powers and James Gamble. McQuarrie developed a strong background in internal medicine by serving for two years as house officer and two more years as director of the endocrine clinic at Detroit's Henry Ford Hospital. When offered an opportunity to obtain further training in pediatrics in order to develop a pediatric service at Henry Ford, he elected to train at Yale with Dr. Park. Returning to Detroit, he developed to a high degree his pediatric clinical skills, but soon accepted his first full-time academic position at the University of Rochester, now under Dean *George Whipple,* a former associate of California days. Four years later, Dr. McQuarrie accepted the chair at Minnesota, initiating a quarter-century of unprecedented growth for the department.

When Dr. McQuarrie arrived in Minneapolis in 1930, there were four full-time staff members and a dozen house officers. At the time of his

retirement in 1955, there were 17 full-time staff members at the level of instructor or above and 31 pediatric house officers. This numerical growth scarcely illustrates the development which occurred under Dr. McQuarrie. Intensive research programs were developed in the area of metabolism, nutrition and metabolic diseases. A child psychiatric unit was established. The Variety Club Heart Hospital was conceived and constructed and, to complement this unit, the American Legion Memorial Heart Research Professorship was created. Dr. *Bryng Bryngelson,* speech pathologist, and Dr. McQuarrie cooperated in establishing the first speech therapy clinic for children at the University Hospital. Full utilization of the teaching material at the Minneapolis General Hospital and the St. Paul Ancker Hospital began. The department became a veritable breeding ground of young pediatricians who would fill responsible positions in medical schools and private and government institutions throughout the nation and even abroad. Thus, under Dr. McQuarrie, some of the dreams that were initated and incubated by Sedgwick, dashed for the moment by the Pirquet incident, strengthened by the basic science interest of Schlutz, now became a reality.

Irvine McQuarrie was an individual who commanded almost universal admiration. His circle of friends at the University and his nonmedical interests were wide. As a physician, he was respected for his astuteness, his patience and his understanding. His numerous published works attest to his stature as an investigator. Yet he is probably best remembered for his impromptu analytical observations of clinical and experimental situations in which an underlying defect was explained as an "experiment of nature." It was this application of basic knowledge to clinical problems which characterized McQuarrie's influence on the young investigators who surrounded him. They were stimulated, encouraged and supported to explore areas of research deeply, critically and with imagination. Under Sedgwick and Schlutz, graduate study and original research, usually conducted with Dr. Ziegler, had been strongly encouraged, but once the young clinician-investigator made such a commitment he was usually presented with a single course offering financial security, that of private practice. Changing times and the "up and out" policy of McQuarrie created secure positions for career academicians within the department and in major institutions throughout the United States.

A related skill which contributed to his unique leadership was his

understanding and appreciation of the individual talents of his colleagues. In the words of Dr. Lewis Thomas, McQuarrie was a "people watcher"; his acute perception of quality in his associates was instrumental in developing their many potentials. His leadership was celebrated in 1954 by a scientific gathering at the University of over 200 former students and the establishment of the McQuarrie Fund, subsequently used to develop the departmental library, strengthen the training program and support the annual McQuarrie Lecture. His memory is honored even more eloquently by the positions which these students hold today.

Dr. McQuarrie attributed much of his success to his wife (Vira Perkins), whom he married while both were students at the University of Utah. Mrs. McQuarrie has been widely admired for her personal traits and for her civic activities, as illustrated by a statement of appreciation from the Citizens League of Minneapolis and Hennepin County which was issued upon the departure of the McQuarries in 1956.

Dr. McQuarrie was succeeded in 1955 by the present head, Dr. *John A. Anderson.* A number of areas of study have been created or recreated under Dr. Anderson. In pediatric neurology, a strong training program has developed jointly with the Division of Neurology and pediatric pathology was incorporated on a more firm basis within the department. Active studies in virology again developed and a highly effective group in pediatric hematology and oncology has been established. The undergraduate and resident teaching programs at Hennepin County General Hospital and at St. Paul-Ramsey Hospital have been strengthened and, for the first time, the Children's Hospital of St. Paul is being utilized effectively as part of the pediatric clerkship and residency program.

The increasing availability of research and training funds from federal as well as foundation sources has permitted the development of strong interdepartmental relationships between pediatrics and other departments in the Medical School. Both teaching and research interdisciplination now exist between Pediatrics and the Departments of Biochemistry, Pharmacology, Microbiology, Pathology, Psychiatry, Neurology, Surgery, Internal Medicine and Obstetrics. These inter-relationships have identified more clearly the importance of the focus of teaching and research activities on the broad problems that relate to human growth and development. The concept that all individuals in the clinical disciplines

of medicine should develop a strong orientation in a basic science, a concept promoted by Dr. McQuarrie, has been extended even further. Stabilization of this concept is evident in the number of dual appointments held by members of the staff in pediatrics in other basic disciplines of medicine. Professors and associate professors in pediatrics now hold joint appointments in microbiology, pathology, laboratory medicine, radiology, neurology, psychiatry and pharmacology. All of these individuals have equally strong basic discipline which permits them to participate in both undergraduate and graduate teaching and research programs in the respective basic science departments.

THE CLINICAL FACULTY

Over the years, the Department of Pediatrics has been distinguished by the caliber of its voluntary faculty. Many of these men have enjoyed notable reputations in the upper midwest and some have attained national recognition for their clinical, teaching, investigative and administrative accomplishments.

At no time was this more true than in the early days of Sedgwick and Schlutz and before, when such a large share of the teaching responsibility was borne by the clinical faculty. Many of these individuals received post-graduate training in the European pediatric centers and were highly skilled physicians and clinical observers.

Dr. *James T. Christison* was the first teacher in the diseases of children who was a *bona fide* pediatrician. He served as chief of staff of the Children's Hospital in St. Paul for many years after its establishment. From 1900 to 1913, Dr. *Thomas S. Roberts* was active on the pediatric faculty. Following his retirement, a second career developed from his pet interest, for he became professor of biology and director of the University's Museum of Natural History and in 1932 published a classic in the ornithology literature, *The Birds of Minnesota.*

Dr. *Walter R. Ramsey* joined the department in 1901 and was the first physician in the state to limit his practice strictly to pediatrics. He deserves the major credit for the conception, funding and construction of the Children's Hospital in St. Paul and served for many years as its medical director. He has authored several books and original scientific papers and was acting chairman of the department while Dr. Sedgwick was in Europe in 1917-1918.

During the influenza epidemic of World War I, Dr. *Edgar J. Huene-*

kens was persuaded to serve full time in the department, attempting to develop an effective influenza vaccine. He was for many years chief of service at the Minneapolis General Hospital, including the time when it was integrated into the University's residency program, and he was largely responsible for the direction of the Infant Welfare Clinics in Minneapolis, which afforded him an opportunity to conduct extensive clinical trials on the efficacy of pertussis vaccine. Only recently did he retire as senior member of a busy pediatric group.

About the same time, Dr. *Frederick C. Rodda* joined the clinical faculty. He was one of the first pediatricians to develop an intensive interest in the x-ray examination of children. Dr. *Max Seham*, one of the early members of the clinical faculty to distinguish himself by his clinical publications and astute teaching, is well known today for his unfailing wit and wisdom and his current interest in social medicine.

Not all lofty academic positions have been filled from the full-time staff, as illustrated by Dr. *Chester A. Stewart* who enjoyed an interesting and varied career. After performing graduate work in anatomy at Minnesota, he completed medical school, trained in pediatrics and began a very successful practice. During this period, he was an active teacher at the University, making daily rounds in the outpatient clinic, and was responsible for a vigorous program of tuberculosis control in Minneapolis children. In 1941, he was called to Louisiana State University to head the Department of Pediatrics, a position which he held until his death in 1946.

Dr. *Erling S. Platou* was a member of a distinguished medical family, an accomplished student of pediatrics, particularly infectious disease problems, and for several years the director of the contagious unit at the Minneapolis General Hospital. He was a highly respected teacher and was founder of the Minnesota Medical Foundation. His untimely death in 1958 was commemorated by a special issue of the *Journal-Lancet*. Dr. *Lawrence F. Richdorf,* whose association with the department dates to the time of McQuarrie's arrival, played a singularly important role in the establishment of the American Legion Memorial Heart Research Professorship. Dr. *Hyman Lippman* was instrumental in the development of child psychiatry in Minnesota and for many years has directed the Child Guidance Clinic of the Wilder Foundation in St. Paul, a clinic which is essential to the child psychiatry residencies in Minneapolis and Rochester. Dr. *W. Ray Shannon,* now on the

staff of Faribault State Hospital, was engaged in early definitive studies of neonatal tetany. Dr. *Frank G. Hedenstrom* has participated effectively at the St. Paul Ancker Hospital and was chief of service there for several years.

Around 1934, Dr. *Paul F. Dwan* joined the clinical faculty and subsequently established the University's first pediatric cardiology unit, the forerunner of the important service to be established at a later time in the Variety Club Heart Hospital. Dr. *Edwin C. Robb* was responsible for the preclinical lectures in infant feeding and nutrition. Dr. *David M. Siperstein,* father of a well-known internist-academician, conducted clinical trials on the intraperitoneal administration of fluids and blood. Dr. *Harold F. Flanagan,* who taught actively at Children's and Ancker Hospital for many years, was elected president of the American Academy of Pediatrics in 1964, but his unexpected death prevented his taking office.

Increasing concern of the department for international pediatrics, expressed earlier by the activities of Sedgwick, Schlutz and McQuarrie, was recently demonstrated by Dr. *Eldon B. Berglund,* who left his practice in 1959-60 to spend a year at Seoul National University Medical School in Korea. In 1966, he again left practice to head the pediatric service at St. Mary's Hospital in Minneapolis.

DEVELOPMENT OF SPECIAL AREAS OF TEACHING, CLINICAL AND RESEARCH ACTIVITY

Perhaps some of the most important contributions of the pediatric department at the University of Minnesota may be best appreciated by a brief examination of the development of distinct areas of clinical and research activity. It is significant that these "divisions" have not been formally organized as such, for they are all integral parts of the department. Collaboration and the cooperation between these areas and the exchange of ideas and individuals are so commonplace that it is difficult to define the boundaries of the Department of Pediatrics today.

It was inevitable that disorders of metabolism and the biochemical aspects of many diseases received early emphasis. For many years before McQuarrie's arrival, Dr. Mildred Ziegler, formally trained in biochemistry, was involved in most laboratory studies in the department. Because of this and because of Dr. McQuarrie's interests, it was natural that this pair collaborated for almost 25 years on numerous studies.

Some of McQuarrie's earliest studies at Minnesota were concerned with water and electrolyte balance in convulsive disorders. Soon Dr. *Arild E. Hansen* was also involved, primarily with studies of the nutrition and metabolism of lipids, calcium and phosphorus. Dr. *John A. Anderson* collaborated in studies of water and electrolyte metabolism and subsequently studies of water and heat balance in the newborn. These basic metabolic interests were extended into studies concerning phosphorus metabolism of the nervous system and more recently to the field of enzymology, with particular reference to phenylketonuria. Dr. *Willis Thompson* joined McQuarrie in the study of various forms of edema and the role of sodium and potassium ingestion in carbohydrate metabolism and blood pressure in children. Dr. Thompson directed the first diabetic and metabolic clinic in the department.

Beginning in 1950, Dr. *Robert A. Ulstrom* participated in the metabolic area, both with Dr. McQuarrie and independently, on various aspects of carbohydrate metabolism. He had graduated from the University of Minnesota Medical School and had trained in pediatrics at the University of Rochester. Between 1953 and 1956, Dr. Ulstrom was a member of the pediatric department at U.C.L.A. and during this time was elected a Markle Scholar in academic medicine. In 1956, he became director of a newly established metabolic research ward, created by a gift from the McClure family, who were influenced by Dr. McQuarrie. His investigations at Minnesota and U.C.L.A. have included steroid metabolism, vitamin-D-resistant rickets, exudative enteropathy and neonatal bilirubin metabolism. In 1964, he became chairman of the Department of Pediatrics at U.C.L.A. and in 1967, returned to Minnesota as associate dean and professor of pediatrics, continuing to pursue his interests in metabolism. Other highly successful investigators have been associated with Dr. Ulstrom at Minnesota, including Dr. *Eleanor Colle* (now at McGill University in Montreal) and Dr. *John W. Reynolds,* who currently directs metabolic research in the department.

It was destined that areas other than metabolism should develop. Dr. *Morse J. Shapiro* was instrumental in the development of one of these areas, the Variety Club Heart Hospital. He was a clinical associate professor in the Department of Medicine who instilled in one of his patients, Mr. Al Steffes, the idea of a hospital devoted to the study and treatment of heart disease. Steffes was "chief barker" or president of

Tent 12 of the Variety Club. The members of this interesting organization were responsible for the construction of the Heart Hospital, which was completed in 1951 and incorporated into the complex of the University Hospitals by Mr. Ray Amberg, Director of the Hospitals. The Variety Club added a fifth floor research area in 1957 and the latest addition of offices, clinics and additional laboratories, in 1966. Further committments for construction of additional space have been made and will soon be realized. When combined with the continuing annual contributions for patient care in the Heart Hospital, the Variety Club of the Northwest has contributed over $2 million to this unit.

The medical needs which existed at the time of the conception of the Heart Hospital indicated that it would serve to a large degree as a rheumatic fever service. Because of a sharp decline in the 1950's of patients presenting with rheumatic fever and rheumatic heart disease, the pediatric unit of the Heart Hospital became best known for the care of children with congenital heart disease. Critically important advances in cardiac surgery occurred here. The diagnostic unit, initially under Dr. Shapiro, next under Dr. *Forrest Adams* (now Professor of Pediatrics at U.C.L.A.) and more recently under Drs. *Ray C. Anderson* and *Paul Adams,* has made numerous significant contributions to the clinical literature of pediatric cardiology and to the training of pediatric cardiologists.

The Heart Hospital has not been limited to clinical activities alone. Largely due to the influence of Dr. *Lawrence Richdorf,* an American Legion member and a clinical professor of pediatrics, the Minnesota American Legion and Legion Auxiliary determined to contribute to the University's medical research program as a memorial to the living and dead of World Wars I and II. Through the persuasiveness of Dr. McQuarrie, the idea of a "living memorial" in the form of an endowed chair for research in heart disease came into being.

In 1950, Dr. *Lewis Thomas* of Tulane University was appointed American Legion Memorial Heart Research Professor of Pediatrics and Medicine. The beginnings were auspicious, for Dr. Thomas gathered an unusually effective group of brilliant young investigators including Drs. Robert A. Good, Floyd W. Denny (now chairman of pediatrics at the University of North Carolina), Chandler A. Stetson (chairman of pathology at N.Y.U.), Richard T. Smith (chairman of pediatrics and more recently of pathology at the University of Florida), and, for

a time, Lewis W. Wannamaker. This highly productive group was concerned primarily with the biology of inflammation. In 1954, Thomas left Minnesota to become head of the pathology department at New York University; Stetson accompanied him and was later to succeed him when Thomas became chairman of the Department of Medicine at N.Y.U. Dr. Thomas was succeeded by the present American Legion Professor Pediatrics and Microbiology, Dr. *Robert A. Good.*

Dr. Good graduated from the University of Minnesota Medical School and received the doctor of philosophy degree in anatomy and microbiology. He spent a year at the Rockefeller Institute and returned to work with Dr. Thomas on the Shwartzman reaction. He was a Markle Scholar and succeeded to the research chair at the age of 32. In the years since this appointment, Dr. Good has brought recognition to himself and to the University from areas of medicine much broader than pediatrics.

Since 1954, the areas of study and the number of young investigators who have worked in the unique group organized around the American Legion Professorship have increased exponentially. A bare outline of some of the definitive investigations might include the following: definition of congenital agammaglobulinemia and related disorders, immunologic responsiveness of the newborn, biochemistry and immunology of pediatric renal disease, role of the thymus and other organs in immunogenesis and leukemogenesis, biology of transplantation, phylogeny of the immune system, morphology and chemistry of inflammation, biochemistry of the immunoglobulins, concept of the local antibody formation and the role and fate of complement in various disease states. In addition to these and other laboratory projects, countless clinical problems have been examined and an active clinic meets regularly for the care of children with connective tissue diseases, renal diseases and various immunological disorders. The fertility of the group associated with Dr. Thomas and Dr. Good may be gauged not only by their contributions to the literature of pediatrics and immunology, but also by the production of many successful academicians.

The study and teaching of pediatric infectious disease has been another area of unusual strength at Minnesota. Even before the development of research activity, a number of the clinical faculty were distinguished students and observers in this field, e.g., C. A. Stewart, E. J. Huenekens and E. S. Platou. Dr. *John M. Adams* became the first

full-time faculty member with specific interest in infectious diseases, when he left a busy practice in Minneapolis in 1943 to establish a virology laboratory within the department to continue his studies of viral respiratory diseases in infancy. His investigative activity at Minnesota continued until 1950, when he moved to U.C.L.A. to become chairman of the pediatric department. He has been a pioneer and a leading contributor in pediatric virology.

Dr. *Lewis W. Wannamaker,* however, is directly responsible for the development of a sustained infectious disease program. He graduated from Duke University School of Medicine and trained in pediatrics at Duke and at the Willard Parker Hospital in New York. When he arrived at Minnesota at the invitation of Dr. McQuarrie in 1952, he was already established in the field of streptococcal infections and their complications, a result of an intensive association with Dr. *Charles H. Rammelkamp, Jr.*, and Dr. *John Dingle* of Western Reserve University and the streptococcal disease laboratory at Warren Air Force Base in Wyoming. It is significant that Drs. Rammelkamp and Dingle were also responsible in part for the nurture of the early development of Drs. Floyd W. Denny and Chandler A. Stetson, proteges of Dr. Lewis Thomas.

Although located for a time in the stimulating environment of Dr. Lewis Thomas and his associates, Dr. Wannamaker's activities soon took an independent course. During a leave of absence at the Rockefeller Institute, he developed new techniques for the definitive study of streptococcal products. Returning to Minnesota, he was singularly honored in 1958 with the lifetime award of a Career Investigatorship from the American Heart Association and simultaneously was made professor of pediatrics.

A partial summary of the work conducted at Minnesota by Dr. Wannamaker and his colleagues should include as a minimum the following: immunological responses in streptococcal infections and their sequelae, studies of the plasminogen system in the newborn and premature, identification of and immune response to staphylococcal products, characterization of streptococcal nucleases and other enzymes, studies of the phages of *B. Pertussis,* characterization of tetanus toxin, epidemiology of skin infections and their complications and the identification of previously unrecognized streptococcal antigens. It was with Dr. Wannamaker's support and encouragement that Dr. *Joseph W. St.*

Geme, Jr. (now chief of pediatrics at Harbor Hospital and associate professor at U.C.L.A.), re-established a virology laboratory in the department and made significant contributions to the field of pediatric virology.

Dr. William Krivit has developed the area of pediatric hematology and oncology to its present prominent position. He graduated from Tulane University School of Medicine, interned at Charity Hospital in New Orleans and took his pediatric training at the University of Utah. During his first four years at Minnesota, he was closely associated with Dr. Robert A. Good and his early development was also influenced by Drs. Paul Frick and Dorothy Sundberg of the Departments of Medicine and Laboratory Medicine. In 1959, he began to work independently and was joined by his first post-doctoral trainee, Dr. *Herschel P. Bentley* (now chairman of the Department of Pediatrics at the University of Alabama).

Dr. Krivit and his associates have been concerned with an increasing number of hematological and other pediatric problems, including the following: red cell survival in the newborn, mongolism and leukemia, the Aldrich syndrome, platelet phospholipids and other components of the thromboplastin system, iron kinetics and erythrocyte metabolism, development of activation analysis of stable isotopes, coagulation disorders, controlled studies of the chemotherapy of leukemia and other childhood malignancies, the ultrastructure of platelets and other tissues, leukemogenesis and carcinogenesis, fibrinogen and fibrinolysis, obstructive jaundice and other hepatic disorders of childhood, and the biochemistry of lipids and cell membranes. Dr. Krivit, who has been professor of pediatrics since 1962, has played a vital role in the development of several young academicians.

Since its inception, the Division of Child Psychiatry has operated in close cooperation with the pediatric department. Dr. McQuarrie was one of the first to emphasize the need for such a service. In 1938, when joint support became available from the Stevens Avenue Home for Aged Women and Children and from the Commonwealth Fund of New York, he was influential in the appointment of Dr. *Eric Kent Clarke,* whom he had known at Rochester, as Director of the Child Psychiatry Clinic and professor of pediatrics and psychiatry. Dr. *Reynold A. Jensen* joined the child psychiatry unit at the same time and is currently director and professor of pediatrics and psychiatry. In 1951, a 14-bed inpatient service was established. Although the Division of Child Psy-

chiatry has moved in and out of the Department of Pediatrics administratively, the relationship with pediatrics has remained a close one. For several years, interested pediatric house officers have gained invaluable experience on this service in dealing with the emotional development and disturbances of childhood.

One of the vital teaching arms of the department throughout its entire history has been the Minneapolis General Hospital (or newly named since 1964, Hennepin County General Hospital). Medical students have received a significant portion of their pediatric education there continually since 1915 and a pediatric residency program was established at the General Hospital shortly after the appointment of Dr. *Edgar J. Huenekens* in 1917 as chief of service. Dr. Huenekens held this position for 25 years and was assisted by Dr. *Erling Platou* as chief of the contagion unit. In the mid-1940's, General became an integral part of the University residency rotation. It is highly significant that many of the department's house officers and a number of prominent full-time staff members have been drawn from the traditionally strong General Hospital rotating internship.

The General Hospital pediatric service has been staffed by voluntary faculty, exclusively for many years and to a large extent even today. Dr. *James F. Bosma* was the first full-time University faculty member assigned to General. Dr. *Forrest Adams* was appointed the first full-time chief of service in 1950, and was followed by Drs. *Spencer Brown* and *Robert A. Ulstrom.* In 1953, Dr. *Richard B. Raile,* the present chief, took over the service and currently holds the rank of associate professor of pediatrics and the position of chief of the medical staff at the General Hospital. He has been recently joined by a second full-time department member, Dr. *George Noren.*

The history of the relationship between the medical school, including the pediatric department, and St. Paul's Ancker Hospital, is sporadic and stormy because of recurrent political and administrative difficulties. Recently, a bright new chapter in pediatrics has been opened. There has been, however, a long-standing tradition of dedicated medical teaching offered by the voluntary faculty of St. Paul physicians.

In the 1930's and 1940's, the contagion unit at Ancker, housing both children and adult patients, was staffed by several loyal pediatricians—notably, Drs. *Woodard Colby, Lyman R. Critchfield, Frank G. Hedenstrom* and *Alexander R. Stewart*—who taught medical students there.

In the early 1950's, the Medical School explored the possibility of a stronger teaching program in several departments at Ancker, including the pediatric service directed then by Dr. Stewart. The assignment of one and later two pediatric residents and the rotation of junior pediatric clerks at Ancker began in 1955 and 1956, under Dr. *Harry W. Orme* and Dr. *Thomas E. Reichelderfer,* who served successively as full-time chiefs of service. However, in 1957, old problems again mounted to a crisis, Dr. Reichelderfer resigned and the medical student rotation was discontinued. From 1957 to 1963, the service was directed by voluntary faculty members, particularly Drs. *Hedenstrom* and *Harold F. Flanagan.* In 1963, a sound University relationship was re-established with the appointment of Dr. *Homer D. Venters* as full-time chief of pediatrics and he was joined the same year by a second faculty member, Dr. *Roswith Lade.* In June of 1963, Ancker Hospital again became a part of the pediatric clerkship rotation program.

The present era is represented physically by a magnificant new city-county hospital opened in 1965 and renamed the St. Paul-Ramsey Hospital. Dr. Venters, an associate professor, now operates an active teaching program and clinical service which includes an inpatient population with a variety of acute pediatric problems, a busy outpatient clinic (including tuberculosis, well-child, metabolism and allergy clinics), a pediatric cardiology service and catheterization laboratory. A liberal Public Health Service grant has been awarded for the development of a diagnostic evaluation unit for children with mental retardation and other neurologic handicaps.

The Children's Hospital of St. Paul, founded in 1924 by Dr. *Walter R. Ramsey* and sustained over the years by other members of the clinical pediatric faculty, has participated in the training of University interns and residents since 1945. From 1955 to 1963, the rotation was limited to a single intern, but since 1963, residents have been assigned continuously to the Children's Hospital. At that time, the teaching program was significantly strengthened by the appointment of Dr. *Martha B. Strickland* as full-time director of medical education. In 1966, the service at the Children's Hospital was made a part of the junior medical student rotation in pediatrics. One of the strongest features of this program is an excellent intensive-care unit, directed by Dr. Strickland, which serves as a community-wide referral center for newborns with respiratory distress and other problems. Vigorous efforts are made to

utilize the private inpatients for effective teaching and are supplemented by the Children's Hospital Association, a voluntary organization which provides beds for indigent patients for the primary purpose of clinical teaching. In addition, the Children's Hospital is one of the five voluntary hospitals participating in the St. Paul Medical Center, a unit which provides total care for the medically indigent and which includes an active pediatric outpatient clinic.

SUMMARY

In recounting the history of the Department of Pediatrics in the University of Minnesota Medical School, one perceives a consistent quality or character which explains the strength of the present structure. When department status was established in 1915 under Dr. Sedgwick, the importance of basic scientific training to pediatric clinicians was emphasized. The presence of Dr. Mildred Ziegler in the environment as a Ph.D. in nutrition and biochemistry, gave assurance of development of their basic knowledge concurrently with their clinical skills. Dr. Schlutz promoted this same concept and extended the development of scientific research programs in clinical medicine. The leadership of Dr. McQuarrie for a period of 25 years clearly identified the Department of Pediatrics at Minnesota as one of the most productive scientific departments in the United States. The availability of federal and foundation resources throughout the middle 50's and up to the present time permitted Dr. Anderson to add strength to existing structures and to develop new areas essential to the expanding responsibilities of the pediatric department. It is apparent that medical students receiving an education in this environment have obtained much to reinforce their capacity to perform in a scientific manner as practitioners. It is apparent that those who have entered graduate training programs in pediatrics have had an opportunity to associate with an ever increasing number of scientifically qualified individuals functioning in a clinical framework. Apart from the production of a very large number of specialists of pediatrics, now scattered widely throughout the United States and in many places in the world, has been the production of a large number of academicians who hold teaching and research positions in institutions in the United States. While the figure changes most rapidly, at last count, some 23 trainees of the Department of Pediatrics at Minnesota now occupy or have held positions as heads of departments of pediatrics, research professors of

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pediatrics, deans of medical schools, directors of research foundations and directors of the public health research institutes. At least 67 trainees of this department now hold academic posts in various institutions in the United States. The development of the Department of Pediatrics to the extent that it has grown in the past 50 years would not have been possible if it were not for the nature of the medical school as a whole. The sphere of influence of the department's educational resources through its training of competent physicians, skilled pediatric clinicians, specialists in pediatrics, scientific investigators and leaders in the field of pediatrics has contributed much toward the welfare of infants and children in the United States and can be viewed with pride.

Dr. *John A. Anderson,* present head of the Department of Pediatrics was born in Sioux Falls, South Dakota, on October 28, 1908. After completing the work of public schools there, he entered the University of South Dakota. From there he transferred to the University of Minnesota where he was awarded the degree of doctor of medicine in 1933. While in school, he took an extra-curricular elective with Dr. *J. C. McKinley* in neurology and psychiatry. There he did a minute dissection of a human brain, since which he has manifested special interest in neurology.

Dr. Anderson took his internship at the Minneapolis General Hospital and at the University of Minnesota Hospitals. He continued his resi-

dency in pediatrics at the University of Minnesota Hospitals and then spent two years in Denver as a Child Research Council fellow, under the direction of Dr. Alfred Washburn. This experience in growth and development increased his appreciation of longitudinal studies in pediatrics. Returning to Minnesota in 1937, he was instructor and assistant professor and obtained a degree of doctor of philosophy in physiology and pediatrics in 1940. Dr. Anderson's interests were closely related to those of Dr. McQuarrie, particularly in metabolism, nutrition and electrolyte and water metabolism. From 1937 to 1943, Dr. Anderson contributed to the development of the metabolic and endocrine investigations so active within the department at that time. He then assumed the chairmanship of the pediatric department at the University of Utah where the development of a four-year medical school was underway. During this period of 1943 to 1949, when poliomyelitis epidemics were sweeping the country, Dr. Anderson acquired extensive experience in clinical problems related to poliomyelitis and developed a research interest in virology. In 1949, he moved to the chair at Stanford University where he remained until returning to Minnesota in 1955 to succeed Dr. McQuarrie.

In the 13 years of Dr. Anderson's leadership, the department of pediatrics has continued to develop rapidly, in many instances along new lines. The rate of numerical growth has been as impressive as it was under his predecessor. For example, while the size of the house staff has been relatively stable, currently about 35, the complement of full-time staff members (instructor and above) has increased from 17 in 1955 to the present figure of approximately 70. While maintaining McQuarrie's emphasis on graduate-level study and the importance of basic research and its applications to clinical pediatrics, Dr. Anderson has been highly successful in procuring federal funds to provide opportunities and positions for a steadily increasing number of teachers and investigators. He anticipated the increasing availability of federal support for medical research and has used this opportunity to strengthen the department as well as to send young men to other institutions.

Dr. Anderson's first medical publication was in collaboration with Drs. McQuarrie and Thompson. It concerned the excessive ingestion of sodium and potassium salts in diabetic children and the effects of such ingestion on blood pressure and carbohydrate metabolism. This manuscript was published in the *Journal of Nutrition* in January 1936.

He has since published more than 50 articles individually or in collaboration with others in leading medical and scientific journals.

Dr. Anderson holds membership in many societies and numerous committees. He is past president of the Intermountain Pediatric Society, the Northern California Pediatric Society and the Western Society for Pediatric Research. He has served as council member of the Society for Pediatric Research, as chairman of the council of the American Pediatric Society, as vice-president of the Physicians' Council, as a board member of the editorial board of *Pediatrics* and of *Advances in Pediatrics,* and as editor of the *American Lecture Series of Pediatrics.*

Since returning to Minnesota, his research has pertained mainly to blood ammonia levels and 5-hydroxtryptamine and phenylalanine metabolism.

Dr. *Lewis W. Wannamaker,* professor of pediatrics, recently wrote:

> "John Anderson has promulgated the importance of applying the tools and concepts of basic science to the solution of clinical problems but has further recognized the unique role of pediatrics as a developmental science. This is witnessed by his absorbing concern with the Child Development Study, a cooperative venture involving several departments and a number of institutions which brings together his interests in perinatal physiology, in neurology and in longitudinal studies. More recently, he has been a prime promoter of the new National Institutes of Health Institute of Child Health and Human Development, which should provide additional opportunities for development-oriented studies both at Minnesota and elsewhere in the country. One other trend can be detected since Dr. Anderson arrived at Minnesota. He has taken advantage of burgeoning federal support to encourage young men to stay at Minnesota and develop new areas rather than move on to strengthen or head new departments in other schools. This has resulted in a steady expansion of the department to its present size and position in academic pediatrics. Present trends in federal and legislative support and in university administration will present new challenges to John A. Anderson, problems of maintaining strength and excellence which may be equally as formidable as the hurdles of building and expanding a department. He brings seasoned experience and an unfaltering spirit of commitment and excitement to the tasks which lie ahead." (See Appendix J for staff list.)

Chapter XXXI

University of Minnesota Health Service

THE FIRST STEPS toward the development of a Health Service at the University of Minnesota were taken by *Marion Leroy Burton* soon after he became president at Minnesota July 1, 1917. Dr. Burton's Committee on Public Health presented to the Board of Regents a list of tentative proposals for the creation of a University Health Department. This report was looked upon with favor at the January 18, 1918 meeting, and on March 15 of the same year the Board voted to approve the immediate establishment of a University Public Health Department as follows:

(1) That a University Health Department be created;
(2) That all related agencies be correlated in support of this department and be represented by a health committee to be appointed by the President, which will serve in an advisory capacity to the Health Officer;
(3) That a health fee of $3.00 per semester be charged to each student of collegiate rank, and that a fee prorated to the period of study be charged to students of less than collegiate rank, beginning with the University session of 1918-19, and that such fees be used as a fund for the establishment of free Health Service for the students of the University;
(4) That under the health fee system a force of physicians and nurses be selected by the Health Officer and appointed by the Board of Regents in the service of the department.

It is evident that President Burton not only was the driving force in this movement, but that he had a very broad concept of its role. In his first annual report he wrote: "The Health Service is indispensable to the operation of a large institution. It exists to protect the health of students and prevent disease. It cares for the sanitation of the campus and buildings. By various methods it aims to educate all of the students in matters of public health and personal hygiene."

John Sundwall

On July 24, 1918, the Board of Regents approved the appointment of *John Sundwall* as University Health Officer with the rank of professor. Early in September, he began to organize the new enterprise. All of the University buildings on the Minneapolis campus were fully occupied, but the fraternity houses were closed since the men were living in barracks; quarters for the Health Service were found in two fraternity houses on University Avenue. On the University Farm Campus, space for Health Service was allotted on the first floor of the boys' dormitory and in the girls' dormitory. The Health Service staff during its first year consisted of the medical director and one part-time physician. Almost immediately, the pandemic of influenza entered the picture. Dr. Sundwall has written: "During the last weeks of September influenza struck Minnesota with an almost explosive violence. I shall never forget the first victim at the University, a handsome, robust, young second lieutenant. In less than a week his body was sent home. . . . Simultaneously, with our first Student Army Training Corps case, the disease struck the city as well. Soon it was widespread throughout the city as well as among the Student Army Training Corps boys and staff. All this came on about a week before the University was scheduled to open for regular instruction and thus add a new crop of young civilians including young women to our more than 6,000 Student Army Training

Corps boys already on the campus. . . . In view of conditions, upon my request the date of the opening of school was postponed."

When the civilian students enrolled, a second wave of influenza again taxed the facilities and personnel of the neophyte Health Service.

According to Dr. Sundwall, "During the first year of the Health Service we had cared for 2,000 cases of influenza—1,200 among the Student Army Training Corps boys and 800 among the civilian students. Twenty had died from it or from the unusually vicious type of pneumonia frequently connected with it."

Soon after the Armistice on November 11, 1918, the Student Army Training Corps was discontinued, and it wasn't long until the fraternity boys were asking the Health Service to move as soon as possible from the two houses they had been occupying. The first floor of Pillsbury Hall was remodeled and occupied by the Health Service on February 1, 1919.

During its first year, in spite of the tremendous load put upon the new enterprise by the influenza outbreak, the Health Service was able to carry on some of its other purposes, including the performance of entrance physical examinations, the supervision of sanitation of swimming pools, inspection and rating of rooming-houses in cooperation with the University Housing Bureau, inspection of eating-places on and near the campus, and the offering of courses in hygiene and public health.

For the year 1919-20, another program was started which has existed to this day, namely, provision for postgraduate fellowships paid out of Health Service funds. Arrangements for such fellowships were made with the Departments of Medicine, Surgery, Gynecology and Eye, Ear Nose and Throat. The fellows who were chosen by the heads of the departments concerned and approved by the director of the Health Service spent part of their time with Health Service patients.

The provision for the most expert of care for unusual cases was provided by the agreement that such cases would be seen when necessary by the head of the clinical department concerned.

A second pandemic of influenza hit the University during the school year 1919-20. Although facilities and personnel were still grossly inadequate, Dr. Sundwall felt that "every case was given all the necessary treatment and care scientific medicine provides." The total cases of influenza and influenza-like illness during the second year of the Health Service numbered 5,075. There were 57 cases of pneumonia; total

deaths numbered 16, 11 from the Minneapolis campus and 5 from the St. Paul campus.

The school year 1920-21 allowed for more development than had been possible during the first two years of the Health Service's existence. Health Service stations were established at Morris and at Crookston. The variety of personal services, sanitation and health education was expanded. A full-time nurse was employed to spend most of her time in the girls' dormitory, in the sororities, and with other women's groups, primarily as a health educator. A separate Department of Hygiene and Public Health was established for the purpose of offering systematic instruction in hygiene and public health—both general and professional courses.

During the school year 1920-1921, the Health Service had to contend with two epidemics. These were small pox (43 cases) and paratyphoid fever (approximately 100 cases). The first of these outbreaks resulted in a vigorous campaign of smallpox vaccinations which reached 3,095 students. The latter outbreak prompted epidemiological studies with the aid of the state Department of Health. It was proved that an employee who was a paratyphoid carrier spread the infection as he dipped milk from 10-gallon cans into glasses. Thereafter, according to Dr. Sundwall, not only was pasteurized milk used (as before), but it came mechanically bottled and sealed in individual bottles and was served in the original bottles. Also, efforts were made toward the examination of food handlers.

The first three years of the Health Service's existence had passed and with it the tenure of its first director. In the fall of 1921, Dr. Sundwall was persuaded to follow President Burton to the University of Michigan. (See Chapter VI.) During these three years, there had come to the Health Service staff such stalwart and loyal supporters as Dr. *J. Arthur Myers,* Dr. *Chauncey McKinlay,* Miss *Hallie Fisher,* and Miss *Marguerite Lydon,* R.N.

Upon the resignation of the first Health Service director, President Lotus D. Coffman persuaded Dr. *Harold S. Diehl* to leave the laboratories of the University Hospital and take charge of the still infant Students' Health Service. (See Chapter XV.) This appointment became effective October 10, 1921. History shows that President Coffman could not have made a better choice. During 15 years as director of the University of Minnesota Health Service, Dr. Diehl's tremendous

energy and vision were largely responsible not only for its full development but also for the college Health Service movement throughout the United States.

During his first year, Dr. Diehl appointed two full-time physicians to his staff, making a total of three (including the Director). These were: Dr. *Ruth E. Boynton* and Dr. *William P. Shepard.* During their first year of service, they were occupied largely with problems on the agricultural campus where there was an extensive and severe epidemic of scarlet fever among the students of the School of Agriculture, followed by an outbreak of influenza on that campus. With grossly inadequate facilities, especially for hospitalization, these three physicians, together with other dedicated members of the Health Service staff, worked countless hours to take care of those who became ill. President Coffman, observing the need for better facilities on the agricultural campus, gave the Health Service the Old Home Building (the original building of the School of Agriculture). This building was remodeled during the summer of 1922 for use as an out-patient department and hospital on that campus. In 1923, a full-time physician on the Health Service staff was assigned to the care of students on that campus, and the examination of food handlers and the inspection of the dining-halls and cafeterias were started.

During the winter of 1924-25, malignant smallpox was rampant in the Twin Cities. Within a six-week period, there were 1,000 cases and 300 deaths in Minneapolis alone. Although the Health Service had been advising students to take smallpox vaccination, not all of them had taken advantage of this free service. When the disease struck the Twin Cities, special efforts were made to vaccinate all susceptible students; some 8,000 vaccinations were carried out in a month's time. Unfortunately, seven students who had not been vaccinated contracted smallpox and two of them died. Since this time, smallpox vaccination has been a routine part of the entrance examination at the University of Minnesota, unless specific objection is made to it by the individual student.

In reading Dr. Diehl's Biennial Report for 1929-30 one finds that the Health Service program at that time contained all of the various elements of a so-called comprehensive Health Service. The changes which have developed since then have been mainly those of refinement

and of added details to the broad existing programs which were dictated by increased size, as well as by newer technical developments.

Some of the highlights of this growth and development of the Health Service under Dr. Diehl follow. The year 1928-29 was the last year in which the Health Service on the Minneapolis campus occupied the first floor of Pillsbury Hall. In 1929, a new building to house the Health Service was built as a wing of University Hospitals, providing modern facilities for the out-patient and hospital care of students. June 1930 saw the establishment of a Health Service Plan whereby full-time faculty members and employees of the University could participate on an optional basis. This provided for ambulatory out-patient care, routine physical examinations and the like, upon payment of the same annual fee as that paid by students. An intensive program for the early diagnosis of tuberculosis was started in 1931. This program consists of a tuberculin test as a part of every examination and an x-ray of the chest of every student showing a reaction to tuberculin.

When Dr. Diehl left the Health Service in 1936 to become dean of the College of Medical Sciences at the University of Minnesota, he left behind one of the most effective and comprehensive college health programs to be found anywhere. This Health Service, housed in a new, well-planned thoroughly equipped building, rendered medical care to 400-500 students per day, who sought services of one kind or another. The professional staff consisted of nine full-time and 28 part-time physicians, including specialists in preventive medicine and public health, tuberculosis, mental hygiene, surgery, orthopedics, ophthalmology, otolaryngology, dermatology, neurology, and gynecology. In addition, the staff included 11 part-time dentists and numerous nurses, technicians, clerks and stenographers. Dr. Diehl had made such important full-time appointments as those of Dr. Ruth E. Boynton, Dr. A. B. Baker, Dr. Ralph V. Ellis, Dr. Robert Hinckley, Dr. Robert B. Radl, Dr. Bernard A. Watson, Dr. M. J. Nydahl, Mr. Ray Amberg, Dr. Harry De Witt Lees, and Dr. Ellet M. deBerry. His Health Service became a model for the nation and he promoted Health Service work nationally. (See Chapter XV.) He was president of the American Student Health Association from 1927-29 and Secretary-Treasurer of that organization in 1934-35.

In 1936, Dr. *Ruth E. Boynton* took over where Dr. Diehl left off.

Ruth E. Boynton

With her fine training and experience in public health, as well as her excellence as a clinical practitioner, it was not unexpected that she would continue the growth and development of the Students' Health Service at the University of Minnesota. In her first year, she added consultants in the fields of proctology and urology, added audiometry as a part of all routine examinations, and set up a special diet table where students with diabetes, peptic ulcers, nephritis, etc., could receive specially prepared meals. In 1938, the Health Service started a program whereby all nonacademic employees of the University were given pre-employment examinations.

In 1939, a fine new Health Service building on the St. Paul campus was completed and ready for occupancy. This building has made it possible to provide much more adequate and satisfactory service for students on that campus. It was equipped to provide full service, except for surgery, and it made available sufficiently expansible hospital space so that cases needing hospitalization could be sent from the main campus to St. Paul when needed, as in time of epidemic.

During 1938-39, the Health Service undertook a very comprehensive survey of students' rooming-houses, the findings of which resulted in a more intensive program of inspections and certifications of student housing. This program has continued since that time.

During the 1940-42 biennium, the Regents extended the pre-employ-

ment examination requirement to the academic staff of the University. The Health Service took on this added chore, together with examination of all faculty recommended for promotion to the rank of associate professor or professor.

During the war years, starting in 1942, several groups of Army and Navy men assigned to the University for special training were given medical care under arrangements made by the Health Service. The arrival of these men from various military centers throughout the United States, with replacements occurring periodically, resulted in a high incidence of illness, particularly of infectious diseases. These included a widespread outbreak of influenza in 1943, as well as smaller outbreaks of meningitis, scarlet fever and mumps. During these trying times, most of the regular Health Service programs were carried on, although some, such as the special diet table, had to be discontinued temporarily. Most of the research activities of the Health Service which had been an important part of the program also had to be drastically curtailed because of the relative lack of staff.

All Army and Navy groups on campus were discontinued on June 30, 1946, and the Health Service was able to get back to "normal" operation. However, the large numbers of veterans returning to campus brought with them many special health problems both of a physical and an emotional nature. The Veterans Administration made a contract with the University under which rehabilitation veterans could receive complete medical care at the Health Service without cost to the student. The Health Service also undertook the task of passing on the feasibility of vocational training for veterans, under contract with the federal Veterans Counseling Service.

With the great increase in the number of students returning to campus immediately after the war, the Health Service was found lacking in space and personnel. The personnel problem was partially solved by greatly increasing the part-time staff. To alleviate the space problem, a temporary building located north of the Health Service was obtained and finished to accommodate the Health Service dental department, eye clinic, record rooms and offices for the sanitary inspectors. At the same time, plans were being developed for a new University Health Service building to house its out-patient facilities, and to be located opposite the out-patient entrance to University Hospitals. A 70-millimeter photofluorographic unit was installed, making it possible to get

a photofluorographic x-ray of the chest of every student entering the University and of every student having a health examination; this unit continued to function until January 1, 1958. Continued efforts to build up the full-time staff met with some success. For example, the full-time psychiatric staff was increased to four, and also during this time, the appointment of a full-time public health engineer made possible the beginning of a strong environmental health and safety program.

In September 1950, the new Health Service building was ready for occupancy. For the first time in several years, there was adequate room to carry on the full health program which had been developed during the past years. In the new building, the Health Service had its own pharmacy and x-ray departments and room for the resumption of such activities as the special diet table. In 1952, Dr. Boynton wrote: "With modern buildings on the St. Paul and Minneapolic campuses the University of Minnesota now has physical facilities for its Health Service second to none."

In February of 1951, the Board of Regents adopted a Sanitary Code for the University of Minnesota which formalized the role of the Health Service as the public health agency for the University. This Sanitary Code covered all areas in which a local health agency performs. On July 1, 1953, the Health Service was asked to take over the program of radiation hazard control on the Minneapolis campus, the St. Paul campus and other areas where the University is concerned. These developments added to the scope of the programs of the Health Service's Division of Environmental Health and Safety, and necessitated the appointment over the ensuing years of health physicists, industrial health engineers, safety engineers, sanitarians, and others.

By 1955, just five years after moving into the new building, it was becoming apparent that even this fine structure would soon prove to be inadequate in size. This was due to two very important factors: one, of course, the projected tremendous increase in student population; and the other, the greater range of benefits provided to students without charge. In the fall of 1954, Dr. Boynton appointed to the staff a full-time health educator who has since that time contributed greatly to the health education in all parts of the Health Service program.

Dr. Boynton found, as did her predecessors, that epidemics among University students can greatly upset the general routine. Though many infectious diseases have come under relative control through the use of

vaccines and other measures, nevertheless on occasion communicable disease can become a major problem on campus. Thus, in the fall of 1957, an epidemic of Asian influenza started during the first week of school and continued for approximately two months. During the first eight weeks of the fall quarter, more than 1,200 students were hospitalized. Through valiant efforts on the part of Dr. Boynton and her staff, together with the fine cooperation of University Hospitals, the Union Board of Governors and others who made space for temporary hospitalization available, the epidemic passed without serious consequence. A total of 45 cases of pneumonia were seen, and although some of them were rather seriously ill, recovery was complete in every case.

Following a period of planning for the construction of a new Health Service Wing, the addition was completed during the 1959-60 academic year. This four-story wing provided room for an enlarged x-ray department an enlarged pharmacy and new quarters for the growing department of Environmental Health and Safety. During this period, also, a special committee composed of members of the All-University Congress and the University Health Service staff studied the feasibility of a supplemental insurance plan to cover students during the time they are not actually enrolled in the University and to cover their dependents, if any. A special Blue Cross-Blue Shield plan was developed, and it has been available to students on an optional basis since that time.

Dr. Boynton chose to retire from the University on July 1, 1961. She left behind her perhaps the most truly comprehensive University Health Service anywhere. Under her directorship, virtually all of the stated purposes of such a service had been fully developed and refined. Her leadership in the Health Service movement in this country and abroad cannot be denied. She earned many honors in the field of college health and public health in the United States and in Great Britain. She was president of the American Student Health Association in 1940-41. Although all phases of the University of Minnesota Health Service program received her constant attention and reached fruition under her leadership, perhaps the two divisions which most needed and received the fullest development under her were the Department of Mental Hygiene and the Division of Environmental Health and Safety.

Among the names of full-time staff appointments made by Dr. Boynton are found the following: Dr. C. Knight Aldrich, Dr. Murray Bates,

Dr. John J. Boehrer, Mr. Richard G. Bond, Dr. Lillian Cottrell, Dr. Donald W. Cowan, Dr. Edward J. Dvorak, Dr. Joyce L. Funke, Dr. E. Russell Hayes, Dr. Frederick W. Hoffbauer, Dr. William H. Hollinshead, Dr. Robert B. Howard, Dr. Philip W. Hursh, Dr. Phillip D. Kernan, Dr. Myron G. Messenheimer, Mr. George S. Michaelson, Dr. Benjamin R. Reiter, Dr. John W. Schumacher, Dr. Royal V. Sherman, Dr. Stella H. Sikkema, Mr. Lee D. Stauffer, Mr. Glen Taylor, Dr. Hugh J. Thompson and Dr. Myron W. Weaver.

Ruth Evelyn Boynton was born in LaCrosse, Wisconsin in 1896. In 1921, she was awarded the degree of doctor of medicine from the University of Minnesota. She soon became assistant director of the Student Health Service as one of Dr. Diehl's first appointees to his staff. From 1922 to 1927, she was first instructor and then assistant professor of preventive medicine and public health. In 1927, she was granted the masters degree in public health. That year, she became assistant professor of medicine and chief medical advisor for women at the University of Chicago. Four years later, she returned to Minnesota as associate professor of preventive medicine and public health and she became professor in 1938. For three years during World War II, she was acting director of the School of Public Health.

At the Student Health Service, she conducted special studies on tuberculosis including infection attack rates among student nurses. She found that among students whose training was limited to general hospitals without special tuberculosis services, the infection attack rate was 100 times greater than that of students in the College of Education.

In 1939, she became a member of the Minnesota State Board of Health where she served as vice-president in 1943 and president in 1945. She remainded a member of the Board until she retired from the University.

In February 1951, Dr. Boynton was granted a Fullbright Scholarship for a six-months study of Great Britain's student health services.

Dr. Boynton became a member of the American Student Health Association (now American College Health Association) at its beginning and was secretary of that organization from 1935 to 1940, and president in 1940-41.

Upon reaching voluntary retirement age in 1961, she moved to Miami, Florida, where after a brief period, she volunteered her services as secretary and treasurer of the American College Health Association.

Marguerite C. Lydon

Leona LeBlanc

Special recognition is due two nurses not only for their superior work but also for their many years of devoted service. Miss *Marguerite Lydon,* R.N. joined the professional staff in 1918 and remained until retirement age in 1955. Miss *Leona LeBlanc* joined the nursing staff in 1927 and retired in 1959.

Miss *Josephine Apker* holds the enviable record of having been a most efficient secretary to the director for the past 30 years.

Dr. *Donald W. Cowan* who prepared the preceding historical sketch of the Health Service, was born in Rochester, Minnesota in 1907. He graduated from the Rochester Public High School in June 1923, and began working in the Mayo Clinic Research Laboratory at St. Mary's Hospital, where he came under the influence of such physicians as Leonard Rowntree, Norman Keith, Albert Snell, Russell Wilder, Edgar V. Allen and others. He was then hopeful of becoming a full-time laboratory technician, so in addition to his full-time position he began taking courses in chemistry, etc., at the Rochester Junior College in the fall of 1923. There he received an associate of arts degree. In the fall of 1927, he entered the School of Medicine of the University of Minnesota and served as part-time assistant in physiology for the next four years including summers. In the spring of 1931, he was awarded the degrees of doctor of medicine with distinction and master of science in physiology. During school years, Dr. Cowan did superior work. He

Donald W. Cowan

was elected to membership in Alpha Omega Alpha and Sigma Xi. He was also recipient of the Charles Lyman Greene Prize in Physiology. The bachelor of medicine and doctor of medicine degrees were awarded with distinction.

After receiving the degree of doctor of medicine, Dr. Cowan was associate in physiology at the State University of Iowa Medical School for five years. He then took an internship at the United States Marine Hospital in Chicago, after which he accepted a fellowship in medicine at the Mayo Clinic. However, because of financial need, he decided to postpone the fellowship for one year.

On July 1, 1937, he was appointed physician with the Student Health Service and instructor in preventive medicine and public health, School of Medicine, University of Minnesota. In 1941, he was promoted to an assistant professorship and in 1946 to associate professor and assistant director of the Health Service. With retirement of Dr. Boynton in 1961, Dr. Cowan was promoted to the rank of professor and director of the Student Health Service. He has not only maintained the excellence of the Health Service but has also kept it abreast of all new developments including some he himself has initiated. Under his direction, the Health Service now has a staff of some 250 individuals. This includes 32 full-time physicians, 50 part-time physicians, 16 full-time and 5 part-time nurses, 9 laboratory technicians, 4 x-ray technicians, 17 part-time den-

tists, 7 full-time dental hygienists, an industrial health engineer, a public health engineer, 3 safety engineers, 3 health physicists, 5 sanitarians. Also included are a health educator, a public health nurse, a dietitian, 4 psychiatric social workers, two clinical psychologists, 3 full-time pharmacists and, a number of secretaries, clerk-stenographers and other supporting personnel.

The physical facilities again proved to be inadequate, not only for the future projected big increase in college population, but also even for the present work load. Building of a new addition to the north is under way and will be followed by remodeling in the old building. These together will add space to practically every division of the Health Service and will include more than doubling the size of the pharmacy and the size of the clinical laboratory, and increasing the size of the outpatient dispensary by at least 50 per cent.

Dr. Cowan served five years with Company A, Collecting First Medical Battalion, Minnesota National Guard. He is a Diplomat of the National Board of Preventive Medicine and Public Health. He holds membership in his county, state, and American Medical Associations and the various organizations in his special field including the American College Health Association of which he is now secretary-treasurer, the American Public Health Association and the North Central Section of the American College Health Association, of which he has been secretary, vice-president, and president. He has published numerous excellent articles in local and national journals. (See Appendix J for staff list.)

Chapter XXXII

Department of Microbiology 1918–1966

MICROBIOLOGY AT MINNESOTA may be unique in the history of the science in the United States. An integral part of the Medical School since its inception, the Microbiology Department historically has served as the organizational center for all microbiological teaching and research for the whole university; this is in contrast to other states where it usually developed independently in agricultural, medical, or arts and sciences schools. The department plays a dual role contributing to the basic science education of medical students, nurses, and medical technologists, as well as offering courses to students in liberal arts, biological sciences, agriculture, engineering, chemistry and technology.

Dr. *Charles N. Hewitt,* who was primarily a bacteriologist, established a small laboratory for the State Board of Health in Red Wing, Minnesota, and as early as 1893-1894 had installed an *avant-garde* diagnostic laboratory in the University's Mechanic Arts Building. Dr. *M. D. Frost,* one of Dr. Hewitt's assistants, later distinguished himself by his contribution to bacteriology at the University of Wisconsin in collaboration with the eminent scientist, Dr. *H. L. Russell.*

The first bacteriology as such was taught at Minnesota in connection with an advanced course in botany by Professor *Conway MacMillan* in 1890. Subsequently, as in most medical schools of this era, bacteriology was the second component in the department of pathology and bacteriology. Professor *J. Clark Stewart* was head of the department. The first formal course in bacteriology in this department was taught in 1892 by Dr. *Thomas G. Lee,* an instructor in bacteriology, urinanalysis and histology. Dr. *Frank F. Wesbrook,* later made dean of the Medical School, succeeded Dr. Stewart as professor of pathology and bacteriology. Dr. Wesbrook had a deep personal interest in bacteriology and contributed to the development of several new techniques.

This was during the "golden period" in the development of bacteriology and immunology in Europe. Many American scholars studied with

Winford P. Larson

such authorities as Koch at Berlin, Ehrlich at Frankfurt, Pasteur in Paris, and Von Behring in Marburg. During this period, bacteriology and immunology developed into a science. This was manifest at Minnesota as early as 1908 when the medical course in bacteriology was offered to graduate students as a minor for doctor of philosophy candidates and as a major for the master's degree.

The 1913 reorganization of the medical school under President George E. Vincent resulted in the appointment of Dr. *H. E. Robertson* as professor and acting head of the Department of Pathology and Bacteriology. Dr. *Winford P. Larson* rejoined the staff after seven years post-doctorate training in Berlin, Paris, and Vienna.

As the new field became more specialized, there was a tendency in the United States for bacteriology to divorce pathology and to establish departments in its own right. At Minnesota, too, the independence of bacteriology and immunology was inevitable, and in 1919, the Department of Bacteriology and Immunology, under the headship of Dr. *Winford P. Larson,* came into existence.

Dr. Larson's talent for selecting a staff of young men in whom he had confidence and allowing them complete freedom to develop their own interests resulted in 29 years of national distinction for Minnesota's microbiology department. Dr. Larson inspired students and staff with a zeal for research and an ambition to succeed. His foresight and skill

Arthur R. Henrici

in organizing, counselling and managing the department must be regarded as outstanding accomplishments. His own scientific investigations dealt with contagious abortion, the effect of surface tension on the growth and physiology of bacteria, the action of soap on bacterial toxins which resulted in toxoids that were used for immunization against diphtheria and scarlet fever, and the development of high titer anti-pneumococcus rabbit serum. At the time of his death, Dr. Larson was studying the cause of sudden deaths of cerebral origin which occur during the convalescent period of pneumonia.

Probably the most renowned member of Dr. Larson's department was Dr. *Arthur T. Henrici,* who became one of the most original and outstanding bacteriologists in America. Born in 1889, Dr. Henrici graduated from the University of Pittsburgh Medical School in 1911, where he remained for another two years. He came to Minnesota in 1913 as an instructor, to spend his entire academic career. His research could be divided into four areas: Dental bacteriology and the role of bacteria in dental caries; the morphologic variations of bacteria; the immunological aspects of mycotic infections; and limnological bacteriology. His students acclaimed him a teacher without peer, and his text on *Molds, Yeast and Actinomycetes* is still accepted as basic some 15 years after his death.

Though his contributions to science won him the plaudit "America's

Bacteriologist" of his era, Dr. Henrici's concern for humanity, his versatility, the broad range of his diversions and his impatience with less than perfection contributed to his fulfillment of his own definition of success: "obtaining the greatest possible personal satisfaction out of living".

In 1949, six years after his death, a group of former students organized an informal society open to all interested in microbiology known as *The Henrici Society for Microbiologists.* One of its first activities was the preparation of a small booklet entitled "*Henrici (1889-1943),*" in which many of his close friends and colleagues documented Professor Henrici's attributes expressed through his personality and hobbies. The society still meets three times each year, and as manifested by the attendance and enthusiasm, it is perpetuating the memory and the spirit of this great teacher.

In the period of the early 1920's, the department's function of serving the University as a whole prompted such courses as "Special Bacteriology for Students of Agriculture" and "Household Bacteriology." The department was offering elective courses primarily for graduate students on the "Morphology and Taxonomy of Bacteria," "Bacteriological Chemistry" and "Pathogenic Protozoa."

"Industrial Bacteriology" dealing with fermentation, the manufacture of alcohol, butyl alcohol, acetone and acetic acid and with the bacteriology of the tanning, flax-retting and sugar industries was first introduced by Dr. *H. Orin Halvorson* in 1925. Dr. Halvorson was a faculty member for 27 years, the first director of the Hormel Institute, and in 1949 became the head of the bacteriology department of the University of Illinois, later becoming head of that university's School of Life Sciences. In 1960, Minnesota's Board of Regents bestowed on him the "Outstanding Achievement Award." Dr. Halvorson has since returned to Minnesota and is associated with the newly established College of Biological Sciences on the St. Paul Campus.

Bacteriology through the years has been vitalized by the creativity of youth with the graduate student challenging and stimulating the maturity of the established investigator. By 1930, the department designed three courses specifically for graduate students in addition to those of a medical nature. Others such as "Physiology of Bacteria," "Applied Bacteriology," "Soil Microbiology," and "Filterable Viruses" were added soon after.

Meanwhile, by 1936, opportunities for graduate study of medical

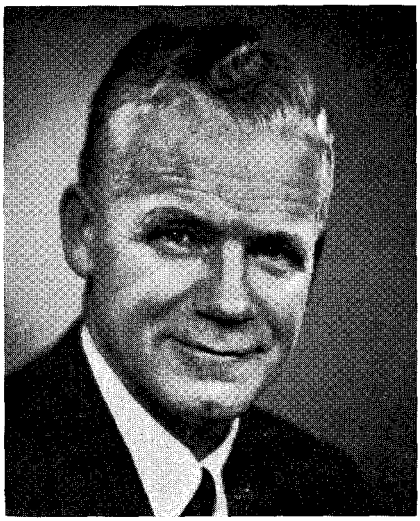
Robert G. Green

bacteriology, parasitology and immunology had been established for clinicians at the Mayo Foundation in Rochester under the direction of Dr. *Edward C. Rosenow.*

When Dr. Larson died in 1947, his colleague and staff member, Dr. *Robert G. Green*, became head of the department. Dr. Green's boyhood experiences in northern Minnesota and love of nature moved him to pursue the study of the diseases of wild animals. By inoculating horned owls, barred owls, and screech owls, he showed that the dead bird had been victim to an unknown virus; and by watching snowshoe rabbits month after month in their forest domain he discovered "shock disease," a malady so depleting the blood sugar that the animal, if abruptly frightened, dies at its first leap.

His general interest in animal diseases led him to specific studies on the silver fox and mink. It is said that he saved Minnesota's fur industry, first by his discovery and control of fox encephalitis, then by ultimately developing a vaccine effective against canine distemper in foxes, and finally by his discovery of a vitamin deficiency that had caused widespread death of foxes. The fox industry supported his work financially, and at least unofficially, Dr. Green might be called the "father of grantsmanship" in bacteriology at Minnesota.

Dr. Green's research on animal diseases broadened to include a biological interest in viruses. Probably his most important contribution to



Jerome T. Syverton

the understanding of viruses was a paper published in 1935 in which he described his ideas as to derivation of viruses by a process of retrograde evolution from microbes. He was neither the first nor the only proponent of this theory, but his concepts established him as an authority in this field.

Dr. Green's headship of the bacteriology department was the most brief in its history, from March to September, 1947; even so, in his flair for developing future scientists he preserved the departmental tradition of providing a stimulating atmosphere for aspiring graduate students and productive research.

If Dr. Green was the "father," his successor, Dr. *Jerome T. Syverton,* deserved the title "master of grantsmanship." Dr. Syverton inaugurated the era of formalized government and organization support of research and graduate training in basic and clinical microbiology. His success in attracting funds was proportionate to his spirit of generosity and unselfishness in giving time and energy to the work of the organizations which supported him. He has been called by a colleague, "the very embodiment of a gentleman—considerate, genuine, sincere, strong in his friendships, gentle, loyal and helpful."

Dr. Syverton was born in North Dakota, trained at the University of North Dakota, Harvard Medical School, Duke University Hospital and the Rockefeller Institute. He was on the staff of the University of

Rochester for several years, and came to Minnesota after two years as professor and head of the Department of Microbiology at Louisiana State University School of Medicine.

Scientifically, Dr. Syverton's most significant contribution was his discovery with McLaren and Holland that the ribonucleic acid of poliovirus could infect non-primate cells that were ordinarily refractory to infection with complete poliovirus. An authority on viruses, his research covered studies of filterable viruses, infectious diseases, tissue culture, arthropod transmission of disease, the immunology of cancer and interepidemic survival of viruses.

Like his predecessors, Dr. Syverton perpetuated an atmosphere conducive to the development and training of graduate students. His staff and his immediate research "team" were composed of bright, young, energetic thinkers with whom he shared his scientific ideas and publications.

Under Dr. Syverton's direction, the curriculum was updated in 1948 to include such titles as "General Mycology," "Viruses and Rickettsia," and "Principles of Infectious Diseases." "Medical Mycology," "The Fungi Imperfecti," "Virus Diseases of Plants," and "Bacterial Metabolism" were added in 1952 and "Microbial Genetics" in 1957.

Probably the greatest compliment to Dr. Syverton's leadership is the number of his staff members who have since become heads of microbiology departments—Dr. Herman Lichstein, University of Cincinnati; Dr. William Scherer, Cornell University Medical School; and Dr. John Holland, University of California at Irvine.

Dr. Syverton died of a coronary in early 1961 and was succeeded in the fall by Dr. *John Spizizen,* then an associate professor of microbiology at Western Reserve University, Cleveland.

Where Dr. Syverton's interests had been slanted toward basic and medical bacteriology, Dr. Spizizen's tended toward the basic aspects of the science, notably genetics. Thus, in keeping with the rapidly changing emphasis and widening scope of the field, Minnesota's bacteriology department was renamed the Department of Microbiology.

Trained as a virologist at California Polytechnic Institute under Nobel Laureate T. H. Morgan, Dr. Spizizen's early personal research investigations were in genetics. He studied the basic genetic mechanism of viral control of cell metabolism and the genetic basis of viral control.

John Spizizen

His most noted discovery was a transformation system for the transfer of genetic information in *Bacillus subtilis.*

Dr. Spizizen continued the concept that as many phases as possible should be represented in a well-balanced microbiology department. On the whole, his appointments in the area of microbial physiology and developmental biology were excellent and strengthened the teaching and research in these important areas.

Dr. Syverton's outstanding contributions to research and his excellent relationship with the granting agencies resulted in a generous contribution of funds which Dr. Spizizen used wisely to supplement and update existing equipment and facilities within the department. Dr. Spizizen made a major contribution in his appointments and the wise utilization of research and training funds for equipping and staffing the department.

Dr. Spizizen took an early interest in plans for the College of Biological Sciences. He envisioned a working collaboration and joint faculty representation for the Department of Microbiology within both the College of Medical Sciences and the College of Biological Sciences. To a degree, this cooperative endeavor was inaugurated after he left the University in 1964 to become head of the microbiology section at Scripps Clinic and Research Foundation in LaJolla, California.

THE PRESENT DEPARTMENT—1966

As in the past, the department continues to represent microbiology in its entirety at the University of Minnesota. There is increased emphasis on integration by means of joint appointments of capable and distinguished microbiologists in other departments and colleges of the university.

The teaching of medical students is a primary function of the department. The joint appointment concept between members of clinical departments serves this teaching aspect well, and may represent the means for a greater degree of integration of microbiology and continued emphasis beyond the sophomore year of medical school.

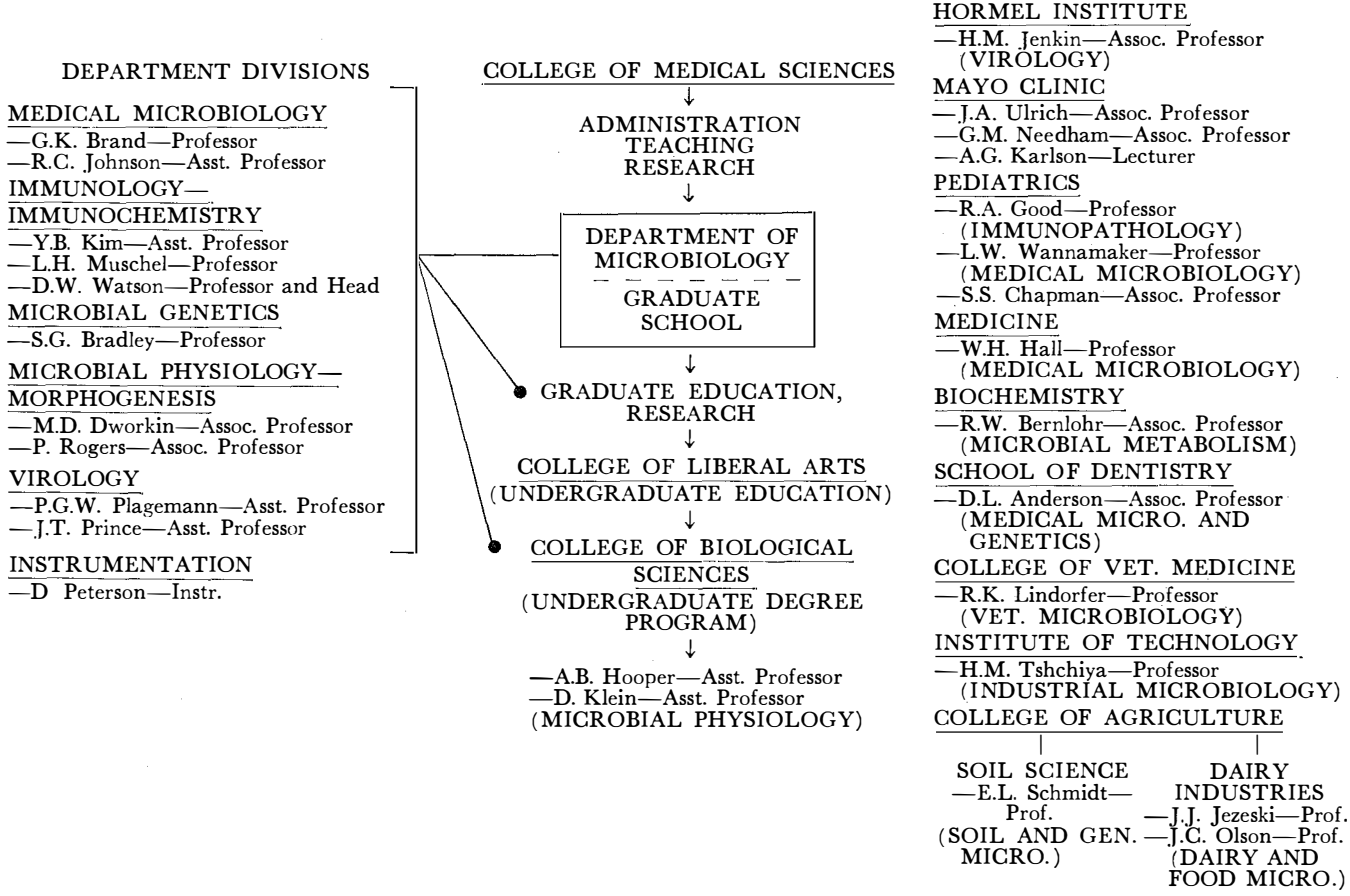
Traditionally, the department has placed great emphasis on graduate teaching. During 1965-1966, the department supported 52 graduate students working toward the master of sciences or doctor of philosophy degrees. This was made possible by two generous training grants from the National Institutes of Health—one from the Institute of Allergy and Infectious Diseases and the other from the Institute of General Medical Sciences.

In the past, graduate students were often supported by stipends from the research grants of individual staff members. The use of training grant funds has permitted a more equitable distribution of graduate students to the various members of the department quite independent of their research budgets. Indirectly, these training grants have also supported the research and teaching activities of the less established and younger members of the staff. The graduate students are expected to take part in the laboratory teaching of the various departmental course offerings. The importance of this part of their training is reflected in the large percentage of Minnesota students accepting academic positions.

Undergraduate teaching, too, remains a substantial activity within the department. In the year 1965-1966, 1400 undergraduate students took laboratory courses within the department.

In an attempt to illustrate the scope of microbiology and the interrelationships with other areas at the University, the accompanying chart was prepared. Those members of the staff within the department who are full-time and without joint appointments are placed within

ORGANIZATION AND INTEGRATION OF THE DEPARTMENT OF MICROBIOLOGY WITHIN THE UNIVERSITY OF MINNESOTA—1966



departmental divisions on the left of the chart. Those with joint appointments are placed in the college or department with which they are affiliated. Drs. Bernlohr and Schmidt have research facilities within the department and have teaching responsibilities in both areas. The majority of those with joint appointments have research facilities within the institution or department listed, and their responsibilities to the department of microbiology may involve teaching undergraduate or graduate courses; some will give a series of specialized lectures; all are eligible to participate in the graduate training of master of science and doctor of philosophy candidates within the Department of Microbiology.

Departmental Divisions

As evident from the chart, the science of microbiology has a large number of sub-specialties. Perhaps the most basic to all microbiology is the area of *microbial physiology.*

Dr. *Palmer Rogers* teaches a lecture and laboratory course and carries on an active research and training program. One aspect of his research concerns the regulation of enzyme synthesis in bacteria, and another deals with the canavanine death and the mechanism of Deoxyribonucleic acid replication in *Escherichia coli.*

Dr. *Robert Bernlohr,* a United States Public Health Service Career Development awardee, joins microbiology and biochemistry through a joint appointment in both of these Medical School departments. Dr. Bernlohr and his students are investigating the control of enzyme systems involved in the process of sporulation. This work encompasses an examination of amino acid metabolism, control of protein synthesis, permeability, biosynthesis of antibiotics and the chemical composition and structure of spore components. Dr. Bernlohr teaches two courses on microbial metabolism, one in biochemistry and the other in the microbiology department.

Developmental biology is a rapidly expanding area to which Dr. *Martin Dworkin* is making a significant contribution. Dr. Dworkin, another Career Development awardee, and his students are pursuing the general problem of morphogenetic change using *Myxococcus xanthus* as a model system. Dr. Dworkin lectures skillfully on microbial physiology to the medical students and teaches an advanced general microbiology course; this will represent one of the core courses in the biology sequence in the College of Biological Sciences.

Within recent years, microbial genetics has increased the basic understanding of genetic mechanisms. In microbiology, Dr. *S. Gaylen Bradley* carries on an active research and teaching program. He and his students are primarily concerned with the biochemical and genetic processes of actinomycetes and actinophages. Dr. Bradley has been a part of the genetics program of the College of Biological Sciences. He teaches microbial genetics and general mycology.

The international renaissance in immunology has also been evident at Minnesota. Development of this area has been intradepartmental. Dr. *Louis Muschel* was added to the staff in recent years; he is interested in microbial and mammalian tissue antibodies. Dr. Muschel is investigating the role of complement and antibodies in the bactercidal properties of serum, and teaches a basic course in immunology.

During 1965-1966, Dr. *Gerhard K. Brand* reorganized the *medical microbiology* course for medical students to increase its effectiveness and relate its theory to clinical practice. In addition to his teaching duties, Dr. Brand and his students study the antigenic composition of mammalian cells and tissues including tumors and virus-infected tissues. In the past, he has studied the process of carcinogenesis in plastic film-induced mouse sarcomas. His studies on aging involve the use of serially transplanted mice.

Dr. *Russell Johnson's* research project concerns the biological properties of the pathogenic spirochete, *Leptospira.* Factors which allow this spirochete to survive the natural defense mechanisms of the host are being investigated through nutritional, metabolic and immunological studies. Dr. Johnson has demonstrated his teaching prowess in both the general survey course and in medical microbiology.

Virology continues to be a popular area of investigation and teaching within the department. Dr. *Peter Plagemann,* a young molecular virologist, is attempting to elucidate the biochemical processes involved in the penetration of ribonucleic acid (RNA) viruses into normal cells, in the production of viral RNA and protein in the cell, and in the assembly of these components into infective virus particles. Dr. Plagemann has revised the graduate course in basic virology to include the molecular aspects, and also teaches the virology section of the course for medical students.

Exploring a different yet equally challenging phase of virology is *James Prince,* who works on the Shope papilloma virus. He hopes to find the

mechanism of spontaneous regression of tumors produced by the virus. Mr. Prince is in complete charge of the departmental teaching laboratory; this includes the organization, preparation, and supervision of all laboratory courses given in the department as well as the maintenance of the four laboratories (which are independent of research and graduate student facilities). In performing these duties, Mr. Prince has enhanced the quality of laboratory teaching at Minnesota as well as provided a real service to other staff members.

Joint Appointments

As outlined in the organization chart, microbiology and its collateral areas are represented in many colleges and departments within the university. The Department of Veterinary Bacteriology in the College of Veterinary Medicine is under the able leadership of Dr. *Benjamin S. Pomeroy.* This department awards advanced degrees primarily to doctors of veterinary medicine. For many of the basic courses in their graduate program, they rely heavily on courses given in the microbiology department. Dr. *R. K. Lindorfer* who holds a joint appointment in veterinary bacteriology and microbiology, serves as liaison between the College of Veterinary Medicine and the Department of Microbiology. Dr. Lindorfer teaches the general survey course in the fall and spring quarters on the St. Paul Campus. His research program concerns the characterization of staphylococcal toxins.

As indicated, there is a working association with the Department of Pediatrics. Dr. *Robert A. Good* supervises graduate students in the Department of Microbiology and shares in teaching basic immunology to medical students. A weekly seminar in immunobiology, jointly sponsored by the two departments, resulted from this association and brings together all individuals interested in immunology. The outstanding investigations of Dr. Good and his group in the field of immunopathology have stimulated and revitalized interest in immunology at Minnesota.

Dr. *Lewis Wannamaker,* a career investigator of the American Heart Association, has his research affiliation in the Department of Pediatrics while holding a joint appointment in microbiology. His interest in group A streptococci and their possible role in heart and kidney complications relates theory to practice in the overall microbiology teaching program.

Dr. *Wendell Hall* has for several years shared in teaching medical

microbiology to medical students. His research activities are carried on at the Minneapolis Veterans Administration Hospital, where he is on a full-time appointment.

School of Dentistry

Since the Henrici era, teaching microbiology to dental students has been a departmental function. The mutually rewarding appointment of Dr. *D. L. Anderson* in microbiology and dentistry has strengthened the effectiveness of the teaching program. Dr. Anderson utilizes departmental facilities for teaching dental microbiology, while his research area is located in the College of Dentistry. As a result, he is closely associated with his colleagues in the School of Dentistry and has a professional base in the Department of Microbiology.

Dr. Anderson's research involves the use of the electron microscope and its application to the study of the fine structure of mycoplasma, their developmental cycles, and the association of mycoplasma with mammalian cells in culture. In addition, Dr. Anderson continues his interest in the ultrastructure of bacteriophages and the genetic mechanisms in streptomycetes.

Institute of Technology

Traditionally, a fine relationship has prevailed between the Department of Microbiology and the University's Institute of Technology. To reestablish this association, recently Dr. *Henry M. Tsuchiya,* a Minnesota graduate in microbiology and a professor in the Institute of Technology, received a joint appointment in the Department of Microbiology, he now serves as liaison with the Institute of Technology. The Institute specializes in the industrial applications of microbiology; it is hoped that the department will assist in the expansion of applied microbiology within the Institute.

College of Agriculture

For several years, there has been a close relationship between several departments within the College of Agriculture and the Department of Microbiology. To cite one example, graduate students in microbiology often select biochemistry as their minor field of study. Until recently, biochemistry was a part of the College of Agriculture.

Interest in soil microbiology developed over the past years as the result of the joint appointment of Dr. *Edwin L. Schmidt* in the Departments of Microbiology and Soil Science. Dr. Schmidt has laboratory space in both departments and is considered an expert teacher in both general and soil microbiology.

Dr. Schmidt and his students first showed that a heterotrophic organism, the soil fungus *Aspergillus flavus,* converted reduced forms of nitrogen to nitrate, a form available to plants. He is continuing investigations of certain soil microorganisms and their interactions in the soil.

Within dairy microbiology, Dr. *Harold Macy,* a distinguished microbiologist, for a number of years held a joint appointment within the department. Later he served as dean of the Institute of Agriculture. His work has been continued by Dr. *J. J. Jezeski* and Dr. *J. C. Olson.* Both hold joint appointments in the Department of Microbiology. Over the years, they have advised some outstanding students within the department and engaged in research dealing with the utilization and control of microorganisms important to the dairy and food industries.

Colleges of Liberal Arts and Biological Sciences

Before the recent organization of the College of Biological Sciences, undergraduate degrees in microbiology were awarded only in the College of Liberal Arts. More recently, within the College of Biological Sciences, two programs are available. There is a proposal for a doctor of philosophy program in biology; in this, microbiology will be one of the core courses. The other proposal is a four year curriculum leading to the degree of bachelor of science in microbiology.

Dr. *Palmer Rogers* of the Microbiology Department serves on Dean Richard Caldecott's advisory committee to the biological sciences, and Dr. *Dennis Watson* serves on the consultative council for the College of Biological Sciences.

At the Graduate School level, an even closer cooperative effort has been initiated. Dr. *A. B. Hooper* of the Department of Zoology (now in the College of Biological Sciences) has a joint appointment in microbiology. The great emphasis on the use of microorganisms for basic studies in biochemistry and molecular biology undoubtedly will lead to additional collaborative efforts with the College of Biological Sciences.

Mayo Clinic

Since the tenure of Dr. E. C. Rosenow and the late Ford Heilman, close ties have united the Mayo Clinic to microbiology at Minnesota. Under the direction of Dr. *Lyle Weed,* the staff of the microbiology department of the Mayo Graduate School of Medicine has served primarily at the graduate level. Three members of the present staff—Drs. *Gerald Needham, Alfred Karlson,* and *John Ulrich*—hold joint appointments within the Department of Microbiology. Dr. Ulrich teaches mycology to our sophomore medical students.

Hormel Institute

As an affiliate of the University of Minnesota, the Hormel Institute, Austin, Minnesota, is directly concerned with the industrial aspects of microbiology. Recently, Dr. *Howard M. Jenkin,* a virologist, received a joint appointment within the Department of Microbiology.

In addition, with the generous support of Drs. *Eldon Hill* and *Almut Dettmers* of this Institute, Drs. Y. B. Kim, S. Gaylen Bradley and D. W. Watson have initiated a unique research effort involving the use of the Minnesota miniature piglet in a study of the ontogeny of the immune response.

Physical Facilities

For many years, the department was located on the second floor of Millard Hall with animal facilities on the roof and some laboratories in the basement. In the summer of 1954, the new Mayo Medical Center was completed and the department moved to occupy the 9th and 10th floors. Teaching and animal units are located on the second floor. Facilities were increased from 12,659 square feet in Millard to 19,220 in the new Mayo building. Later, after the completion of Diehl Hall, the department acquired an additional unit of 1,458 square feet which accommodates the departmental electron microscope and Dr. Bradley's research facilities.

The laboratory teaching facilities on the second floor are completely independent of research and graduate student training areas. There are four teaching laboratories which together can accommodate 150 students in an area of 2,717 square feet. These laboratories have been especially equipped to handle large numbers of students efficiently.

During Dr. Syverton's tenure, much equipment was added to the

research facilities. This came about from increased funds provided largely by the National Institutes of Health. Dr. Spizizen's greater emphasis on molecular biology resulted in the addition of more specialized instruments. During the past year, a model E analytical ultracentrifuge and two liquid scintillation counters were added to the central equipment laboratory which now houses an amino acid analyzer, high voltage and free-flow electrophoresis, gas chromatography, gas flow counters, two liquid scintillation counters, and a recording spectrophotometer. In addition, all investigators within the department have adequate research laboratories. Cold rooms contain fraction collectors and monitoring equipment necessary for all aspects of quantitative and preparative chromatography.

When the department moved to the Mayo Building, one large room was reserved for the "Henrici Memorial Library." Twenty-four hours a day students and staff may study the latest periodicals and books in microbiology and allied areas. During the academic year, the library serves as a forum for weekly seminars given sometimes by invited guests from all over the world and sometimes by staff members from both inside and outside the Department of Microbiology.

Two memorial shelves in the library have been dedicated. One honors Dr. Henrici and houses the microscope given to him by his father. Known as Zentmayer's "Grand American," the scope, dated 1862, is among a very few of its kind still in existence. It was given to the department by Mrs. Henrici in 1965.

The second memorial is to Dr. Newell Ziegler who returned to his alma mater as a staff member in 1948. After his death in 1964, Mrs. Ziegler presented his extensive collection of scientific texts to the Henrici Memorial Library. (See Appendix J for staff list.)

FUTURE OF THE DEPARTMENT

The present administration believes that the department should develop and emphasize the quantitative molecular biologic aspects of our science. Physiology, genetics and developmental biology must be continually strengthened. At the same time, we must not lose sight of the fact that microorganisms do produce disease and although some of the host-parasite relationships are complex, there is much useful information to be taught somewhat above the molecular level.

We must excel in our teaching and maintain strong teaching and

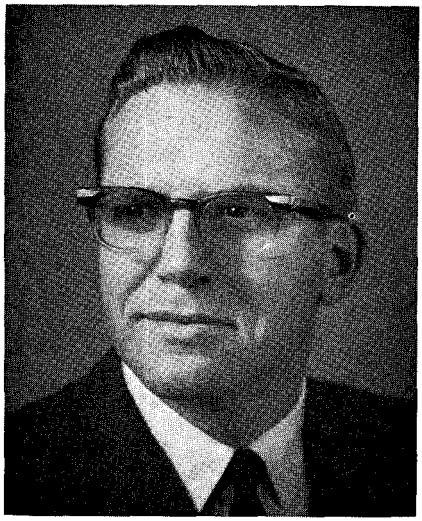
research programs at the graduate level. There should be a willingness to recognize the changing trends in medical education. The need for more integration of the preclinical subjects into the clinical years might be accomplished through joint appointments of individuals in the clinical departments comparable to those already initiated with pediatrics and other areas within the university. Additional appointments in medical virology and mycology are necessary to strengthen the College and to assist clinical departments especially concerned with these areas. It is hoped that whoever fills these appointments in clinical microbiology will hold a joint appointment in laboratory medicine. This is an increasingly important area of microbiology and should receive a greater share of our attention.

Members of our department have played an important and constructive role in the organization of the College of Biological Sciences. We believe microbiology has much to contribute, and we welcome the opportunity to assist in the future development of the biological sciences at Minnesota.

The growth of the department—as manifested by the sizable increase in facilities and equipment, the ability to support in excess of 50 graduate students, and the excellent support of a relatively young and capable faculty—has been made possible by the generous support of outside agencies such as the National Institutes of Health, the National Science Foundation, and other foundations. Of the total operating budget within the Department of Microbiology for 1965-66, 75 percent came from these outside sources. It is unlikely that the sources and distribution of funds will change within the near future. The growth of the department, therefore, will depend on our continued productivity in teaching and research.

Following Dr. Spizizen's resignation, a search committee made an extensive survey for a successor. The committee found already within the walls of the School of Medicine an able successor in Dr. *Dennis W. Watson,* who prepared the above sketch of his department.

Dennis Watson was born at Morpeth, Ontario, Canada in 1914. He attended a one room country school. There he, with his Airedale dog, hunted, fished, sailed and worked together. The nearest high school was in Ridgetown, ten miles away, which he reached daily in a "sporty Model T." In due time, he entered the University of Toronto, where in addition to usual university work he did research on the microbiology



Dennis W. Watson

of fresh water fish. His interest was such that he devoted the summer vacation to continued study in a laboratory he had outfitted on the front porch of his parents' home. This research provided him with the basis for a thesis for the degree of bachelor of science in 1934 and for his first scientific publication. For the next two years, he did research on microbiology of marine fish as an assistant for the Biological Board of Canada in Halifax, Nova Scotia. At the same time, he was doing graduate work in biochemistry at Dalhousie University where he was awarded the degree of master of science in 1937. He then spent another year in Halifax before accepting a National Tuberculosis Association Research Assistantship in the Department of Bacteriology at the University of Wisconsin. There, he did research on the chemistry and biology of tuberculin and was awarded the degree of doctor of philosophy in 1941. After graduation, he married Alicemay Whittier, a graduate student in the English department at the University of Wisconsin. They have a daughter, Catherine, and a son, William.

In 1942, the Wisconsin Alumni Research Foundation supported his studies on Western and Eastern equine encephalitis viruses as a visiting investigator at the Rockefeller Institute for Medical Research. That year he joined the Connaught Laboratories for Medical Research of the University of Toronto and worked on typhus vaccine. In 1944, he transferred to Washington D.C. to serve as Medical Consultant to the

Federal Security Agency and was commissioned into the United States Army that year. After discharge, he accepted an assistant professorship in the Department of Bacteriology, University of Wisconsin.

In 1949, he accepted an invitation in the Department of Bacteriology and Immunology as associate professor, University of Minnesota. He was promoted to full professorship in 1952 and to the headship of the Department of Microbiology in 1964.

Dr. Watson has taught immunology at Minnesota for 16 years. During this period, he and his students have studied immunochemistry of microbial toxins. In addition, the host-parasite relationships of Group A streptococci have been investigated. A former student and colleague, Dr. *Yoon Berm Kim,* presently an assistant professor in the department, has contributed greatly to these studies. In collaboration with Dr. *Gaylen Bradley* and Dr. *Kim,* Dr. *Watson* is studying the ontogeny of the immune response in germfree Minnesota miniature piglets.

His biographer Dr. S. G. Bradley recently wrote: "Professor Watson has made many important contributions to our understanding of host-parasite relationships, the chemistry and immunology of the tubercle bacillus, pathogenesis of Group A streptococci and *Bacillus anthracis* and mechanism of nonspecific resistance to infection. His demonstration of immune paralysis with massive doses of antigen is a landmark in modern immunology. His broad biological experiences, which, coupled with sound immunochemistry, have provided unique insight into the role and nature of gram-negative bacterial endotoxin and streptococcal toxins. Recent studies concerning the initiation of the immune response have re-emphasized the intimate, complex ecological relationships between a host and its parasites. Professor Watson is a dedicated teacher who stimulates and challenges undergraduates, medical graduates, and postdoctoral scholars alike. He counsels, but does not direct his advanced students."

Dr. Watson holds membership in all of the local, state, and national organizations in his field in this country and has held office in a number of them. He has been in continuous demand as a speaker before medical and scientific organizations. He has served as adviser and consultant to many governmental agencies both state and federal. He has a long imposing list of publications, and therefore, has contributed magnanimously to the literature. "Leadership in a field as diverse as microbiology comes only to those having talent, versatility, perspective, vision, and devotion. Such a man is Professor Dennis Wallace Watson."

Chapter XXXIII

Department of Medical Illustrations and Photography

It was early recognized that medical illustrations and photography are exceedingly important in articles published in journals, books and in classroom teaching.

Medical art began when a part-time artist was employed to prepare charts for teaching purposes and occasional illustrations for publications by the department of anatomy, then located in a brown frame house on Washington Avenue near the location of today's Murphy Hall. From time to time, work was done for other departments in the School of Medicine. In 1908, the illustrator was moved to the Dentistry Building (now Wesbrook Hall) and three years later to the Institute of Anatomy where it was known as the *Medical Art Shop.* Here, Miss

Seated at their drawing tables are Jean Hirsch and Virginia Moore. Miss Hirsch is shown sketching a specimen, while Miss Moore is drawing cells shown by her microscope. From the *Minnesotan, 2*:5, 1948.

Katharine Whitney, with one or two part-time assistants conducted the art work from 1914 to 1917. Miss Whitney was succeeded by one of her assistants, Miss *Jean E. Hirsch* who had her training at the University of Minnesota and special work with Mr. Max Broedel at Johns Hopkins University School of Medicine.

The medical art shop became an *independent department* in 1926. With the establishment of the shop's own budget and with the natural developments which time brings, the scope of work became extensive. It consisted of preparing illustrative material for any department in the medical sciences, for any college in the University, for any individual or institution not attached to the University who needed the sort of professional aid which the shop was equipped to give. Miss Hirsch and her assistants prepared and assisted with illustrations for use in lantern slide form, and for publication in journal articles and in books, and exhibits for medical meetings. She illustrated graphic presentations of statistical data, diagrams, drawings of apparatus, of anatomic and pathologic material, of surgical technique, of microscopic slides, of models, of clinical material and of x-ray. She occasionally did work of a medicolegal nature and planned illustrative material for the laity. Her department was self supporting, earning its own way, with no appropriation to supplement its earnings.

Miss Hirsch and her staff produced thousands upon thousands of excellent illustrations for members of the medical school faculty. She was a founder member of the National Association of Medical Illustrators. She retired in 1952 after having contributed significantly to medical education for 35 years. She was replaced by Mr. *William Holmes* who added to his staff Mrs. *Inga Platou.* These two continued the services of the Art Department for another four years in the Institute of Anatomy.

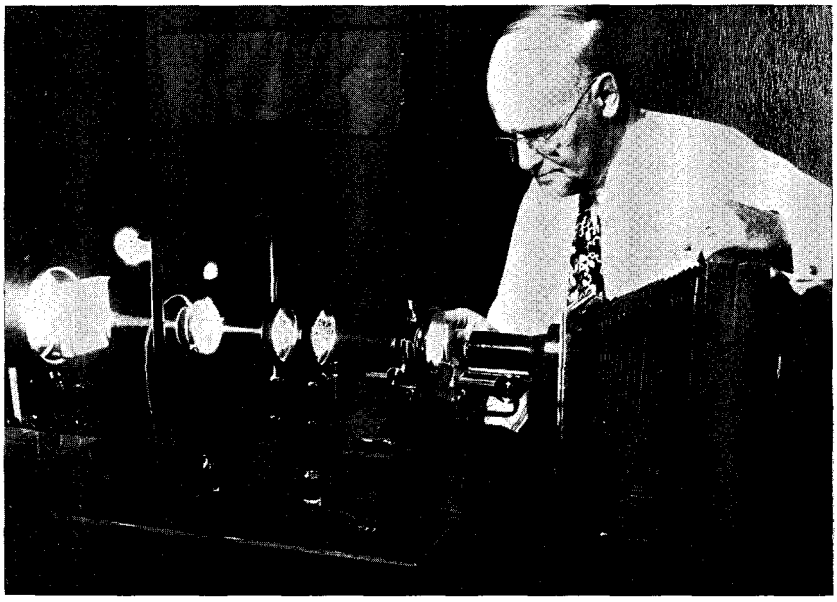
Inga Rockswold was born in Litchville, North Dakota in 1907. She entered the Graduate School at the University of Minnesota with a major in the history of art and a double minor in zoology and drawing and painting. Her next two years were devoted to study of medical illustration in surgery. Department of Surgery, College of Medicine, Cincinnati, Ohio.

From 1951 to 1954, Mrs. Platou was medical illustrator for *Modern Medicine* and *Lancet Publications* including *Postgraduate Medicine, Dental Survey, Geriatrics,* etc.

Inga R. Platou

In 1954, she joined the staff of the Department of Medical Illustrations and Photography at the University of Minnesota. Since that time, she has done and directed a tremendous volume of excellent work in all of the various phases of medical illustrations. Along with her heavy schedule she has carried work in the Graduate School and has earned the degree of doctor of philosophy in the history of art.

The need for first class *medical photography* in the operation of the College of Medicine and Surgery was also early recognized. As a high school student in 1906, *Henry Morris* began working afternoons in the pathology laboratory which was headed by Dr. Frank Wesbrook. In 1907, Dean Wesbrook summoned him and said, "The time has come when we need a photographer to serve in the medical and research work, and we would like you to leave the campus for a year of study and come back a full-fledged photographer . . . We have arranged for you to go to Rochester, New York, and study at the headquarters of the Eastman Kodak Company. Your expenses will be paid and you will have a salary of $90.50 per month." When he left for Rochester, he did not know that it was the first such course in basic photography ever to be offered by the Eastman Kodak Company. Morris was one of the four chosen students who learned basic photography by "doing" under the instruction of the Eastman experts. Another of the four students was Walt Disney, from Pittsburgh. When Henry finished at Rochester,



Henry W. Morris

he asked permission to do additional studying at Rockefeller Center in New York. Dean Wesbrook replied, "Stay as long as necessary, but come back a photographer."

When he returned, a $5,000 studio was equipped on the third floor of the new Institute of Pathology and Public Health building in 1909. He was then one of the three medical photographers in the entire country. In 1912, the studio was moved to the Institute of Anatomy (now Jackson Hall) where it remained for the next 45 years (1957).

During that early period, Henry Morris became closely allied with the medical profession. He audited many classes in anatomy and pathology in order to become familiar with the different medical terms for the convenience of the physicians and himself in the work of medical photography.

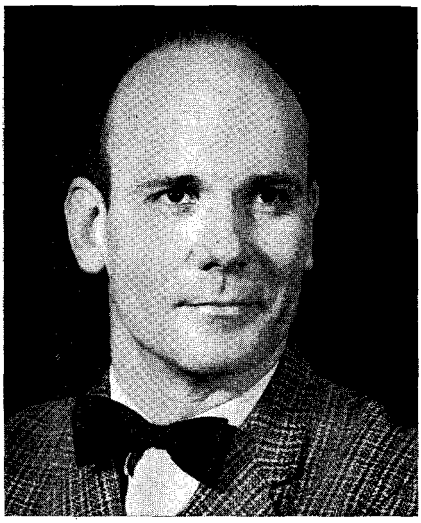
He took countless pictures of patients, both children and adults, with disease, deformities and fractures and of those whose cases physicians wanted to record for medical history. Many stages of research surveys were photographed and used to illustrate articles and books. He also took pictures of specimens, new apparatus, cultures, research, animals, prints for publication, color photography and photomicrography (micro-

scopic pictures of cells). He prepared the illustrations for Dr. E. T. Bell's *Text Book of Pathology.*

Henry Morris took great pride in his work and received many honors, including the Blue Ribbon and Certificate of Achievement from the Royal Photographic Society (1920); fellowship in the Biological Photographic Association (1946) and an Eastman Kodak Company Award (1956) on his fiftieth anniversary as a photographer.

During the latter part of Henry Morris' tenure, photographic studios were developed in other areas of the medical school and the School of Dentistry. The Medical School's concern over the multiplicity of photographic service soon gelled into the formulation of a plan to unify all of the photographic and the art departments into one department. In October 1956, Mr. *Alvin Shemesh* was brought to the University to coordinate these two functions under the heading of the *Medical Art and Photography Department.* The rooms recently vacated by the X-ray Department were made ready (C566 Mayo Memorial Building) and early in 1957 the unification was carried out. *Leroy Christenson,* joined by the two artists from the former Art Department, united with Henry Morris and together they moved into the new department. Henry Morris was very near retirement age so in August 1958 Al Shemesh brought in from New Jersey Miss *Delores Breen* as senior medical photographer to replace Mr. Morris. After spending a year as a laboratory technician

Delores Breen



John E. Parker

at the Jersey City Medical Center, Miss Breen had studied under the direction of Professor Felix Traugott. She stayed on to become supervisor of the photography section, curator of pathology museum and associate to the director for a period of 10 years. She has done excellent work in large volumes at the University.

In 1959, Mr. Holmes the medical illustrator, left the University.

With Mr. Shemesh at the helm, the young department began the difficult ascent up the uncertain slopes toward success and stability. Periodically, new employees were added to the staff, and it grew steadily. Its growth was not easy or "automatic." The demands of the medical staff were often more than could be handled by the fledgling; and its struggles with fulfilling the requirements of quality, punctuality, and reasonable cost were not always appreciated by those whom it served. It enjoyed a checkered reputation. However, it did survive, and it did grow. At the end of three years (i.e., in 1960), Mr. Shemesh retired from his leadership in order to enter medical school at the University of Minnesota.

Nearly a year later, he was replaced by Mr. *John E. Parker,* of Washington, D.C. Mr. Parker's career had begun in 1950 when he graduated from the George Washington University with a bachelor's degree in zoology. The following three years were spent at the school of Medical Illustration established by Mr. Max Broedel at Johns Hopkins Uni-

versity School of Medicine, Baltimore, Maryland. Shortly after the completion of this specialized training, Mr. Parker joined the staff of the Art Department of the National Institutes of Health, Bethesda, Maryland. For eight years, he served this Federal institution, achieving a position as assistant chief of the department. In 1961, he responded to the call from Dean Howard to head the flagging department of Medical Art and Photography here at Minnesota.

Mr. Parker's emphasis on uncompromising quality of both art work and photography required the purchase of new equipment and brought about some changes in personnel, but eventually stemmed the tide of depression and, building upon the former gains of Mr. Shemesh's leadership, renewed the progress of Medical Art and Photography toward a more successful outlook. Its gross income moved from $74,-630.17 in 1961 to $109,725.90 in 1966. The department now enjoys a warm and happy rapport with the medical staff and maintains a much improved reputation for quality, punctuality and moderate cost. Its services include excellent cinephotography; photomicrography; and all aspects of studio photography; the production of award-winning exhibits; creative colorful art-work; highly precise medical illustration; and a myriad of other indispensable art services.

Chapter XXXIV

Department of Radiology

"WE LEARN THAT Professor Jones yesterday located bullets in the legs of two patients of the City Hospital of St. Paul with the aid of the x-ray machine. This was done at the request of Dean Millard, and in both cases the photographs were successful."—*Ariel,* October 24, 1896

Little is known of the early history of Radiology at the University of Minnesota, but it is significant that within six months following the discovery of "a new kind of rays" by Wilhelm Konrad Roentgen in November, 1895, the University student newspaper the *Ariel* was able to report: "Professor F. S. Jones' new fluoroscope and Crookes' tube have arrived and both proved to be all that was expected."

The same article notes that Professor Jones had taken an x-ray photograph of the hand with a five-minute exposure time. This rapid acceptance of the new diagnostic technique was typical of reaction from the entire scientific world. At this time, however, the University's Medical School did not possess its own hospital, and students received their clinical inpatient training at the city hospitals of Minneapolis and St. Paul.

When the University Hospitals were founded in 1909, immediate thought was given by the faculty toward the creation of an x-ray service. The minutes of the Hospital Committee of the Medical School in 1910 and early 1911 record the concern of the Committee that a custodian for the x-ray room of the new Elliot Memorial Hospital be appointed as quickly as possible so that he might assist in the choice of equipment for the new room. Accordingly, Dr. *Frank S. Bissell* was appointed custodian of the x-ray room on June 2, 1911, and a Snook direct-current x-ray machine was installed in the new hospital late in 1911.

Dr. Bissell had joined the faculty of the Medical School in 1910 and held an appointment as an instructor in the Department of Medicine. Initially, the department was provided with a single room, but within

a short time a second adjacent room was added. Bissell received the title of Radiographer to the University Hospitals in April, 1912. By 1916, he had been promoted to assistant professor and was offering an elective course in roentgenology to junior and senior medical students, involving eight hours of instruction. Prior to this time, no formal lecture had been given in roentgenology, although the glass plates (this was prior to the era of x-ray film) were used in case demonstrations by other clinicians. Dr. Bissell performed investigative work in the field of pulmonary tuberculosis and was elected a vice-president of the Radiological Society of North America. During the period of his tenure as radiographer (1911-1919), his service was a part of the Department of Medicine.

With the arrival of Dr. *Robert Glen Allison* as roentgenologist to the University Hospitals, the service was placed under the administration of the Department of Surgery. Dr. Allison received an appointment as assistant professor of roentgenology. He was a native of South Carolina and received his medical education at the University of Maryland. He had received training in radiology during his World War I army service, following which he spent a year as a patient at the famous tuberculosis sanatorium at Saranac Lake, New York. While convalescing, he was able to observe and learn from Homer Sampson, no physician but a self-trained and outstanding roentgenologist of his day.

With the arrival of Dr. Allison, time was allotted within the curriculum for the required study of roentgenology. A course listed as Surgery 79 is noted in the *Bulletin of the Medical School* for 1920, and is described as including lectures, demonstrations, and plate reading. With increasing acceptance of the diagnostic value of the roentgenogram, a Division of Roentgenology was created within the Hospital Department of the Medical School in 1923 with a budget for the 1923-24 fiscal year amounting to $7,800.

Dr. Allison offered four courses to undergraduate medical students, including the required lecture course and three elective subjects: plate reading, x-ray technique, and x-ray therapy. Allison was the sole radiologist in the University Hospitals during this period. In 1923, Dr. *Milton Geyman* became his first resident. More properly, this was a type of preceptorship since Dr. Geyman had no official appointment to the University. A similar arrangement was provided for Dr. *Russell Gates* one year later. Both of these men not only read films and per-

Leo G. Rigler

formed fluoroscopy at the University Hospitals but also at Dr. Allison's office and in the other hospitals where he attended. Upon completing their preceptorships, both Geyman and Gates joined Allison in his flourishing practice.

Although Allison was very busy and could devote only a few hours a day to the x-ray division at the University, his services were highly sought after and his lectures were well attended. In particular, his lecture on foreign bodies in the tracheobronchial tree was regarded as a classic by both medical students and faculty. Although he was promoted to associate professor in 1924, there arose a demand within the faculty for a full-time person in radiology which Dr. Allison was unwilling to satisfy.

At about this time, there was a young man at the Minneapolis General Hospital, a resident in internal medicine, who had exhibited a considerable degree of interest and facility in the field of radiology. *Leo G. Rigler* was born in 1896 and educated in the schools of Minneapolis. He was a graduate of the University, receiving his undergraduate degree in 1917 and his doctor of medicine degree in 1920. Following internship and a year in general practice in North Dakota, Dr. Rigler had returned to Minneapolis to continue his training and had almost immediately become interested in x-ray diagnosis. This led him to spend

a number of months during 1924 in Michigan, first at the Battle Creek Sanatorium with Dr. *James Case* and then at the University of Michigan with Dr. *Preston Hickey*. Following this period, his enthusiasm and skill rapidly gained him good notice in the medical community. He was appointed radiologist to the Minneapolis General Hospital, and was invited to give lectures in roentgen anatomy to freshman medical students at the University. These lectures met with an excellent response. Accordingly, when the new chief of the Department of Medicine, Dr. Hilding Berglund from Stockholm, and the Dean of the Medical School, Dr. E. P. Lyon, determined that a full-time person was needed in x-ray diagnosis, they turned to Dr. Rigler.

In a letter to the writers, Rigler describes his reaction: "Since I was at the General Hospital at this time, Dr. Berglund and Dean Lyon came to see me and offered to give me a special grant of $1,000 if I would go to Sweden to study with Gosta Forssell for one year. I suspect that this was the first time the University had made this sort of offer, and I was enormously flattered by it. Obviously, $1,000 even at that time was a small amount in proportion to the total cost for my wife and myself, but we had some savings and accepted this. The idea was that I would spend a year abroad, then return and be made the head of a division of diagnostic radiology with the title of associate professor."

Following a tour of several other centers of radiology on the continent, he returned on July 1, 1927, to assume control of the x-ray division at the University Hospitals. Dr. Allison remained on the clinical teaching staff of the division until his death in 1947.

With the arrival of Dr. Rigler, the Division of Radiology was returned to the auspices of the Department of Medicine. Dr. Rigler describes the department at that time: "The x-ray department consisted of one large room which served as a reception room for patients, as a film conference room for the staff, as a film interpretation room, as a secretarial and clerical office, and for any other miscellaneous tasks which were needed. In addition, there was a very small darkroom for processing, and a small fluoroscopic room with one dressing room connected with it for gastrointestinal and other fluoroscopic examinations. The staff consisted of Mrs. Lillian Dahl, who was technician, secretary, receptionist, and so forth, all rolled into one. In addition, she typed the reports and waited on the staff, helped with the barium meals, and

saw to it that the patients were properly prepared. She did the darkroom processing as well."

Almost immediately, Dr. Rigler attracted able young men for residency training in this blossoming new specialty. Initially, Dr. *Malcolm Hanson* and Dr. *Harry Hillstrom* enrolled, the latter also assisting Dr. *K. W. Stenstrom* in radiation therapy and physics. At this time, Dr. Stenstrom was on the staff of the Department of Surgery and of the new Cancer Institute, but he and Dr. Rigler set up a cooperative arrangement and a three-year program for training which was adhered to for many years. Upon completion of his training, Dr. Hillstrom received an appointment as associate professor of radiology at Vanderbilt University.

Whereas in 1927 some twenty examinations per day were being done in the division, within two years the total had risen to eighty per day and larger facilities were desperately needed. The work was performed by Dr. Rigler and two residents, each of whom was paid the sum of $900.00 per year, a figure in line with similar positions in other clinical departments. In addition to routine chest, abdomen, and bone film examinations and fluoroscopic examinations of the gastrointestinal tract, newer procedures had been introduced and accepted, including contrast examinations of the biliary and urinary tracts and bronchography. Dr. *Jacob Sagel* and Dr. *Cyrus Hansen* had enrolled in the residency program.

In 1929, the division moved to the fifth floor of the Hospital where it remained for 25 years. Dr. Rigler states: "In setting up this new department on the fifth floor, we instituted a new procedure which had probably never been done in the United States before, namely, the development of a wet film viewing room, the films being arranged that they could be seen while still being in the clearing solution in order to expedite rapid communication, especially concerning urgent cases. In addition, it permitted us to inspect the technique to be sure the films were satisfactory before the patient left. About a year later, I saw an exactly similar arrangement at the Mallinckrodt Institute in St. Louis in their new x-ray department, independently conceived."

Dr. Rigler quickly became engaged in a number of research projects including studies of the barium-filled esophagus for the evaluation of cardiac enlargement and the demonstration of abnormalities in the heart, and studies on the distribution and movement of pleural effusions.

He introduced and popularized the lateral decubitus projection for the evaluation of the presence and location of pleural effusion and his articles on this subject in the early 1930's are classics in the field of chest x-ray diagnosis. Within two years following his appointment to the University staff, Leo Rigler was promoted to the rank of full professor at the age of 33.

During the years that followed, Dr. Rigler's curiosity and enthusiasm resulted in many contributions to the field of diagnostic radiology. He described a number of roentgen signs of acute abdominal conditions, including strangulated intestinal obstructions. He became interested in the problem of early detection of carcinoma of the lung and described important roentgen signs of pulmonary malignancy.

In the 1940's, he investigated and reported on the association of pernicious anemia and tumors of the stomach, both benign polyps and carcinomas. Always the outstanding educator, he wrote an *Outline of Roentgen Diagnosis* for the undergraduate lecture course, which won quick acceptance from students, residents, and practitioners alike. This book, originally published in 1938, was given a second edition in 1943. His textbook on *The Chest* was also given a second edition, being originally published in 1946 with a new edition in 1954. This book remains today an outstanding text and reference for the student of x-ray diagnosis of the chest.

Dr. Rigler has served as an associate editor of *Radiology*, associate editor of *Diseases of the Chest* and as a member of the editorial board of *Surgery* and *The New Physician.* He has been recipient of signal honors too numerous to cite in this brief survey, and was president of the Radiological Society of North America in 1958. Always first the educator, he takes great pride in the number of former students and associates now occupying positions of prominence in the field of academic radiology. A short listing would include the following heads of departments:

Harold O. Peterson, M.D., University of Minnesota
Herbert M. Stauffer, M.D., Temple University
Henry S. Kaplan, M.D., Stanford University
Bernard J. O'Loughlin, M.D., California College of Medicine
Charles M. Nice, Jr., M.D., Tulane University
Hymer Friedell, M.D., Western Reserve University
Sidney P. Traub, M.D., University of Oklahoma

Elliott Lasser, M.D., University of Pittsburgh
Harry Mellins, M.D., State University of New York (Downstate)
E. Robert Heitzman, M.D., State University of New York (Syracuse-Diagnosis)
Alexander Margulis, M.D., University of California
Joseph Jorgens, M.D., Veterans Administration Hospital, Minneapolis
John Amberg, M.D., Veterans Administration Hospital, San Francisco
Richard G. Lester, M.D., Duke University
Richard H. Greenspan, M.D., Yale University
Bertram Levin, M.D., Michael Reese Hospital
A. N. K. Menon, Stanley Medical School, Madras, India
Francis F. Ruzicka, Jr., M.D., St. Vincent's Hospital, New York

During the course of their training, residents in Dr. Rigler's department were encouraged to participate in clinical or laboratory research and to take an advanced degree. Many did achieve a master of science in radiology and a few achieved the signal distinction of the doctor of philosophy degree.

Beginning in the early 1930's with an association with the Minneapolis General Hospital under Dr. *Walter Ude* and then Dr. *Oscar Lipschultz* and with the Ancker Hospital in St. Paul under Dr. *J. Richards Aurelius,* residents from the University department were rotated to these general hospitals where they were exposed to more trauma and other acute conditions than were generally available at the University Hospitals. Shortly after the end of World War II, as part of the Dean's Committee arrangement with the Veterans Administration, Dr. *Daniel Fink* was named the first chief of the department there under the auspices of the Medical School. His successors have included Dr. *B. J. O'Loughlin* and Dr. *Joseph Jorgens.* During this period, of course, the number of residents in active specialty training under the auspices of the department gradually increased.

With the increasing acceptance and importance of roentgen diagnosis, Dr. Rigler sought full departmental status for radiology. Initial attempts by Dean Lyon to give full departmental status to radiology were rebuffed by President Coffman in 1930, but finally in 1935 an autonomous Department of Radiology was created with Dr. Rigler as chief. The department also included radiation therapy and physical

medicine, but the former was given division status under Dr. Stenstrom and the latter was separated from radiology in 1941.

Always the enthusiastic educator, Dr. Rigler early became concerned about the need for short courses for radiologists. The first postgraduate course in radiology in the United States was held at the Center for Continuation Study in 1938. The subject was "Radiology of the Chest" and the course lasted three days. The following year, the first of several highly successful courses in neuroradiology was given with distinguished radiologists from the United States and Europe participating. The outstanding staff of the Mayo Clinic in diagnostic radiology early agreed to act as a partial faculty for these courses whose popularity rapidly increased. Within a few years, the courses grew to the point where difficulty was encountered in accommodating all the applicants. Today, the annual Continuation Course in Radiology in the Fall represents one of the largest postgraduate teaching exercises in the country and has been much imitated.

Dr. Rigler describes the problems of the increasing work load of his department in the 1930's: "The budgetary problem was severe, the Medical School having very little funds. Fortunately, we were able to persuade Mr. Amberg, who was at this time the director of the Hospital, to allocate funds from the Hospital for a full-time assistant. By 1936, therefore, I was able to bring Dr. *Harold Peterson* from Boston to the department. The demands for neuroradiology had increased apace with the development of an active neurosurgical and neurological department, and we were unable to cope with them adequately. Dr. Peterson was given this task and, of course, as is well known, performed it superbly."

Peterson remained on the full-time staff until 1940 when he entered private practice in St. Paul. However, he remained active on a part-time basis during the ensuing years.

With the outbreak of World War II, the problems of the Department of Radiology were greatly compounded. Almost all of the residents were taken into the service very quickly. For a short period, Dr. Rigler and one resident constituted the entire full-time staff. In time, the armed services were persuaded to permit a few residents to complete their training.

With the conclusion of hostilities, the problem of limited physical

space became acute as the work load continued to rise by leaps and bounds. Additional space had been secured for radiology in the new Variety Club Heart Hospital opened in 1949. In this department, spurred by the outstanding accomplishments of the cardiac surgeons Lewis, Lillehei, and Varco, and by men of similar caliber in pediatric and adult cardiology, a whole new branch of the field of radiology was developed. Serial angio-cardiography, employing rapid film changers to make as many as six exposures per second, enabled the delineation and classification of a large number of previously poorly understood congenital abnormalities of the heart. Jorgens, Lester, Amplatz and Carey all contributed greatly to the development of this field while working in and supervising the x-ray department in the Heart Hospital.

Finally, in 1954, a new and much larger department was opened on the second floor of the new Mayo Memorial Building. The department contained eleven x-ray rooms, housing a variety of radiographic and fluoroscopic equipment. In addition, a whole suite of offices and viewing rooms was included. Almost immediately, however, the new department was taxed to its capacity and space limitations have grown gradually more severe through the years.

Another aspect of the department's activities is described by Dr. Rigler: "One of the enterprises which affected us seriously was the institution of the Cancer Detection program. Prior to that time, I had undertaken on my own to do routine semiannual examinations of the stomach on patients with pernicious anemia, and this led to a large number of contributions in a research way insofar as cancer of the stomach is concerned. Under Dr. Wangensteen's direction, we entered into an additional program of similar character but in which we made roentgen examinations of the stomach at annual intervals of all patients coming to the outpatient clinic who could have a histamine-stimulated gastric analysis and showed either low or no hydrochloric acid. This, of course, caused a much greater load on the department. By the time we had moved down into the new quarters in the Mayo Memorial Building, we were doing as many as fifty gastrointestinal examinations in a morning, a large number of them, of course, being routine examinations on asymptomatic individuals who were a part of the study. The institution of the Cancer Detection Center likewise increased our work in the stomach, colon, and chest areas."

It would be remiss not to mention one other and perhaps the most

important, accomplishment of Dr. Rigler's department during his tenure. Not only were men trained who made their contribution in academic radiology, but also the department represented the major source of supply of radiologists for Minnesota and the surrounding area. The generally high level of quality of the practice of Radiology in the Upper Midwest relates, in the opinion of many qualified observers, to the graduate and postgraduate training programs at the University of Minnesota.

Dr. Rigler "retired" from his position as head of the Department of Radiology in September 1957. He became Executive Director of the Cedars—Sinai Medical Center in Los Angeles. For the past several years, he has been professor of radiology in residence at the University of California in Los Angeles where today he directs the residency teaching program in the Department of Radiology. In tribute to his outstanding contribution to radiology and to the University of Minnesota Medical School, his former residents and associates have endowed the Leo G. Rigler Lectureship in Radiology which annually invites an outstanding scientist to speak at the Medical School during the week of the Continuation Course in Radiology. Dr. Rigler himself was persuaded to give the 1965 Rigler Lecture and delivered a fascinating exposition on the radiological examination of the liver. As an indication of the stature he enjoys throughout the world, there is also a Leo Rigler Lectureship at the Municipal Hospitals in Tel Aviv, Israel.

Dr. *Harold Peterson* who succeeded Dr. Rigler was born in Dalbo, Minnesota in 1909. Following graduation from Medical School in 1934, he interned at Kansas City General Hospital. Here, he found it instructive to observe Dr. David Dann, the hospital roentgenologist, review the films of the day. Dr. Peterson attended these sessions so regularly that he was asked to act as radiologist on a few occasions when Dr. Dann was unable to be present. The latter recognized the young intern's aptitude and was instrumental in arranging a residency for him at the Massachusetts General Hospital under Dr. George Holmes and Dr. Richard Schatzki.

Dr. Schatzki writes of his early association with Dr. Peterson: "His most striking qualities as a young resident were:)1 his unbeatable honesty, and 2) his thoroughness of thinking. He tried to get to the bottom of things and never took things at face value. Simple statements of his teachers didn't mean a thing unless they could be followed by logical proof. A classic example was his review of patients

Harold O. Peterson

with ureteral stones which he did while he was a resident. He thought that everyone in the department ought to do better in the diagnosis of ureteral stones. He proved it by showing that of 100 ureteral stones, the diagnosis had been made in the department on the flat film on 80 while the stones in 16 other cases were visible on the film but had not been mentioned. I remember this very vividly because the largest stone which had not been mentioned had been missed by myself."

Following completion of his residency in 1936, Dr. Peterson returned to Minnesota as an instructor and became Dr. Rigler's first full-time assistant. Dr. Rigler writes about his young associate: "When he came to Minnesota, he was young and had only a few years experience as a resident in radiology in Boston, but within one year he established a degree of leadership which was really quite remarkable for one with so little experience. I believe it was only a year after he came that I took a six month sabbatical and he was given the task of running the department. I found on my return that he had done this so satisfactorily that the residents were not even disturbed by my absence. I cite this as an indication of his great competence and capacity for leadership."

Dr. Peterson entered the private practice of radiology in 1940, becoming radiologist and head of the department at the Charles T. Miller Hospital in St. Paul. From 1940 to 1957, he engaged in a busy private practice in St. Paul in a partnership of radiologists. One of his

partners, Dr. J. Paul Medelman, comments: "During these years, his associates at the University regarded him as one of them, while his partners and colleagues in St. Paul felt the same way about him. To both groups he brought enlightenment, intellectual leadership, and honesty. I have never known anyone with the capacity for sustained, intensive, and sincere work that Dr. Peterson has."

It was during these years that Harold Peterson established an international reputation in the field of neuroradiology. His technique for myelography, characteristically emphasizing a meticulous procedure under fluoroscopic control, became world renowned. He remained on the clinical faculty of the University of Minnesota and actually reviewed all neuroradiological film studies done in the University Hospitals and conducted a weekly neurology-neurosurgery-neuroradiology conference on Friday afternoons. In July 1956, he achieved the rank of clinical professor in radiology.

As a lecturer and teacher, Dr. Peterson exhibits the same thorough meticulous approach which has characterized his entire career, with the addition of a gentle dry humor that has earned him the title of "the Will Rogers of Radiology." Since 1939, he has presented biannually a series of lectures encompassing the field of neuroradiology to an audience of students and residents in neurology, neurosurgery, and radiology. A condensed version of this excellent course has become a favored feature of the annual meetings of the American Academy of Neurology. He has delivered many honorary lectures throughout the United States and Canada, and has been a guest lecturer in Columbia (1954) and Israel (1965) on invitation of the radiological societies of these countries. In 1957, he became professor and head of the Department of Radiology at his alma mater. A measure of the esteem in which he is held by his fellow physicians and teachers is his election to the newly created post of Chief of Staff of the University Hospitals in 1966, the first person to hold this position.

Dr. Peterson's leadership has not been limited to the Department of Radiology or to the University Hospitals. He has been a member of the Executive Council of the American Roentgen Ray Society. He has been a trustee of the American Board of Radiology since 1959 and was elected its president in 1964. Dr. Peterson was a member of the Board of Censors of the Radiological Society of North America from 1961 through 1966, and was Chairman of that Board in 1966. A

Chancellor of the American College of Radiology, he was its vice-president in 1963. He was a charter and founding member of the American Society of Pediatric Radiology and of the American Society of Neuroradiology, of which he is currently the president. He has been the recipient of awards and honorary lectureships too numerous to mention.

The years (over a decade now) which have followed Dr. Peterson's assumption of the chairmanship have been characterized by further steady growth of the department. The total volume of examinations performed during the most recent fiscal year was 80,000, a figure which places the University of Minnesota as one of the largest academic departments in the country. This growth has been augmented by the development of an outstanding radiology service at the Minneapolis Veterans Administration Hospital under the dynamic leadership of Dr. Joseph Jorgens. The residency program including both institutions is now the largest in the country with nearly fifty physicians in post-graduate training.

In addition to the growth in volume of patients and residents, the past decade has witnessed a true revolution in the field of Radiology. As a result of tremendous strides in improvement of equipment and with the increasing emphasis on special procedures, the radiologist has become more and more an active participant in the diagnostic work-up of the patient. Electronic intensification of the fluoroscopic image has permitted the department to completely discard the red goggles formerly worn for accommodation of the eyes to dim light. The markedly amplified image has resulted in improvement in quality of fluoroscopic examinations and increasing acceptance of a whole new host of procedures. Automatic film processing has been improved to the point where the main x-ray department now contains no wet processing facilities. Films of good quality are now available for reading, completely dried, within ninety seconds. New, more powerful transformers and x-ray tubes have led to the development of complex rapid film changers making simultaneous exposures in two planes at rates of up to twelve films per second. The availability of an intensified image has led to an increasing acceptance of cine techniques allowing motion studies of contrast-filled organs.

Perhaps the most significant development of recent years has been the rapid growth in angiography. Dr. *Kurt Amplatz,* now associate professor of radiology, joined the staff of the department in 1957 and

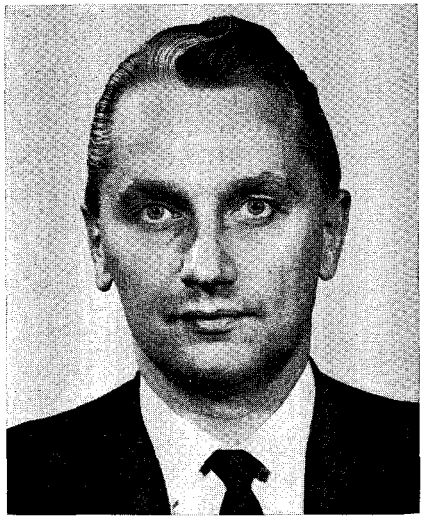
has been a pioneer in the development of techniques for accurate visualization of blood vessels. It was he who modified the original percutaneous vessel puncture technique of Seldinger and developed a simple safe technique for catheter replacement allowing selective opacification of nearly all the arteries of the body. His techniques have been widely copied and his articles in the fields of renal physiology and arteriography, cardiac angiography, and peripheral vessel studies have won him high acclaim. A man of varied talents, Amplatz has also designed the first effective light-weight portable injector for angiography, an accurate isotope inhalation method for detection of small intracardiac shunts and a somersaulting chair for pneumoencephalography.

During these years, other outstanding staff members of the Department of Radiology have contributed to the growth and development of this specialty. Drs. Richard Lester, Lewis Carey, and Eugene Gedgaudas have helped to classify and understand the complex area of congenital heart malformations and the text coauthored in part by the former two is now regarded as a classic in its field. Dr. Leonard O. Langer, Jr. has made a considerable contribution in the area of congenital bony dystrophies and has diagnosed and classified many previously poorly understood syndromes. His present status as radiologist to a national committee on the classification of congenital abnormalities headed by Dr. Victor McKusick of Baltimore testifies to his stature in this area.

Although the first official residencies in radiology were not created until 1927, the past decade has witnessed the development of advanced post-residency training in the radiologic subspecialties. Active post-residency training programs in neuroradiology and in cardiovascular radiology are now the pride of the department. These have been developed because of a need for more highly trained personnel in these areas.

A recent poll of chiefs of radiology departments in over eighty of the accredited medical schools in this country disclosed that the University of Minnesota ranked number one in the opinions of these qualified observers, both from a standpoint of academic contributions and overall quality of the residency program. The history of the department is one of outstanding leadership—Rigler and Peterson. With pride in this heritage, the future is bright.

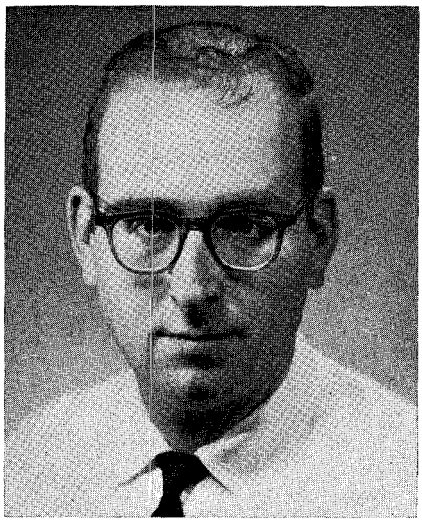
The above sketch of the Department of Radiology was prepared by *Stephen A. Kieffer* and *Eugene Gedgaudas*. Dr. Gedgaudas was



Eugene Gedgaudas

born in 1924 in Lithuania. He received his medical degree from the University of Munich in May 1948. After one year as resident in surgery at the United Nations Hospital in Germany, he emigrated to Canada. By 1958, he was a member of the faculty in the Department of Radiology of the Medical School of the University of Manitoba. In 1963, he was appointed to an assistant professorship in radiology at the University of Minnesota, where he became responsible for organizing and participating in teaching lectures and seminars. He also has the responsibility of supervising the Residents' Training Program, which now has a total of 49 residents. Dr. Gedgaudas is presently associate professor and Director of Diagnosis Radiology.

His research projects have been directed to cardiovascular radiology, mainly in analyzing rare congenital cardiovascular anomalies, being the first one to describe the radiological findings in single ventricle with transposition of great vessels as well as left ventricular right atrial communications. He has also done much research in use of special procedures in evaluation of renal mass lesions and has contributed to developing the techniques in combining the biopsy and contrast medium injection in evaluation of renal tumors. His present activities include the evaluation of existing methods in cancer detection of the gastrointestinal tract and developing of early cancer detection techniques utilizing radioisotope and pneumoperitoneum.



Stephen A. Kieffer

Dr. *Kieffer* was born in Minneapolis in 1935. In 1959, he was awarded the degree of doctor of medicine by the University of Minnesota. After completing an internship at the Wadsworth General Hospital, Veterans Administration Center in Los Angeles in 1960, he accepted a residency at the University of Minnesota Hospitals. From 1962 to 1964, while in the Army, he was chief of the Radiology Service, United States Army Hospitals at Fort Polk, Louisiana and Fort Harrison, Indiana. In 1966, he was appointed to the staff of the Department of Radiology where he presently is an assistant professor.

In 1957, Dr. Kieffer was a prize winner in the essay contest of the American College of Chest Physicians. His essay entitled "Atrial Septal Defects—An Evaluation of Surgical Closure" was published in *Diseases of the Chest* in October 1958. Since that time, he has made over 20 additional original contributions in the fields of general, cardiovascular, and neuro-radiology. His area of interest is in neuroradiology. His research activities have been in the area of developmental changes in the intervertebral disc and in assessing the value of intrathecal gold in the treatment of spinal axis neoplasms. (See Appendix J. for staff list.)

DIVISION OF RADIATION THERAPY AND NUCLEAR MEDICINE

Radiation therapy at the University Hospitals came into being with

K. Wilhelm Stenstrom

the establishment of the Cancer Institute. Funds made available through the George Chase Christian Memorial donation were used for the acquisition of radium and a 200 kV x-ray therapy machine.

Radium was purchased, and a radon plant established. To help in the management of the radon plant, Dr. *K. Wilhelm Stenstrom* was invited to assume this responsibility and that of the x-ray therapy unit. Dr. Stenstrom accepted this assignment and became an associate professor of biophysics in the Department of Physiology. During the early years, the health physics and standardization aspects of radiation therapy were accented.

Dr. Stenstrom arrived in July 1926; his only assistance was provided by a part-time nurse and a part-time radiology fellow. Despite shortages in personnel, radiation therapy was represented in the Tumor Clinic from its inception. Dr. Stenstrom quickly accumulated experience and shortly was a recognized authority in radiation therapy. He remained in charge of the division when radiology became a separate department under Dr. Leo Rigler.

The number of patients treated increased rapidly over the years. A 140 kV machine for superficial therapy was added; yet, by 1938, patients had to wait as long as one month before an appointment for therapy became available. Through the intercession of Mrs. Christian,

a second high voltage therapy machine was purchased in 1938, and this benefactor in 1942 provided funds for the replacement of the original 200 kV machine with a 400 kV unit. Various other changes in the apparatus took place culminating with the donation by Mrs. Archie Walker of a 1000 curie cobalt therapy unit for the hospital. This was the second unit of this type to be used for cancer therapy in the United States and was put into operation in April 1953. In the meantime, radiation therapy had been relocated in basement facilities newly built for the purpose.

Dr. Stenstrom's background in biophysics led him early into the study of radiation exposure. Radiation meters of suitable sensitivity were used, and a film badge service instituted so that the amount of exposure received by personnel could be measured and kept within limits of safety. The Division of Radiation Therapy assumed this responsibility University-wide for many years but when the use of radioactive materials expanded, the Health Physics Service was created and the Division of Radiation Therapy relinquished this task.

Early research reflected Dr. Stenstrom's interest in the physical aspects of radiation. It is noteworthy that one of the few high voltage cathode ray tubes produced by W. Coolidge was made available to the University. Early research included studies in animals such as irradiation epilation and necrosis in rabbit ears together with such generalized effects as the depression of the leukocyte count. Some of the first investigations of the reactions produced by electron beams were conducted at the University of Minnesota. Other studies conducted within the division, notably under the guidance of Dr. *James Marvin,* radiation physicist, and Dr. *Halvor Vermund* helped establish the division as one of the foremost research units in the country.

Dr. Stenstrom retired in 1956 and was succeeded by Dr. *Donn Mosser.* Dr. Mosser rapidly became one of America's best known radiotherapists renowned for his clinical skill, and his administrative abilities. He has been responsible for many years for the radiation therapy portion of the Refresher Courses presented at the annual meetings of the American Roentgen Ray Society, a task he continues today. Dr. Mosser has also been active on the national scene as a consultant to the National Institutes of Health.

Associated with Dr. Mosser over the years were Dr. *Halvor Vermund,* now director of radiation therapy at the University of Wisconsin, Dr.

Arnolds Veinbergs, currently director of radiation therapy at Minneapolis Veterans Administration Hospital, and Dr. *John Dillon,* who left to enter the private practice of radiation therapy in Indianapolis. Dr. Mosser withdrew from the University in 1963 to enter private practice, and Dr. *Charles Hewel* assumed the responsibilities of radiation therapy pending the arrival of Dr. *G. J. D'Angio,* the new director-designate. Dr. D'Angio joined the University in 1964 together with a new group of clinical associates. Dr. *K. K. N. Chary* preceded him by a few months. Dr. Chary, who received his basic training in India and England, came to Minneapolis after a year at New York's Memorial Hospital.

Dr. D'Angio had been on the Harvard Medical School faculty for several years and was radiotherapist at the Boston Children's Hospital and Children's Cancer Foundation prior to coming to Minnesota. Dr. *Y. Maruyama,* the third member of the new team, came from two years at Stanford University in radiobiological research after having had his radiology training at the Massachusetts General Hospital.

The radiotherapists divide their time amongst the traditional activities of the University Hospital: patient care, teaching, and research. Their research interests encompass such diverse fields as the oxygen effect in radiobiology, patterns of tumor growth in mice, the efficiency of combined chemo-and radio-therapy, the use of radioactive microspheres in clinical medicine, and the role of heavy particle irradiation in biomedical research.

In 1964, the venerable and historic Eldorado A cobalt therapy unit was replaced by a new machine of more flexible design. At the same time, the old 400 kV therapy unit was scrapped because of its low efficiency, and the room where it was housed was made available to the Nuclear Medicine Section.

NUCLEAR MEDICINE

The Nuclear Medicine Section developed from studies by Dr. Stenstrom of small quantities of radioactive material made available by the physics department. Sodium 24 and chlorine 38 were obtained for experimental work, and suitable measuring equipment was constructed. This background was useful when iodine 131 and phosphorus 32 became available in 1945.

Nuclear medicine has grown from an activity conducted in a few rooms within the Division of Radiation Therapy to a complex operation

involving many rooms, pieces of apparatus, and professional people. This effort, under the direction of *Merle Loken,* doctor of philosophy, doctor of medicine, continues to expand. Dr. Loken has a unique background. Having obtained his master of science degree from the Massachusetts Institute of Technology, he came to the University of Minnesota where he obtained a doctorate in biophysics. For several years, he was the radiation physicist in the Department of Radiology, and was associated with much of the early work in radiation biology and nuclear medicine. His interest in nuclear medicine grew, and he decided to pursue a career in medicine, concentrating in the nuclear medicine area. He successfully completed his medical studies at the University of Minnesota, whereupon he was designated director of the Nuclear Medicine Section.

In 1959-60, approximately 1,300 patient studies utilizing radionuclides were performed; in the twelve month period ending December 31, 1965, 4,000 examinations were conducted. Many new pieces of apparatus have been purchased, notably an Anger camera which has proved a boon in both clinical and research applications.

Personnel has expanded in keeping with the development of the section. In 1950, one part-time physician directed the activities of a physicist and technician. Today, one full-time and one half-time physician are in charge of four full-time technicians, and a part-time biochemist.

The sections of Radiation Biology and Radiation Physics have also been active. The former, under the direction of Dr. *Baruch Jacobson,* continues to study the interaction of radiation effects with biological systems of varying complexity. Dr. Jacobson's activities are complemented by the other members of the division, all of whom have active radiobiological investigations under way. *Vaughn Moore,* master of science, is in charge of the Radiation Physics Section. Assisted by one part-time dosimetrist, he has organized an active teaching program while at the same time providing invaluable day-to-day assistance in patient treatment planning and in research. At the same time, Mr. Moore is pursuing studies relating to computerized dosimetric determinations.

Plans for the future for the Division of Radiation Therapy include expanded roles in all spheres of its activities. For example, a training program in radiation therapy and allied fields, recently approved by the National Institutes of Health, is under way with two full-time trainees.

Giulio J. D'Angio

Research activities have expanded and the latest radiotherapeutic techniques are being applied to patient care. Plans for a markedly remodeled expanded physical plant including much needed patient-examining areas, waiting room space, treatment planning facilities, and new therapeutic armamentarium are all approved and awaiting implementation. It is expected that the next few years will see major changes in the division in all categories.

Giulio J. D'Angio, who prepared the above sketch, was born in New York City. He received the degree of doctor of medicine at the Harvard Medical School in 1945. From 1946 to 1948 he was in military service. Dr. D'Angio entered the field of radiology at the Boston City Hospital in 1949 following preliminary training in pathology. After completing his radiology residency, he became assistant in radiology at the Harvard Medical School in 1953 advancing to clinical associate in radiology at that institution in 1962. He held staff appointments at various institutions, later joining the Boston Children's Hospital and the Children's Cancer Research Foundation as Radiotherapist in 1956. During his tenure there, he became consultant to the Massachusetts General Hospital. He also spent a year's leave-of-absence at the Donner Laboratory and the Lawrence Radiation Laboratory, University of California, Berkeley as research associate and continues as consultant to that laboratory today.

In 1964, Dr. D'Angio became professor of radiology and director of the Division of Radiotherapy, University of Minnesota Hospitals. In 1966, he was also made consultant in radiation therapy at the Hennepin County General Hospital.

He holds membership in the usual county and state medical societies, the American Medical Association, and the Royal Society of Medicine; and is a member of many organizations in the field of radiology as well as the American Association for Cancer Research, Sigma Xi, the American Association for the Advancement of Science and other learned societies.

His research interests have been mainly in the fields of cancer and radiobiology. His publications have dealt with the late effects of radiation given to children, the enhancement of radiation effects by chemotherapy, and the radiobiology of heavy particle beams. Others of his publications have been concerned with the management of children with malignant tumors, a field of special interest to him. In recognition of this, he was invited to address the Royal Society of Medicine, London, in 1964 when he also gave the University Lecture at St. Bartholomew's Hospital, the University of London. (See Appendix J. for staff list.)

Chapter XXXV

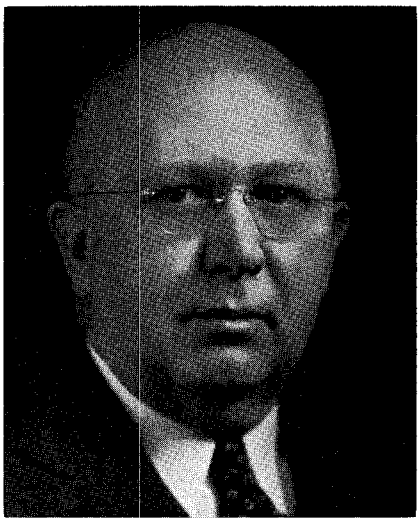
Department of Continuation Medical Education

RELATIVELY YOUNG in comparison to most basic science and clinical departments in the Medical School, the Department of Postgraduate Medical Education, as it was then known, began informally in 1937 under the direction of Dr. *William A. O'Brien,* and it was not until July 1st of 1938 that it was organized on a formal departmental basis with Dr. O'Brien as its first director.

Its organization at that time was related to many changes occurring in adult education throughout the country in the 1930's, but more especially it may be regarded as the brainchild of Dr. William O'Brien who was the principal person guiding this program at its inception.

The idea that one's education was not completed at college graduation was slow in being recognized in educational circles throughout the country, especially among physicians. However, the rapid advances occurring in the scientific fields during the late 1920's and early 1930's demonstrated quite conclusively that granting of the doctor of medicine degree was essentially only the start of a physician's education. (See Chapters VI and XV.)

Center for Continuation Study Building



William A. O'Brien

In 1936, the Center for Continuation Study was opened on the campus of the University of Minnesota. At that time, it was unique in the country in providing a separate self-contained residential college on a University campus. It had classrooms where short courses for small adult groups could be presented, and a dormitory where the registrants for the courses stayed during their time on the campus. There were also dining facilities where the registrants and faculty could eat and this room was also used for "informal discussions" on the formal papers presented earlier. With a specific building on the campus for postgraduate education, and an enthusiastic medical leader like Dr. O'Brien, it was only natural that the Department of Continuation Medical Education should result. For many years, Dr. O'Brien had felt the need for such a unit. On his own time, because of a personal belief in the merit of postgraduate medical education, he introduced the idea to the University of Minnesota in 1937.

Although there had been a few isolated attempts at programs of continuing medical education in medical schools throughout the country, no one school had regular recurrent programs until the opening of our Department of Continuation Medical Education.

In the first year, there were only five short courses offered to the physicians practicing in this area and only 96 physicians attended. It is of interest to note that there were 96 members of the faculty who

participated in teaching at that time offering a student-faculty relationship since unequalled. Because of his own enthusiasm, "Obie" as Dr. O'Brien was affectionately called—gradually increased the number of courses and the number of registrants up until the advent of World War II when the activity of the department was sharply curtailed. Immediately after the war, there was a period of extremely rapid growth as large numbers of physicians were released from the Armed Forces. Many utilized the G.I. Bill of Rights in renewing their education.

From 1945 to 1949, 511 physicians, mostly veterans, attended basic science courses of three to nine months duration. In addition, the presentation of shorter courses on clinical subjects continued throughout the period. In 1949, the demand for basic science courses had largely been satisfied. Since then, only the shorter type of program designed for the physician in active practice has been offered.

In 1945, the W. K. Kellogg Foundation granted $250,000 to the University of Minnesota for the purpose of furthering postgraduate medical education at this institution. The need for sound programs in postgraduate medical education was obvious at the war's end. Many hundreds of physicians, discharged after varying periods of military service, had experienced little or no clinical medicine and felt the need for reviewing and refreshing their basic knowledge. Many of them also wished to prepare themselves for entering special fields of practice and learning the newest advances in medicine.

The Kellogg Foundation recognized this need, and made grants to several medical institutions in support of postgraduate teaching programs. The $250,000 granted to the University of Minnesota was originally intended to cover a five-year period, 1945 to 1950. Since the entire grant was not expended during that period, the University authorities requested an extension of the period during which the funds could be used. Permission for this was granted and the funds were expended over a period of nine years from July 1, 1945 to June 30, 1954.

The fact that the Department of Continuation Medical Education flourished and grew during the period from 1937 to 1947 was directly related to the energy and enthusiasm of Dr. O'Brien. His untimely death from a heart attack on November 15th, 1947 was a great loss to the department, the entire Medical School, the University and, as a matter of fact, this region of the upper midwest. Dr. O'Brien was the author of many medical papers and wrote a regular newspaper column on

George N. Aagaard

various health topics to be read by the lay public. He had a radio program answering questions and discussing items of health interest and he was in great demand as a speaker throughout the state and region. At one time, Dr. O'Brien was known as widely as any person in Minnesota both to physicians and lay groups. He personally supervised every course, guiding the faculty such that they presented courses that were well received by the registrants. In addition to the short courses on the campus, he actively organized and planned seminars for physicians throughout the state and functioned as an informal public relations director for the Medical School.

Following Dr. O'Brien's death, the department was directed on a part-time basis by Dr. *Thomas E. Eyres* until March 1948. Dr. Eyres had been Dr. O'Brien's assistant, having joined the staff of the department about five months previously. He left in July of 1948 to join the Student Health Service at the University of South Dakota.

The next full-time director was Dr. *George N. Aagaard* who assumed the directorship in March of 1948 and served almost four years through December 31st, 1951, when he left for Texas to accept the post of dean at Southwestern Medical School. He later became dean at the University of Washington School of Medicine in Seattle. His able leadership resulted in continued expansion of the activities of the department

including the introduction of a series of regional medical seminars presented in various areas throughout the state.

The next director chosen by the dean and faculty of the medical school was Dr. *Robert B. Howard* who was appointed on January 1st, 1952. Dr. Howard was a graduate of the University of Minnesota Medical School, being the top-ranking member of the class of 1944. After completing his internship and service in the Army, Dr. Howard took a residency in internal medicine at the University of Minnesota Hospitals under Dr. Cecil J. Watson. He received a doctor of philosophy degree in medicine in 1952. In addition to his work in the Department of Continuation Medical Education, he continued an active interest in the Department of Internal Medicine where he participated in the teaching activities at the undergraduate, graduate and postgraduate level. During his period of leadership, the Department of Continuation Medical Education continued its growth and influence such that the number of courses and the number of registrants increased each year. Moreover, he enlarged the number of outstate seminars and conferences, and in his role as editor of the *Bulletin of the University of Minnesota Hospitals,* he completely revised and improved this journal to make it a more effective instrument of medical communication. In October 1957, Dr. Howard was named associate dean of the Medical School following Dr. Diehl's leave of absence to work with the American Cancer Society in New York. On July 1st, 1958, Dr. Howard became Dean of the College of Medical Sciences at the University of Minnesota. (See Chapter XVIII.)

During the nine month period when Dr. Howard was associate dean, his replacement as the director of the Department of Continuation Medical Education was Dr. *N. L. Gault,* a 1950 graduate of the Medical School, and like Dr. Howard, an internist who also trained under Dr. Watson. Dr. Gault was director from October, 1957, until June, 1958, when Dr. Howard appointed him as assistant dean in the College of Medical Sciences. (See Chapter XVII and XVIII.) The next director of the department was Dr. *W. Albert Sullivan, Jr.,* who was appointed as director on August 1st, 1958 and he has continued to function in this position until the present.

The first year (1937) short courses were conducted in medicine, obstetrics and gynecology, pediatrics, radiology and trauma. During the succeeding years, courses have been offered in 33 medical fields.

Forty-one courses have been devoted to surgery; 39 to obstetrics and gynecology; 37 to radiology; 35 to pediatrics and 34 to medicine. In six other subjects, from 20 to 30 courses have been given from 1936 to 1965. Five hundred and five courses were presented in which 27,271 physicians registered.

Throughout the history and development of the Department of Continuation Medical Education, the directors have all been involved with jobs other than just the operation of the Department of Continuation Medical Education. They have all served as the chairmen of the weekly staff meetings of the University Hospitals. In addition, the office of the Department of Continuation Medical Education has served as an informal clearing house for physicians looking for practice opportunities as well as a place where communities looking for physicians could make their needs known. For many years, the director was also an *ex officio* officer of the Minnesota Medical Foundation and served to coordinate its activities until July, 1959, when the post of Executive Director of the Minnesota Medical Foundation was created. (See Chapter XXXVI.)

In any sort of history of the efficient organization of any group, it is always to be noted that there are many people besides the directors who have contributed to the efficient running of a department. Particularly notable in this regard are Mr. *Fred Berger,* the director of the Nolte Center for Continuing Education and Mr. *Merrill Cragun,* who is the associate director of the Center. Also playing a large role in behind-the-scene activities have been a number of ladies who have been secretaries and Mrs. *Louise Liggett Lambie* has served ably in this department since 1948.

W. Albert Sullivan, Jr., who prepared the above sketch was born in Nashville, Tennessee in April, 1924. He received the degree of doctor of medicine from Tulane University in 1947. He then came to the University of Minnesota Hospitals for a surgical internship under Dr. Wangensteen, and subsequently a residency in general surgery where he received the degree of master of science in surgery in 1956. That year he was appointed assistant professor of surgery and director of the Cancer Detection Center. In 1958, he became director of the Continuation Medical Education Program. In 1961, he was promoted to an associate professorship and has continued as director of Continuation Medical

W. Albert Sullivan

Education. He is also active in the Department of Surgery, particularly at the undergraduate teaching level and is also on the tumor surgery service of the University of Minnesota Hospitals.

His main interests have been in general surgery, surgical treatment of cancer, and postgraduate medical education of physicians. Under his direction, beginning in 1958, the Department of Continuation Medical Education has flourished. During the year 1964-1965, 17 courses in various medical fields were presented which were attended by a total of 940 physicians.

Dr. Sullivan's talents as a teacher were attested in 1963, when he was nominated by the medical students and selected by the Minnesota Medical Foundation as a recipient of the Foundation's Distinguished Teaching Award. He organized the weekly Friday noon University of Minnesota Hospital Staff meeting which has continued regularly over a number of years, and he is editor of the *University of Minnesota Medical Bulletin.* Dr. Sullivan is also an active contributor to the national scene in postgraduate education, having served since 1963, as chairman of the Committee on Continuation Medical Education of the Association of American Medical Colleges.

Chapter XXXVI

The Minnesota Medical Foundation 1939–1966

THE MINNESOTA MEDICAL FOUNDATION was created just before World War II at the conference table of the Minnesota Medical Alumni Association. The Foundation's origin may be traced in the following letter written August 11, 1939:

> *Dr. Maurice B. Visscher*
> *1943 East River Road*
> *Minneapolis, Minnesota*
>
> *Dear Dr. Visscher:*
>
> *At the last meeting of the executive committee of the Alumni Association of the University of Minnesota Medical School you were appointed to serve on the committee for the establishment of a Minnesota Medical Foundation. Dr. Erling Platou is chairman and in addition to yourself, the committee includes Dr. J. C. Litzenberg, Ted Anderson, Gordon Kamman, Owen Wangensteen, and the president of the Medical Alumni Association.*
>
> *Your committee chairman will be contacting you soon to arrange for your first meeting.*
>
> *Very truly yours,*
> *Harold G. Benjamin, M.D.*
> *Secretary*

War clouds were gathering in Europe when the above letter was written; in Minneapolis the Medical School was celebrating the 50th anniversary of its founding. The University of Minnesota was poised on the threshold of a vast expansion. Its Medical School would become one of the world's great medical institutions.

For the 3,000 Medical School alumni of that day, however, there was little excitement over the 50th birthday party. Many of the graduates, in fact, were quite discontented with their Alma Mater, and some

were even hostile to it. Over the years, the School had failed to cultivate goodwill among its students and degree holders. And the long, arduous expensive course of study, especially in the Depression Era, had left the alumni with meagre warmth of feeling for Alma Mater.

In this setting, the Medical Alumni Association survived weakly in the hands of a few loyalists, many of whom were also faculty members of the school. It was this small group that proposed the establishment of a Minnesota Medical Foundation to encourage private support for the Medical School. Since foundations at educational institutions were relatively unknown at that time, there was little experience to guide the planners. However, their perception was keen and their thoughts were on the future. What they devised in 1939 has flourished and had a lasting impact on the course of Medical School history.

Today, both the Foundation and the Association are growing, spirited organizations rallying large numbers of men to participate in their work. Both provide meaningful assistance for medical education at the University of Minnesota, and their capacity to do so increases steadily. Oddly, despite overlapping membership and often coinciding interests, matrimony between the two has not occurred.

THE BEGINNING OF THE FOUNDATION

The broad shape and form of the Minnesota Medical Foundation was hammered out in 1939 at a series of weekly meetings held in the old Minnesota Union on the University Campus. (See Chapter XV.)

There, and at numerous other meetings, the planners drew up their desired outline: a nonprofit organization, separately incorporated from the University of Minnesota, dedicated exclusively to the advancement of its Medical School. The Foundation was to be tax exempt, separately managed, and flexible in character. The latter would give it wide range to encourage, receive, and administer gifts for medical research and medical education at the University. No other such foundation existed on the campus in 1939, and there were very few at other U.S. colleges and universities.

Although the Medical School was already a prestigious institution, it suffered from a chronic case of "limited legislative appropriations," which is endemic to public institutions. The indicated remedy would be a foundation to encourage private assistance. The planners also guessed that some donors would more readily contribute to a nonprofit

Erling S. Platou

foundation than to the tax-supported university itself in those pre-war years. They were correct. But even in their wisdom they could not have known that they were acting at such a propitious moment: The American people were about to write a remarkable chapter in philanthropic history.

Once the plans were drawn, the founders elected Dr. *Erling S. Platou,* a Minneapolis pediatrician and clinical faculty member, as the Foundation's first president. He took office in 1939. Dr. Platou was a graduate of the Medical School. The other original officers were Dr. Maurice B. Visscher, vice president; Dr. Jennings C. Litzenberg, treasurer; and Dr. Robert L. Wilder, secretary: All were alumni of the Medical School.

Seventy-three persons attended the first organizational meeting of the Foundation held on November 24, 1939. Among those signing the registry were George Earl, W. W. Will, Raymond Amberg, E. J. Simons, Vernon D. E. Smith, Leo Rigler, Paul Dwan, Olga S. Hansen, Russell Moe, J. A. Myers, William A. O'Brien, and R. S. Ylvisaker. Articles of Incorporation and Bylaws, months in preparation and revision, were approved in final form. They were filed with the Minnesota Secretary of State, and on November 29, 1939, the Foundation became a reality. It was a splendid 50th birthday present for the Medical School.

THE EARLY YEARS

The originators of the Foundation were all physicians. To this day, its leadership is largely entrusted to alumni of the Medical School. Among the early supporters was Dr. *Leo J. Madsen,* a surgeon, who set a valuable example by donating $1,000.00 and became the Foundation's first Patron Member. (The late Dr. Madsen also provided a major legacy for the Foundation in his will which one day will supply thousands of dollars annually towards the Foundation's work.)

Since War had now begun in Europe, the Foundation invested Dr. Madsen's gift and most of its other first gifts in U.S. Defense Bonds. A brochure was published outlining the purposes and objectives of the organization, and the maiden issue of the *Bulletin* of the Minnesota Medical Foundation appeared. Dr. Visscher was editor. The Board voted to send the quarterly journal "free to all of our members in the service." The war, however, was to cause a painful delay in the Foundation's development.

In 1940, the Foundation counted 415 members and was administering a number of special purpose funds contributed to the Medical School. (One of the earliest of these was a research grant from Munsingwear, Inc., of Minneapolis. The Department of Physiology used the funds to investigate the insulating properties of fabrics designed for our military forces who were fighting in combat zones from the Arctic to the Tropics.) Four small research grants totalling only $800 were awarded to faculty members by the Foundation in 1940, and an endowment fund was established "to help perpetuate the life of the Foundation."

President Erling Platou and trustee Vernon D. E. Smith are remembered for vigorous personal efforts to win friends for the Foundation during this early period. Dr. Platou preached relentlessly of the Foundation's goals before numerous Twin Cities hospital staff meetings and alumni groups. Dr. Smith roamed the state, boosting the Foundation before county medical societies between reels of his famous outdoor movies. Dr. Smith often flew his own airplane on these missions. On one trip, he had to make a forced landing in a hayfield near Ortonville, Minnesota.

These men were pioneers in the effort to win back the lost interest of the School's graduates.

World War II robbed the Foundation of its early momentum and all but paralyzed the activities of the Minnesota Medical Alumni Associa-

tion. Many of the leaders of both organizations were called to military duty, and the Medical School's faculty ranks were also greatly thinned. Quarterly meetings of the Foundation's Board of Trustees were held, the *Bulletin* continued to appear (often reporting news of alumni in battle zones) and a slow trickle of donations arrived at the Foundation's office in the Medical Center. There, a part-time office girl easily kept track of all business and correspondence.

BEGINNING OF THE MAYO MEMORIAL

As the fortunes of war turned slowly in America's favor, the program of the Foundation was reawakened. In 1944, plans were afoot to construct a memorial to the Mayo brothers at the University of Minnesota Medical Center. When requested by Dr. *Harold S. Diehl,* then dean of the Medical School, the Foundation contributed $1,000.00 as a starting fund. This timely grant, so important, was typical of the kind of on-the-spot help which the Foundation was intended to provide. Although construction of the 15-story Mayo Memorial Building was not completed until nearly ten years later, the Foundation's early backing was instrumental in creating the $14,000,000 edifice which now dominates the Medical Center skyline.

After the war, the Foundation helped revive the Medical Alumni Association. Its members scattered during service in World War II, the Association had lain dormant for several years. The Foundation provided a series of small grants for maintenance of alumni lists, membership files, and various mailings. With this help, the Association was able to pull itself together in the late '40s.

FIRST OF THE PRESIDENTS

By an interesting coincidence, a pediatrician, Dr. Platou, was chosen to oversee the early development of the Minnesota Medical Foundation. This kindly physician-teacher served as president through ten embryonic years (1939-1949), and was also president of the University of Minnesota Alumni Association during the time. A warm human being, and a superlative and stimulating clinical teacher, Dr. Platou served the University and the community with extraordinary devotion until his death on June 17, 1958. He died only a year before the modern era of the Foundation was to begin. The Nu Sigma Nu Medical Fraternity, of which he was a member, established a perpetual scholarship in his mem-

ory through the Foundation which is still awarded every year at the Medical School.

Dr. Platou was succeeded as president of the Foundation on June 21, 1949, by Dr. *Owen H. Wangensteen,* Professor and Head of the Medical School's Department of Surgery. (See Chapter XXVI.) During five years as president, Dr. Wangensteen brought a dynamic spirit and sense of urgency to the work of the Foundation. He was a skilled fundraiser, persuading his patients, leading citizens and alumni to invest in building the School's strength. Dr. Wangensteen wrote the name of the Minnesota Medical Foundation in the minds of thousands. Many of these people also wrote the Foundation's name—in their wills.

In historic ceremonies held in September, 1949, Dr. Wangensteen conferred the first Minnesota Medical Foundation Scholarships to medical students at the University. These $500 awards for scholastic attainment and need were the first of 506 scholarships which would be distributed in the next 16 years. The original student recipients were Alan R. Hopeman, Norman A. Nelson, Mildred Schaffer Hanson, John W. Anderson and Edward G. Huppler. The ranks of scholarship winners have since grown far beyond the most optimistic predictions.

During his term as president, Dr. Wangensteen also recruited two key Minnesota citizens who were destined to play major roles in the history of the Foundation.

ENTER THE LAYMEN

For the first ten years of its life, the affairs of the Minnesota Medical Foundation had been directed almost exclusively by physicians. In 1950, however, *Donald J. Cowling* (see Chapter XVI), who had retired after 36 years as president of Carleton College, became the first lay member of the Board of Trustees. Senator Gerald T. Mullin of Minneapolis became the second lay member. Both men demonstrated an abiding interest in medical education at the University of Minnesota. They contributed important outside counsel to Foundation policymaking, and were the first of a long list of non-physicians who have devoted themselves to the work of the Foundation.

In Dr. Cowling, in fact, the Foundation had recruited a volunteer of heroic proportions for the University. An articulate champion of independent causes and peerless educational fund raiser, he plunged devotedly into University causes and soon was appointed by Minnesota

Governor Harold E. Stassen to head the Mayo Memorial Commission which would build the Mayo Memorial Building. Senator Mullin, long a friend of the Medical School, was a key spokesman for the Mayo Memorial project in the Minnesota State Legislature, and an active advocate in the Foundation's work for nearly two decades.

THE SCHOLARSHIP FUND GROWS

On November 16, 1950, after 11 years of life, the Foundation held total assets of only $42,440.65, half of which was earmarked for restricted uses. The other half of this small sum helped keep the Foundation afloat during the next problem period: The Korean Conflict. In 1950, the Foundation had 851 members, and a total of $81,000 was donated through the Foundation for various medical purposes.

Soon the Foundation adopted the Scholarship Fund as the backbone of its support program for the Medical School. This was one of the great unmet needs of the institution. Through 1966, more than a quarter million dollars for this purpose was distributed to meritorious students. This has probably been the greatest single achievement of the Foundation, since scholarship funds tend to be scarce at public universities. (The Foundation's Scholarship Program today assists over 12 per cent of the medical student body at Minnesota; it is expected that most of this money will some day come back to the School in Alumni gifts.) Much of its success is owed to Dr. Wangensteen and Dr. Cowling, who agreed on the merit of a Scholarship Program and pushed it accordingly. A number of "Cowling Scholarships" are still awarded annually to the graduates of Minnesota's private liberal arts colleges. Funds for scholarships were obtained originally for the program by Dr. Cowling. He served actively as a trustee of the Foundation for 13 years; he retired in 1963 and served as honorary trustee until his death occurred on November 27, 1965.

By 1953, the Foundation had enough strength to plan seriously for professorships, loan funds, research grants, and construction grants for the school. Membership, another area promoted vigorously by Dr. Wangensteen, had risen to 1,085 individuals. There were some notable fizzles in programs attempted in the early 1950's, but the successful ventures were highly encouraging.

Dr. *Wesley W. Spink,* Harvard graduate and professor of internal medicine at the Medical School, was elected president of the Foundation

Wesley W. Spink

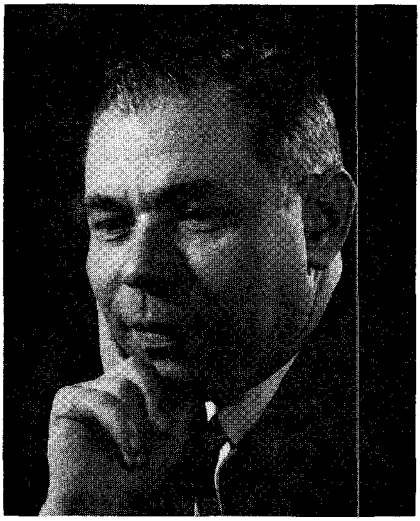
Herman E. Drill

on November 17, 1954. In that year, the Foundation helped publish an *Alumni Directory* of the Medical School. The present Dean, Dr. Robert B. Howard, then secretary-treasurer of the Foundation, was editor of that directory.

Dr. Spink served as president for four years, during which time the assets of the Foundation jumped to nearly $100,000 and the amount channeled through the Foundation each year became substantial. This period of history was marked by some major changes in the methods of handling earmarked grants. Many earmarked funds were turned over to the University in their entirety and ceased to be a part of the Foundation's assets.

Dr. *Herman E. Drill,* Hopkins, Minn., general practitioner and former Gopher football tackle, was elected president on October 23, 1958. He was the first non-faculty member to head the Foundation. A devoted alumnus and master of intra-alumni relations, Dr. Drill was to oversee the Foundation's historic changeover to full time operations.

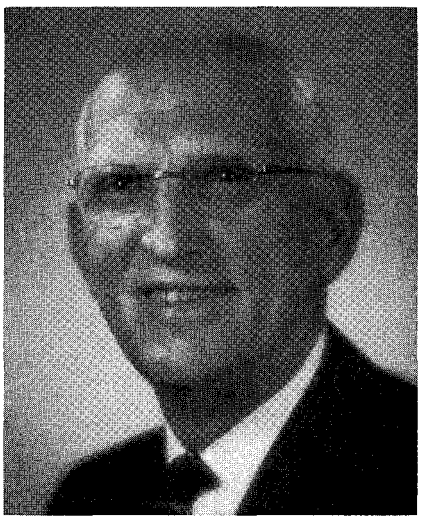
On July 1, 1959, after 20 years as a part-time entity, the Foundation opened its doors for business in Room 1342 in the Mayo Memorial Building which it had helped build a decade earlier. Two employees went to work on a full time basis. Succeeding presidents of the Foundation have been:



Arnold Lazarow

Corrin H. Hodgson

Vernon D. E. Smith



Karl W. Anderson

Dr. *Arnold Lazarow* (1960-62) (see Chapter XIX) professor and head of the Department of Anatomy, who was the principal author of the report which inspired the guidelines and objectives for the Foundation in the modern era.

Dr. *Corrin H. Hodgson* (1962-64), professor of medicine and internist

at the Mayo Clinic, whose devotion and spirited leadership won statewide support for the Foundation.

Dr. *Vernon D. E. Smith* (1964-66) capable St. Paul surgeon and clinical faculty member of the Medical School, who set a new standard of leadership for the organization which he had helped establish a quarter century earlier.

Dr. *Karl W. Anderson* (1966-68), former internist, clinical faculty member, and retired senior vice president and medical director of Northwestern National Life Insurance Company, who has been an unceasing advocate of the Foundation for years.

AN HISTORIC DOCUMENT

If there is a "modern father" of the Minnesota Medical Foundation, it is Dr. Arnold Lazarow, who came to Minnesota from Western Reserve University in 1954 to become new head of the Department of Anatomy, succeeding Dr. Edward A. Boyden. In 1957, Dr. Lazarow was appointed chairman of a faculty committee to write a comprehensive report on needs of the Medical School. The Medical School wanted the report for the change in deanship which was anticipated on July 1, 1958, when Dr. Harold S. Diehl would retire after 23 years at the post. Also, the Medical Foundation needed a clearer definition of what its modern goals would be. Dr. Lazarow knew what medical foundations could accomplish, since he had worked extensively with one at Western Reserve. (See Chapter XIX.)

The Lazarow Report, as it came to be known, was several months in preparation. It appeared in 1958, a painstakingly complete survey setting forth nearly all of the long-talked about needs of the Medical School which were beyond its limited tax appropriations. The Lazarow Report was accepted and adopted as the basis of the Foundation's program for the future.

The Lazarow Report crystallized five basic areas of Medical School need, all of which have since been prosecuted vigorously by the Foundation. Importantly, it recommended hiring of a full time executive to direct the Foundation's work. In no other way, said the report, could the proposed programs be undertaken and the goals reached. Two Minnesota foundations, impressed by the proposal, offered to underwrite two years of start-up funds for the Foundation. Officials of the

University of Minnesota agreed to house the Foundation without cost in offices at the Medical Center.

FIRST FULL TIME DIRECTOR APPOINTED

Thirty candidates were considered before the trustees of the Foundation named Mr. *Eivind O. Hoff, Jr.* of Minneapolis as the first executive secretary. The University also gave him a concurrent appointment as associate director of the Greater University Fund. Later, the name of the post was changed to executive director, and the Greater University Fund was dissolved by the University. However, the cause of Medical School development has prospered and the Foundation has become well established as a member of the University "family." The original executive remains at his post after eight years.

Under full time direction, the Foundation moved rapidly into fund raising, student services, and alumni relations work as suggested by the Lazarow Report. Within two years, the Foundation became self supporting and no further grants for operating funds were needed. Alumni gifts were already providing the basic operational funds, just as anticipated by the planners.

Long range objectives were mapped out and the Foundation's *modus operandi* soon emerged. Volunteers who could help create the first important achievements were soon recruited. The Foundation gained public notice by obtaining and granting some major benefactions to the Medical School.

Nearly $10,000,000 has now been channeled through the Minnesota Medical Foundation for Medical School purposes over the years. On June 30, 1967, the Foundation showed assets exceeding $3,925,802 more than 85% of which represented endowment. About a quarter-million dollars per year in grants for various purposes are now received and distributed by the Foundation. Most of what is received each year is promptly invested in Medical School purposes.

An early landmark in 1961 was the receipt of a $200,000 bequest for medical research from a North Dakota farmer. His legacy has been kept intact and it today endows part of the Foundation's medical research program. The Foundation also contributed a vital gift of $25,000.00 toward the construction of the Diehl Hall Biomedical Library building. Distinguished Service Awards bearing $5,000 annual cash

prizes until retirement have been bestowed on four of the Medical School's prominent teachers by the Foundation.

In mid-1967, an enormous bequest of about $4,000,000 was acquired from the estate of Royal A. and Olive W. Stone of St. Paul. The bequest was an endowment for research in heart disease and cancer, and gave the Foundation major status almost overnight.

These items are a modest beginning, however, compared to a charitable harvest which is sure to occur in the future, officials believe.

Of utmost importance, the Foundation has aroused a new feeling of involvement which clearly is rising among the Medical School's 5,000 graduates. In 1967 the Foundation had nearly 3,000 alumni and lay members, up 350% in six years. The Minnesota Medical Alumni Association had 2,400 members. The two organizations tend to stimulate each other toward greater achievement. In measuring this progress, it should be remembered that the Medical School was virtually without an alumni relations program for much of its life. At least one-half of the Medical School's graduates now participate in its affairs, which is a respectable "batting average" by standards at public universities.

DEVELOPMENT OF THE MEDICAL BULLETIN

A key to better alumni relations in recent years has been improvement and wider circulation of the *University of Minnesota Medical Bulletin,* successor to several previous medical journals published at the University.

In 1948, the Foundation's own "*Bulletin*" was merged with that of the *University of Minnesota Hospitals Staff Bulletin.* The new publication was adopted as the official publication of the Medical Alumni Association, the Foundation, and University of Minnesota Hospitals. In the mid-1950's, it was redesigned and renamed the *University of Minnesota Medical Bulletin.*

Since 1960, the *Medical Bulletin* has been publishing a lighter diet of scientific material, and devoting more space to news about alumni. Reader interest jumped immediately. The *Medical Bulletin* is now basically an alumni magazine, with primary emphasis on building strong ties among the Medical School, its faculty, and its graduates. *"Alumni Notes," however lamentable to the scientific mind, are clearly its most popular pages.* The scientific output of the Medical School is still

reported, but the condensed articles are now written for consumption by a broad medical audience. *Interest in the "Alumni Notes" is a symptom of latent affection for Alma Mater which deserves to be cultivated.*

The Foundation is publisher of the *Medical Bulletin,* and is responsible for news gathering, production, circulation, and financial backing. The *Medical Bulletin* appears monthly except July and August, and carries no advertising. Its link with the alumni is invaluable to the Medical School.

In 1962, the Board of Trustees of the Foundation voted to circulate the *Medical Bulletin* to all 5,000 medical alumni of the University (formerly to members only). This was a wise move. Some graduates found themselves hearing regularly from their Alma Mater for the first time in many years. Membership in the Foundation, thought to be threatened, actually increased as a result. The potential of the *Medical Bulletin* in serving the field of alumni relations can hardly be overestimated.

POTENTIAL UNLIMITED

Possibly the most important achievement of the Minnesota Medical Foundation has been its own perpetuation. No one really knew whether the Foundation would "catch on" in 1959 as a full-time organization. A considerable gamble in time and money was at stake. Fortunately, the return has far exceeded the investment.

By avoiding major controversy and political involvement, by recruiting capable volunteer leadership, and by efficient operation the Foundation has gained a wide following and admiration among the alumni and Minnesota's medical community. It has earned a respected place on the state's medical scene, and even co-sponsors several programs with segments of organized medicine.

A page from the Foundation's history and method was borrowed, in fact, when the new *University of Minnesota Foundation* came into existence in 1963. U.M.F. is patterned along similar independent lines but with the wider objective of stimulating private support for all parts of the University. This is a flattering imitation of the concept of the Minnesota Medical Foundation. The trustees of the Foundation who always clung stubbornly to the Foundation's independent status can be proud. (More than once it had been strongly urged that the Foundation become an official agency of the University itself.)

THE FUTURE

The Minnesota Medical Foundation's presence bodes well for the future of the Medical School. Its financial assets represent assurance for the 600 full time students now enrolled; and to the 1,000 in the student body of the future. On the drawing boards is a $53 million expansion of the University of Minnesota Medical Center. The Foundation will plan an important role in that growth. Few other medical schools have a foundation which is entirely devoted to their needs.

In the hands of the Foundation lies an opportunity to reshape and mould the alumni attitude of the future, beyond the efforts of the Medical Alumni Association. Through its monthly *Bulletin,* the Foundation speaks directly to the Medical School's graduates. Each day it helps a number of hard pressed medical students (who will soon become alumni). The Foundation serves as the Medical School's unofficial financial counseling office, and is visited daily by many students and faculty. More than 1,100 small loans worth over $150,000 have been issued to students without a single default by a borrower. The Foundation now provides the bulk of all private medical scholarship aid available to students at the University of Minnesota.

An even larger role for the Foundation is inevitable in Medical School affairs. A great opportunity exists for the administration of the Medical School to harness the Foundation's energies for maximum benefit of the institution. The future will reveal how well this is done. Already, over 70% of the Medical School budget is financed by other than state appropriations.

Indeed, if Dr. Erling Platou were alive today he would be justly proud of the 28-year-old foundation which he first headed. It is doubtful, however, that Dr. Platou or even today's leaders can accurately perceive the dimension and impact of the Minnesota Medical Foundation in the coming decades.

Only an acorn has been planted!

Since *Eivind O. Hoff, Jr.,* who prepared the above account, became director, the Foundation has continuously and rapidly increased in every phase of its activity. He was born on September 14, 1927 at Mountain Lake, Minnesota. After graduating from high school at Brainerd in 1945, he served 34 months on active duty with the United States Coast Guard. He entered the University of Minnesota in 1948,

Eivind O. Hoff, Jr.

and won the degree of bachelor of arts in journalism in 1953, although he was recalled to 15 months duty with the United States Navy during the Korean Conflict. From 1953 to 1955, he was publicity director of the Minneapolis "Lakers" professional basketball team. He then spent four years as public information director, Minnesota Heart Association. It was fortunate indeed, that the officers of the Minnesota Medical Foundation were able to convince Mr. Hoff to accept the executive directorship of this organization in 1959. He has been the ideal chief administrative officer of the Foundation with its ever widening responsibilities.

Under his direction, the Foundation has gone forward with great rapidity and now has such momentum that its future is unlimited.

Eighty-six persons served as trustees of the Minnesota Medical Foundation from 1939 to 1966.

They are:

*George N. Aagaard, M.D.
*John F. Alden, M.D.
Raymond M. Amberg
*Howard A. Andersen, M.D.
*Edward D. Anderson, M.D.
*John A. Anderson, M.D.
*Karl W. Anderson, M.D.
T. Richard Anderson
*J. Richards Aurelius, M.D.
*Moses Barron, M.D.
E. T. Bell, M.D.
L. R. Boies, M.D.
*Paul G. Boman, M.D.
Mrs. Frank W. Bowman
*H. Mead Cavert, M.D.
*Carl E. Christenson, M.D.

W. Grady Clark
Charles F. Code, M.D.
Louis M. Cohen
Donald J. Cowling
Ruth Cranston
*C. Donald Creevy, M.D.
Mrs. Grace Dayton
*Herman E. Drill, M.D.
Paul F. Dwan, M.D.
*George A. Earl, M.D.
*Philip L. Eckman, M.D.
Bertin C. Gamble
*N. L. Gault, Jr., M.D.
*M. Melvin Goldfine, M.D.
*Bernard Halper, M.D.
*William A. Hanson, M.D.
James C. Harris
*William F. Hartfiel, M.D.
A. A. Heckman
*Raymond Hedin, M.D.
*Olaf M. Heiberg, M.D.
Malvin E. Herz
*Anderson C. Hilding, M.D.
*Jerome A. Hilger, M.D.
*Corrin H. Hodgson, M.D.
John M. Hollern
*Robert B. Howard, M.D.
*Milton M. Hurwitz, M.D.
*L. G. Idstrom, M.D.
*Gordon R. Kamman, M.D.
*Dennis J. Kane, M.D.
James E. Kelly
*Arthur C. Kerkhof, M.D.
York E. Langton
Arnold Lazarow, M.D.
*N. Logan Leven, M.D.
Richard C. Lilly
*Jennings C. Litzenberg, M.D.
*Virgil J. P. Lundquist, M.D.
*Francis W. Lynch, M.D.
*Gordon C. MacRae, M.D.
Samuel H. Maslon
Malcolm B. McDonald
*Russell J. Moe, M.D.
*John B. Moyer, M.D.
Gerald T. Mullin
I. A. O'Shaughnessy
*Harold O. Peterson, M.D.
*Erling S. Platou, M.D.
Raymond D. Pruitt, M.D.
*Charles E. Rea, M.D.
*Leo G. Rigler, M.D.
T. H. Rowell, Sr.
*Lloyd H. Rutledge, M.D.
*Russell O. Sather, M.D.
Raymond A. Scallen
*Harold G. Scheie, M.D.
*Charles G. Sheppard, M.D.
*Edwin J. Simons, M.D.
*Vernon D. E. Smith, M.D.
*Albert M. Snell, M.D.
Wesley W. Spink, M.D.
*Edward L. Touhy, M.D.
*Richard L. Varco, M.D.
*Maurice B. Visscher, M.D.
*Owen H. Wangensteen, M.D.
*Cecil J. Watson, M.D.
*Robert L. Wilder, M.D.
*William W. Will, M.D.
*R. S. Ylvisaker, M.D.

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*Alumni of University of Minnesota Medical School.

Chapter XXXVII

School of Public Health

THE CONCEPT OF A School of Public Health at Minnesota is almost as old as the University itself, dating from the creation of a State Board of Health, the appointment of Dr. *Charles N. Hewitt* as its first secretary, and the apparent interest of then Governor Horace Austin. In the first annual report of Dr. Hewitt to Governor Austin (1873), it is stated that "recognizing the necessity for and value of systematic education in the principles and practices of public hygiene to our teachers and the pupils of our schools, your next effort was to secure for that study the proper place in the University and in normal, high, and common schools of the state . . . . At your request the Regents of the University have recognized its importance. They called upon your secretary to provide a course of lectures on public health at the University this winter. By your order, the lectures will be given by your secretary and begin in January."

The University calendar for the year 1874-1875 (p. 37) states that "The Department of Public Health (and associated subjects) is in charge of the Secretary of the State Board of Health." Dr. Hewitt was appointed as a Non-Resident Professor of Public Health, providing a "course of lectures on sanitary science . . . . to the seniors of all departments the third term. The topics embraced are such as: Personal Hygiene as depending on soils, water, air, food, clothing, etc.; Public Hygiene including sewerage and drainage of towns, heating, lighting and ventilation of dwellings and public buildings; epidemic diseases, intemperance, etc. . . . . The Physiology taught . . . . . to the lowest class of the Collegiate Department is included in this department of instruction." (p. 50)

Instruction of this character was continued for several years, modified only by an entrance examination in physiology required for admission to the "Scientific and Modern Courses in the Collegiate Department."

In 1877, the calendar further stated that "By authority of the Board of Regents, Professor Hewitt will institute at the beginning of the next year a routine of physical examinations designed to protect and preserve the health history of each student during his connection with the University." Dr. Hewitt continued in charge for several years, offering courses in personal and community health as well as some instruction in sanitary science in the Institute of Agriculture.

The development of a Medical Faculty in 1883 marked the beginning of professional concern in the field of health. So long as the Medical Faculty was merely an examining body and offered no instruction Dr. Hewitt extended his interests to cover the examinations in Hygiene and serving as senior member of the Faculty.

The development of a teaching medical school in 1888 brought about a change in Dr. Hewitt's relationship to the University. President Folwell, who had been a close personal friend of Dr. Hewitt and had been persuaded by Dr. Hewitt to come to Minnesota from New York, states in his *History of Minnesota* that "it was the doctor's hope, or dream, that a department or school of public health might at length be developed in the University for the training of health officers and instructors in hygiene. He therefore declined a professorship of hygiene and sanitation in the department of medicine, when it was organized for instruction in 1888." Dr. Hewitt had had an extremely broad concept of a school of public health which would embrace not simply the training referred to above but would actually include a medical school that would be a part of a broad program of instruction designed in one way or another to promote and preserve the health of the people of Minnesota.

In letters to Folwell and Northrop in 1886, he had stated that "my plan includes not only medical higher education but the resting (of) that and all other associated work on development in the Department of Public Health which is more and more the admitted foundation of Practical Medicine" (Jordan, Philip D.: *The People's Health,* Minnesota Historical Society 1953 p. 63). That he could not realize this ambition, and that a school of medicine aimed solely at the training of physicians should be established was apparently contrary to his philosophy. Although he had played a leading role in the original establishment of the medical faculty he chose to remain aloof. He continued his

association with the University, however, though his title was changed to University Professor of Sanitary Science, a position that he continued to occupy until 1897 when, for no apparent reason, Governor Clough suddenly failed to reappoint him to the State Board of Health, at which time he withdrew to his earlier home in Red Wing but continued his University appointment until 1901.

From 1880 to 1890, instruction in the newly established teaching Medical Faculty was provided by Dr. *Arthur B. Ancker* of St. Paul who carried the title of Professor of Hygiene. His activities were strictly limited to the medical students, while Dr. Hewitt continued instruction in other parts of the University. This appointment of Dr. Ancker lasted but two years, when Dr. *John F. Fulton* of St. Paul, who carried the title of Professor of Ophthalmology and Otology when the Medical School was first established, assumed Dr. Ancker's duties and from 1888 to 1900 served as Professor of Ophthalmology, Otology and Hygiene.

By the beginning of the new century the State Board of Health had moved onto the campus and was closely interlocked with the Medical School both in physical quarters and in joint appointments. Dr. *Frank Wesbrook* had come from Vancouver in 1895 to serve in the dual capacity as Director of the State Laboratories and Professor of Pathology and Bacteriology, while Dr. *Henry M. Bracken* who succeeded Dr. Hewitt as Secretary of the Board of Health (State health officer) served also as Professor of Materia Medica and Therapeutics. In 1901, Dr. Fulton relinquished his role in hygiene, and instruction was provided by what the *Bulletin* referred to as a "core of the faculty" which was listed as consisting of Dr. *Charles J. Bell,* Professor of Chemistry; Dr. *Richard O. Beard,* Professor of Physiology; Dr. Wesbrook, and Dr. Bracken.

This arrangement of a "core of the faculty," changing slightly in composition from one year to the next, was continued until 1907 when a separate Medical School Department of Hygiene was created consisting of Dr. Bracken as Professor of Preventive Medicine and still Secretary of the State Board of Health, Dr. F. F. Wesbrook, Professor of Pathology and Bacteriology while serving also as Director of the State Board of Health Laboratories and dean of the Medical School, and Professor *F. H. Bass,* "civil engineer in charge of municipal and sanitary engineering, College of Engineering and Mechanic Arts, and Sanitary

Engineer of the State Board of Health." This arrangement meant essentially that professional instruction in the field of hygiene, preventive medicine and public health was being taken over by staff of the State Board of Health who at the same time carried a variety of appointments within the University. Although recognized in the *Bulletin* as a department coordinate with others in the College, there was little to indicate that this was in reality an organized department. By 1910, it had ceased to be so listed and had been replaced in the *Bulletin* by a long list of lecturers, a plan that was continued until 1914.

The reorganization of the Medical School in 1913 was accompanied by more formal recognition of public health, the *Bulletin* for that year containing the statement that "Provision has been made for the ultimate establishment of a separate Department of Public Health and Bacteriology. Temporarily it will be combined with pathology and the two conducted as one department." (p. 32) By the following year, a formal Department of Pathology, Bacteriology and Public Health had been established, under the chairmanship of Dr. *H. E. Robertson,* an arrangement that was to continue until 1919 when a separate Department of Bacteriology and Immunology was created leaving Public Health combined with Pathology. At this time, Dr. *John Sundwall* was appointed as Professor of Hygiene in this new department, serving also as University Health Officer and initiating what is now the University Health Service. Dr. Sundwall continued in this position until 1921 when he transferred to the University of Michigan. The combination with pathology continued until 1922 when the Board of Regents established a separate Department of Preventive Medicine and Public Health under the direction of Dr. *Harold S. Diehl.*

The idea of a formal program of instruction to prepare for professional public health work envisioned by Dr. Hewitt had apparently not been completely lost. Dr. Wesbrook, who had worked with Dr. Hewitt and probably been influenced by his dynamic idealism, had been in a strategic position to promote this concept of professional training. As director of the State Laboratories and at the same time Professor of Bacteriology and Pathology he had been influential in Medical School planning and decisions. In 1906, he had become dean of the Medical School, a position in which he continued until 1913. In these several capacities, he had been in an ideal position to help influence the ideas advanced many years earlier by Dr. Hewitt. Probably as a result of

his influence, the *Bulletin of the College of Medicine and Surgery* for 1911 (p. 58) in describing the instruction in hygiene contained the statement that "A graduate course for medical health officers will be announced later." This statement was repeated annually until 1914, when, pursuant to a vote of the Board of Regents May 7, 1914, the *Bulletin* (p. 19) stated that "The School of Public Health has been organized under the control of the Administrative Board of the Medical School. An executive committee has been appointed by the Board for the immediate direction of the work of the School. This committee consists of the President of the University, the dean of the Medical School, and head of the (State) Department of Sanitary Engineering, the ranking instructor in charge of the Division of Public Health in the Medical School and the executive officer of the State Board of Health. A teaching faculty will be chosen of which one member will sit in the Administrative Board of the Medical School. The functions of the School will be broad. It will institute measures relating to the health of the University community; it will prepare and recommend courses of instruction in public health in the several colleges of the University; it will conduct courses of instruction for health officials and others; it will establish and maintain a public health museum; and will cooperate with other agencies in the study of public health problems outside of the University.

"The School expects to offer courses during the coming year for medical health officers, which will cover one year of time and will lead to the bestowal of a certificate in public health. It is expected that this course will be further extended to cover a second year and will lead to the degree of doctor in public health."

"The School will cooperate with the Department of Pathology, Bacteriology and Public Health in maintaining a course in hygiene for students of medicine."*

*This statement of intent in 1911 and action 1914, even though not implemented, has some historical significance in that it was indicative of a carefully considered plan for a school of public health several years before Johns Hopkins in 1916 established the first formal school. President Vincent, who assumed the presidency of the University in 1911 and in 1917 became head of the Rockefeller Foundation from which the Johns Hopkins School of Hygiene derived its early support, was obviously aware of the idea of a university-based school of public health. While the discussions at Minnesota may have had their effect in Dr. Vincent's sympathetic support, it is very doubtful that the Johns Hopkins group had been aware of or influenced by the Minnesota planning (or dreaming).

In spite of this statement, and a subsequent statement under the Department of Pathology, Bacteriology and Public Health to the effect that "courses in the School of Public Health for medical health officers are suitable as electives for six year medical students," there is little evidence that this School was truly implemented. The *Bulletin* of 1915-1916 contains a very comparable statement but with the modifying clause (p. 20) that "the School expects to offer courses during the coming year. A circular of information will be issued later." There is no evidence that this was ever done. The *Bulletin* of 1916-1917 contains no reference to such a School nor is there evidence that the combined Department of Pathology, Bacteriology and Public Health actually offered any courses of this character. Further implementation of the idea of professional training in public health had to await the establishment of a separate department.

At its meeting on January 13, 1922, the Board of Regents adopted a resolution requesting appointment of a "Committee to consider the advisability of establishing a Department of Public Health." The president appointed to this committee Dr. H. S. Diehl, Dr. E. T. Bell, Dr. S. Marx White, Dr. L. B. Wilson, Dean G. S. Ford, Dean J. B. Johnston, Professor F. Bass, Professor R. M. Elliott, Dean M. E. Haggerty and Professor F. J. Bruno. The composition of the committee, with representation from medicine, liberal arts, education, the Graduate School, and the Mayo Foundation, clearly indicated the idea of a department that would serve the entire University, not merely the Medical School. Three months later on April 22 the Board adopted the following recommendations of the committee.

> "(1) That a Department of Preventive Medicine and of Public Health be established in the Medical School, this department to offer appropriate required and elective courses in hygiene and public health for students in the various colleges and schools of the University.
>
> "(2) That this department be provided with a budget for salaries and expenses and that to this budget be assigned all moneys (sic) which are now allotted to health and public health education in the University, together with such further sums as may be available.
>
> "(3) That the director of this department be also the director of the Students Health Service,
>
> "(4) That action be taken as soon as possible so that the new department may be organized, courses offered and curricula organized for the college year 1922-23."

Pursuant to this vote, a Department of Preventive Medicine and Public Health was created under the chairmanship of Dr. Diehl and began functioning with the academic year 1922-23.

With the creation of this department, and in keeping with the intent of the Board of Regents to concentrate in it all instruction in health being carried on throughout the University, the course in Public Health Nursing was transferred from the School of Nursing, personnel of the State Board of Health that had been helping with the formal instruction of medical students were given academic appointment within the new department, and a series of new courses dealing specifically with public health was arranged. Most of these were courses of general rather than professional interest, courses that would be of value to students concentrating in various fields elsewhere in the University.

The concept of professional training was not overlooked, however, for the *SLA Bulletin* (page 42) 1922-23 contains announcement of an undergraduate four-year course in Preventive Medicine and Public Health leading to the degree of bachelor of science and described as "intended to train men and women for laboratory, field, and administrative work in public health." The course was divided into two electives Program A, labeled "Public Health or Sanitary Work" was designed "to prepare a student to undertake sanitary surveys and inspections and to perform the chemical and bacteriological examinations of water, sewage, foods, milk, excretions and blood," while Program B "leading to service in public health organizations" was designed "to prepare the student to assume certain positions with official and voluntary public health organizations and (to provide) the fundamental training essential for advancement to positions of responsibility." Admission to the program required knowledge of a foreign language, a condition that obviously reflected the growing interest in public health on an international basis.

The idea of an undergraduate program, possibly modeled after the undergraduate health officer's course being conducted at that time by the Massachusetts Institute of Technology, apparently found little support for by 1928 the sequence "leading to service in public health organizations" had been discontinued and a year or so later the companion sequence likewise disappeared. In 1928, an attempt was made to develop a four-year curriculum in school health work, an attempt that likewise found little success. In the meantime, however, these several

attempts to provide professional training had resulted in the creation of a number of courses in such subjects as public health administration, epidemiology, and sanitation most of which were offered by staff of the State Health Department and served as a nucleus from which professional courses at the graduate level were to evolve during the latter half of the following decade.

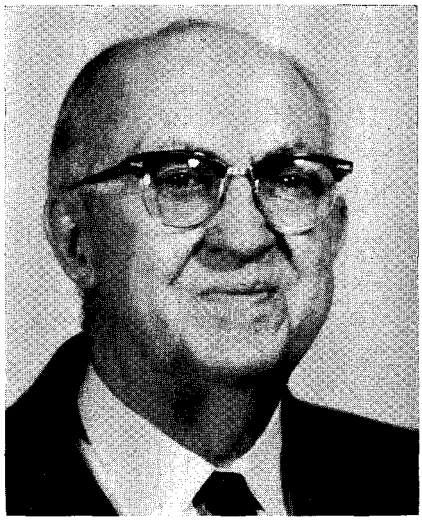
Although it was clear from the wording of the Board of Regents action that the newly created Department of Preventive Medicine and Public Health was to take over instruction in health being offered in other parts of the University, this part of its resolution was not fully implemented until about 10 years later. Since the early part of the century, instruction in personal health had been given through the Department of Physical Education, Dr. *L. H. Cooke* giving the lectures to the men and Dr. *J. Anna Norris* the lectures to the women. These were apparently "required" courses carrying, however, no academic credit and were accorded the respect and attention by the students that might be expected of any required non-credit course.

Although the Department of Preventive Medicine and Public Health immediately after its organization established courses in personal health at both the junior college and senior college levels, the Departments of Physical Education continued to offer their "instruction in health" which was combined as a part of a required sequence in compulsory exercise. By 1926, the Preventive Medicine course was recognized as a suitable substitute for the course in Men's Physical Education but the women were not permitted to substitute it for Dr. Norris' course, which for many years carried the mysterious title of "Preliminary Hygiene." By the end of the decade, however, the Physical Education courses were fading out and the several courses given by the Department of Preventive Medicine and Public Health were taking their place. It is interesting to note, however, that the School of Nursing required the course in women's physical education (Preliminary Hygiene) longer than did any other part of the University.

This first decade of the department had brought in two individuals, Dr. *William A. O'Brien* and Dr. *J. Arthur Myers,* who, in addition to Dr. Diehl and Dr. Boynton, were destined to play important roles in the health program of the University and the State of Minnesota. Dr. O'Brien had joined the Medical School in 1923 as an instructor in pathology, in which role he quickly demonstrated an unusual flair for

teaching. With a natural gift for expression, he had manifested interest in the much neglected problem of conveying reliable and scientifically sound health information to the general public. In 1925, he was given joint appointment in pathology and in preventive medicine and public health, in the latter role participating in the teaching of the courses in personal health that served as undergraduate electives but were later to replace the physical education courses in personal health. As the Department of Physical Education slowly abandoned its health instruction in the late 1920's, the personal health course (PM & PH3) was taken over by Dr. O'Brien and, largely because of his personality, became a popular symbol of public health in the minds of most of the undergraduates who failed to realize that there was anything in the Department other than this course. At the same time, Dr. O'Brien, while carrying the responsiblity for the course in Medical Technology and later the Program of Continuation Medical Education, developed a state-wide following due to his weekly programs over the University radio station (KUOM) and for the Minnesota Medical Society over one of the commercial stations. A popular after-dinner speaker on a variety of subjects and an active leader in the Minnesota Cancer Society, Dr. O'Brien, while always occupying a somewhat obscure position in the formal organization of the department, became in the eyes of the public synonymous with public health not only in the University but also to a high degree throughout the State. The subsequent development of more formal programs of professional training were outside of his interest and were to go unnoticed by the public. As "Mr. Public Health," both to undergraduates in the University and to the general public of the State, Dr. O'Brien continued in the spotlight until his sudden yet not unexpected death in 1947. (See section on Personal Health Instruction.)

Dr. *J. Arthur Myers,* a graduate of Ohio University with a doctor of philosophy degree from Cornell, had come to Minnesota from the University of Missouri in 1914 as an instructor in anatomy under Dr. Clarence Jackson. While serving in this capacity, he completed his requirements for a medical degree and in 1920 was appointed in the Department of Internal Medicine. Having developed an absorbing interest in tuberculosis and its control, it was logical that in 1923 he should accept appointment jointly in the Department of Medicine and the recently organized Department of Preventive Medicine and Public Health. Coupled with this was a clinical appointment in the Student



J. Arthur Myers

Health Service and an active private practice focused on tuberculosis. In these several capacities, he was to serve the University for a total of 43 years until his retirement in 1957. During these years, he had participated in the teaching of anatomy, physical diagnosis, principles of preventive medicine, personal health and control of tuberculosis. He had personally taught almost two generations of medical students who had developed for him a degree of respect and affection accorded to few teachers. His instruction of public health personnel was approached with the fervor of the crusader for to him control of tuberculosis was a crusade to which he was devoting his life. Through his work at the Lymanhurst Health Center and the Minneapolis Health Department in association with its health officer, the late Dr. Francis Harrington, he developed not only a productive program of research but provided a militant leadership in the campaign against tuberculosis. To him, this was a campaign of eradication, for his goal was not simply reduction in the amount of demonstrable active disease but rather absolute prevention of primary infection. While recognizing the role of exogenous reinfection, he became the champion of the endogenous school of thought at a time when devotion to this concept seemed highly radical to many persons. Yet, as the years passed, he emerged much as a prophet ahead of his time as he saw control programs being increasingly focused on detection and treatment of primary lesions as potential sources of

endogenous reinfection in subsequent years. Appreciation of his research and the fervor of his crusade, brought him into national and international prominence. As president of the National Tuberculosis Association he provided energetic and inspiring leadership in this campaign. By the time of his retirement in 1957, Dr. Myers had been the recipient of most of the awards and distinctions in the field of tuberculosis. He had been honored by tuberculosis and public health associations and was a recipient of honorary degrees. Traveling widely throughout the country as well as to tuberculosis meetings in other countries, he had become truly an international figure known and respected by all who worked in the field of tuberculosis control. At the same time, he had acquired wide recognition as editor of the *Journal Lancet* and of *Diseases of the Chest* as well as the author of numerous books and journal articles dealing with the epidemiology and control of tuberculosis. He had indeed become an institution revered by colleagues and students alike, to all of whom he personified the highest ideals of the teacher as well as the physician.

But to the University and the stream of students with whom he had contact, Dr. Myers was much more than an internationally recognized leader in the field of tuberculosis. Over his many years of active teaching, he had provided stimulus and inspiration as well as knowledge. To the student who knew him through formal lecture or through his many informal office conferences, he had imparted some of his crusading spirit. To his colleagues in the School of Public Health, the Medical School and the Health Service, Dr. Myers personified devotion to a cause, devotion to the patient and devotion to an institution. Although most of his service in the University was on a part-time basis, no one on a full-time appointment could have devoted more of his time and his energies to the institution. It was a rare occasion when the lights in his office failed to burn late into the night for "the doctor" was always at work on his writings and his editing. Although, due to his many other interests, Dr. Myers did not take an active part in policy formation within the Department of Preventive Medicine and Public Health and later the School of Public Health and his teaching was of necessity limited in extent, the influence of his personality and his mere presence provided a constant stimulus to all of his associates. While highly respected as a clinician, his basic and absorbing interest has been disease prevention to which ideal he has devoted his life.

To most men, retirement means a withdrawal from former activities, a period of rest and leisure. But to Dr. Myers, retirement has meant release from a few of his routine teaching and clinical assignments so that he might devote more time to his writing, his studies, his editing and above all to his research. When lights elsewhere around the University have been dimmed the lights in his office still burn brightly long into the night for "the doctor" is at work. In the history of the University, few persons have contributed longer or more than has Dr. Myers over a span of more than 50 years. To the thousands of former students of medicine and public health, to his colleagues within the University, to his innumerable professional associates throughout the world, Dr. Myers has truly become an institution honored and respected for his contributions to human welfare.

The passage of the Social Security Act in 1935 marked the beginning of a new era in public health instruction at the University. This Act provided for substantial subsidies to State Health Departments for general public health work (Title VI) and for maternal and child health programs (Title V). If such expansion was to be implemented there would inevitably be a need for more personnel specially trained for public health work. At that time, there were only two formally organized schools of public health, namely Harvard and Johns Hopkins. Programs leading to graduate diplomas or degrees in public health were also being conducted within medical school departments of preventive medicine at Columbia, Vanderbilt, Yale and to a limited extent at Michigan. It was inevitable, therefore, that state health officers should consider the need for additional training facilities not only to expand those that already existed but also to provide new facilities in large areas in the country where they did not exist.

It was with this thought in mind that certain Upper Midwest health officers under the guidance and at the initiative of Dr. *Albert Chesley,* then Health Officer of Minnesota, should have come together to consider the desirability of further training facilities in this upper Midwest area. The University of Minnesota, with strong Schools of Medicine and Engineering and a Department of Preventive Medicine and Public Health which for some 15 years had been training public health nurses and had close affiliation with a State Department of Health located on the campus, offered a logical place for expansion of this character. Under the terms of the Social Security Act, it was possible for the

Albert J. Chesley

health officers of other states to permit allocation of certain of their funds to the Minnesota Health Department which would in turn transfer funds to the University, thus providing limited federal support for further development of public health training at the University. With an agreement of this sort, the University undertook to develop within the Department of Preventive Medicine and Public Health in the Medical School a graduate program for the training of physicians, engineers and nurses for public health work, receiving $18,000 a year of federal money through the State Health Department.

With this decision to embark upon an expanded program of this character, the University sought a suitable director for the program. Such a director was found in the person of Dr. *Kenneth F. Maxcy,* then chairman of the Department of Preventive Medicine at the University of Virginia. A native of Maine, Dr. Maxcy had had his medical and public health training at Johns Hopkins. Before turning to academic work, he had spent eight years as a commissioned officer of the United States Public Health Service and had achieved well deserved distinction for his pioneering studies of endemic typhus in the southeastern part of the United States. He was nationally recognized as one of the most competent and imaginative persons in the field of epidemiology. Unfortunately, he was to stay only one year, namely the academic year of 1936-37, leaving to return to the Johns Hopkins School of Hygiene

as Professor of Public Health Bacteriology, later as Chairman of the Department of Epidemiology. His departure was not related to any sense of frustration or lack of faith in the opportunities in Minnesota but rather was due to the attraction of return to Johns Hopkins where his roots were very deep and where he could continue his close associations with Dr. Wade Frost, then Professor of Epidemiology, an association that was cut short by the latter's death in 1938.

During this year at Minnesota, Dr. Maxcy strengthened existing relationships with other parts of the University and the State Health Department. The Department of Preventive Medicine and Public Health was made a separate Department of the Medical School with a full-time director rather than a part-time responsibility of the Director of the University Health Service. The biostatistics unit which had been developed in the Department of Botany of the College of Science, Literature and Arts, was transferred to Preventive Medicine and Public Health, and a rearrangement of certain public health courses separated the professionally interested students from those from other parts of the University for whom public health was a secondary non-professional interest. Staff in the person of Mr. *George Pierce,* then with the Division of Sanitation of the State Health Department, was transferred to the department to provide a nucleus of instruction in environmental sanitation and new courses in public health administration and epidemiology were established, the former under the responsibility of the State Health Department staff.

With Dr. Maxcy's departure for Johns Hopkins, the University obtained the services of Dr. *Gaylord W. Anderson,* then Deputy Commissioner of Public Health and Director of the Division of Communicable Diseases of the Massachusetts State Health Department. The department, as Dr. Anderson found it, was one of several related yet diverse components and interests, responsible alike for instruction of medical students, an undergraduate program in public health nursing, teaching of personal health in the undergraduate colleges, instruction in fundamental biometry and a beginning professional public health program at the graduate level. While the last of these was being planned for programs extending throughout an academic year and leading to either a diploma or a master's degree in public health, principal attention was currently being given to short courses of a single academic quarter in length. As most of the health departments of the area felt that they

could not spare personnel to go to school for an entire academic year, short courses had been conducted and planned for both physicians and engineers and for the immediate future would probably be the major concern in professional training, though an occasional student was registered for an entire academic year. The public health nursing degree program, however, was well established and nationally recognized both for its size and its quality and was in reality the major contribution of Minnesota to professional public health work at that time.

The appointment of Dr. Anderson coincided with the resignation of Miss *Eula Butzerin* who for 13 years had been in charge of the nursing program. Miss Butzerin left to go to the University of Chicago where she had hopes of being able to establish a master's degree graduate program in public health nursing, hopes that were never realized, while events were to show a strong program of this character was to be later developed at Minnesota. Effective in the Fall of 1937, Miss Butzerin was succeeded by Miss *Margaret G. Arnstein,* who was at the time Consultant in Communicable Disease Nursing for the New York State Health Department and well recognized throughout the Northeast for her inservice institutes.

The period from Dr. Anderson's first year to the advent of World War II was marked by very slow progress, the most notable features of which were the transfer of the public health nursing program from the College of Education to the Department of Preventive Medicine and Public Health and the establishment of a master of public health degree program. For many years, although the public health nursing staff was in the department and supported out of the department's budget, the students in this program had been registered in the College of Education ostensibly so that they could, if employed as school nurses, participate in teaching in recognition of their teaching certificates. Unfortunately, this meant that all of the nurses being trained for public health work were compelled to take many courses in pedagogy for which they would have no subsequent use but which were necessary to satisfy degree requirements for the College of Education. During the academic year 1937-38, the program was transferred by authorization of then Acting President Ford.

Authorization for the master of public health degree was obtained in 1940 on approval of the administrative committee of the Medical School and the Executive Committee of the Graduate School. When the

graduate programs were first envisioned in 1935 and 1936, approval had been obtained for a certificate in public health but any students seeking degrees were to be required to register for a master of science degree in the Graduate School. During these years, Johns Hopkins and Harvard, which had previously been working on a certificate basis, established the degree of master of public health, in other words a professional in contrast to an academic degree. With this recognition of the difference between professional and academic degrees by the two oldest public health schools, other schools or departments engaged in comparable work promptly followed suit. At Minnesota this was particularly important in view of the then inflexible Graduate School requirement for a foreign language. While this could be defended as a tool for those who might be engaged in research, it could not be justified as a prerequisite for a professional program in public health any more than it could be for a professional degree in medicine or dentistry.

With the recognition of the professional degree of master of public health, the department was in a position to go ahead with further development of its professional program at the master's level. When this permission for the MPH degree was sought it was stipulated that the School would observe other aspects of the Plan B master's program including papers in courses totaling 9 credits but with an honor point ratio of not less than 1.5 (2.5 on the present basis) an honor point ratio halfway between the 1.0 (2.0) required for medical and dental degrees and the 2.0 (3.0) required for master of science and master of arts degrees.

During these pre-war years, the number of public health nurses in the bachelor's program grew steadily while the number of engineers and physicians remained very small. Short courses for both groups covering only one academic quarter were conducted for two or three years but were ultimately discontinued, as the immediate need that had been felt earlier had disappeared and health departments were more and more willing to give staff a study leave of a full academic year. During this same period, the active participation of staff of the State Health Department dwindled, not because of an unwillingness on their part but because of the difficulty that an individual found in adhering to a rigid academic schedule for an entire academic quarter. The only alternatives were for the University departments to take over more of the instruction on a full-time basis or to rely on a highly uncoordinated

series of visiting lecturers. The former seemed more desirable and could fortunately be supplemented by limited use of outside visiting lecturers who were able to spend an academic quarter at the University. Notable among these were Dr. *Gregoire Amyot,* who, after one academic quarter, left to accept the position as Deputy Minister for British Columbia and Dr. *Carl Buck,* Field Director of the American Public Health Association. Both of these assumed responsibility for instruction in Public Health Administration while at Minnesota. Under these circumstances, the role of the State Health Department staff became more of a supplementary service than full responsibility for individual courses. The only exceptions to this were the course in Public Health Bacteriology, which for many years had been conducted by the staff of the State bacteriological laboratories and which still operates on this basis, and in later years the courses on dental health conducted by Dr. *William A. Jordan.*

Entry of the United States into World War II brought an abrupt stop to the growth and development of the department. During the early months of the war, many of the collaborating staff in the State Health Department who held reserve commissions were called to active duty, thus reducing the assistance available from this source. Finally, in the early summer of 1942, Dr. Anderson was called to military service in the Office of The Surgeon General of the Army. With his departure, and until his return in January 1946, the administrative responsibility of the department was carried by Dr. *Ruth E. Boynton,* Director of the Student Health Service. The war emergency meant a discontinuance of post-graduate programs for physicians and engineers but it did not relieve the department of its responsibilities for training of public health nurses, teaching of medical students, or for the conduct of the programs in biostatistics and personal health. To provide the medical component of this instruction, the University was extremely fortunate in obtaining the services of Dr. *Haven Emerson* for one or two quarters each year. Dr. Emerson, one of the leading figures of the American public health scene, had recently retired from the position as Professor of Public Health at Columbia, a position he had occupied with distinction for 20 years, following service in World War II and a short time as Commissioner of Health in New York City. No one in public health at that time was better known or recognized than was Dr. Emerson. Not only did he bring to the department a

freshness of point of view but, through his mere presence, he added tremendously to its stature. In 1943, Professor George Pierce, who had responsibility for the public health engineering program, was likewise called into service, leaving no one to provide the necessary instruction in sanitation. Here again the School was fortunate in obtaining outside assistance, this time in the person of Mr. *Richard G. Bond,* then of the Iowa State Health Department, a former student in the department, whose services to Iowa were released for one academic quarter each year to provide instruction in sanitation. Even later, Professor *Alan Treloar,* head of the biostatistical unit, was absent for over a year as a civilian consultant to the National Defense Research Committee. His associate, Dr. *Borghild Gunstad,* assumed direction of the biostatistical program during his absence.

It was during these war years that the Department of Preventive Medicine and Public Health was changed in its pattern of organization to a School of Public Health. The death of Drs. William and Charles Mayo a few months apart in 1939 had naturally raised question as to the establishment of a suitable memorial. While many of their friends were planning for a physical memorial which later became the Mayo Memorial building of the University, the Mayo Properties Associates in Rochester envisioned a different type of recognition that would be supported by the Associates rather than the general public. With this in mind, they proposed to Dr. Diehl a lump sum endowment to assist in the establishment of a School of Public Health and the endowment of a Mayo Professorship in Public Health. The decision to place this money in Public Health rather than some other part of the Medical School was apparently occasioned by the active interest in public health that had been taken by the Mayo brothers, Dr. Charles having served for many years as Health Officer of Rochester and Dr. William having been active in the affairs of the Minnesota Public Health Association and at one time serving as president. As a consequence of this proposal, the Board of Regents changed the Department of Preventive Medicine and Public Health to a School of Public Health, giving it a position in the College of Medical Sciences coordinate with those occupied by the Medical School and the School of Nursing. At the same time, the School received an endowment of $500,000* from the Mayo Properties

*With the approval of the Mayo Properties Associates, $350,000 of this endowment was later used toward construction of the School's space in the Mayo Memorial

Associates and the University accepted a promise of $10,000 each year toward the salary of a Mayo Professorship of Public Health. Direction of the new School was continued by Dr. Boynton until Dr. Anderson's return from military service in January 1946, when he became the director and a few months later was named as Mayo Professor of Public Health.

During the war years, the only part of the department and School that had grown in size was the Public Health Nursing program. Miss Arnstein had stayed as director of the program until 1940 when for personal reasons she returned to the New York State Health Department, later to go to the Public Health Service and ultimately become director of its Division of Nursing. After an interim year, during which Miss *Mellie Palmer* served as Acting Director, she had been succeeded by Miss *Ruth Freeman,* who remained throughout the war, leaving in the summer of 1946 to take the post as Chief Nurse of the American Red Cross. Under Miss Freeman's direction, the Public Health Nursing program had grown in numbers and a slight beginning had been made with respect to master's degree programs.

With the end of the war and return of its staff from military service, the newly organized School was prepared to resume its formal public health training on a definitely expanded basis. Physicians, engineers, veterinarians, nurses and health educators, whose training had been postponed by the war, entered upon Master's degree programs. The Laboratory of Physiological Hygiene, which had been established in the Department of Men's Physical Education during the war years, was transferred at its own request to the School of Public Health, and the hospital administration program was begun under a grant from the Kellogg Foundation. Initiation of this latter program had been proposed by the Foundation during the war years but acceptance and implementation of the $20,000.00 annual grant were delayed until the beginning of the academic year 1946-47. When two years later, the first class in Hospital Administration completed its program, the new degree of master of hospital administration was authorized by the Board of Regents upon request of the School.

The year 1946-47 was one that, throughout the University, was

building. Most of the balance served as matching funds to secure a federal grant for construction of Environmental Health research laboratories in the basement of the west wing of the Health Service.

characterized by an avalanche of students who descended upon a University not prepared for such large numbers from the point of view of either staff or physical facilities. The deluge of students was felt in the School of Public Health, especially in its programs in biostatistics, public health nursing, and personal health. The fall quarter enrollment of graduate students grew from 15 in 1945-46 to 66 and the undergraduate public health nursing program mushroomed from 144 to 267 in a single year.

Simultaneously, the School was undergoing major changes in staff. With the resignation of Miss Ruth Freeman, Miss *Margaret Taylor* of the Public Health Service took over as Director of the Program in Public Health Nursing. Professor *James A. Hamilton,* with the assistance of Professor *James W. Stephan,* assumed direction of the new hospital administration program. Dr. *Stewart C. Thomson,* Acting Dean of the Loyola Medical School and a war-time associate of Dr. Anderson, joined the staff and a year later, on the death of Dr. O'Brien, accepted responsibility for the rapidly expanding undergraduate courses in personal health. In 1949, he was appointed Assistant Director of the School and in 1957 associate director, duties which he carried in addition to a crushing load of undergraduate courses in personal and community health. Enrollment in these courses, for which he assumed almost exclusive teaching responsibility, grew rapidly with the mounting size of the University. Courses which in 1946-47 were serving only 2,349 students had an enrollment of 4,943 in 1965-66. Over these two decades, Dr. Thomson had personally taught over 70,000 students in these courses, in addition to carrying a heavy load of instruction of medical students and public health graduate students.

Early in the post-war period, several new programs began to evolve within the School. The hospital administration program, made possible by the Kellogg grant, was taken over by the University at the end of the third year of Foundation support. A program for training of public health veterinarians was developed in cooperation with the Department of Veterinary Medicine and expanded upon the change of this Department into the College of Veterinary Medicine in 1957. Minnesota was in a unique position for such a development inasmuch as it was (and still is) the only university with both a school of public health and a program in veterinary medicine on what is essentially a single campus.*

*The University of California is the only other institution with both a school of public health and a veterinary school but the latter, located at Davis, over 60

By the end of the academic year 1965-66, this program had attracted 96 graduate veterinarians, 27 of whom came from 20 foreign countries. The mental health training grant in public health nursing was attracting more students than could be accepted and the Laboratory of Physiological Hygiene was quickly gaining international repute and attracting scholars from other nations who were anxious to become familiar with the methods that it was developing in its studies of the epidemiology of coronary disease.

Until the move into the newly built Mayo Memorial building in 1954, the School was badly handicapped by lack of suitable physical facilities for offices, laboratories and classrooms. The quarters in Millard Hall, even though supplemented by space in the postwar temporaries, were barely adequate for staff purposes but provided no room for students. Laboratory facilities for epidemiology and sanitation were nonexistent. The temporaries provided a little space for offices and a limited number of conference rooms. During the year 1946-47, a beginning had been made on a sanitary biology laboratory thanks to the availability of war surplus and a special Regents' reserve grant of $10,000.00 from the University. In the fall of 1947, this laboratory was moved to quarters generously made available by the State Board of Health in space developed during the late 1930's for influenza virus research under a grant from the Rockefeller Foundation but now discontinued. This laboratory in the State Health Department provided an invaluable addition, making possible student laboratory exercises in sanitary biology and the beginning of research programs. Occupancy of this was continued until larger facilities were available in the Mayo Memorial.

The post-war expansion also presented critical problems from the standpoint of budget. Unfortunately, certain of the state health officers in other parts of the country, seeking grants for their state medical schools, had successfully challenged the right of the Public Health Service to allocate funds for development of public health training programs in selected universities through the means of special grants to States in which these universities were developed. Thus, the School found itself without even the token support of $18,000.00 that had existed prior to the war. In the meantime, the American Public Health Association had established an accreditation program, largely because of a demand

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miles from Berkeley, is so far removed as to constitute almost a separate institution and to limit effective coordination in public health training.

from the Public Health Service for some sort of criteria that might be used for allocation of training funds, when and if these might again become available. Criteria for such accreditation were drawn up by the Committee on Professional Education of the Association and an ad hoc committee consisting of Dr. C.-E. A. Winslow of Yale and Dr. James Doull of Western Reserve was appointed to visit Minnesota during the war years to see whether or not the program could be accredited. Following this visit and a conference in Washington between this committee and Dr. Anderson, who was still in military service, the committee recommended to the Association that the School be accredited, though it was recognized, as Dr. Winslow emphasized, that this was based on faith in its potential rather than evidence of its existent program. To warrant this accreditation, however, more staff was needed. The Mayo Endowment Fund provided a limited basis for this essential staff expansion, the decision being made (with the approval of the Mayo Properties Associates) that both interest and principal could be expended over a period of some 20 years. Use of these funds made possible the transfer of Professor *Theodore A. Olson* from the State Health Department to the School and in 1951 the appointment of Dr. *Franklin Top* as Professor of Epidemiology. The latter stayed but two years, at the end of which time he moved to the University of Iowa as head of its Department of Hygiene and Preventive Medicine.

The expansion of the School of Public Health from this shaky beginning at the end of World War II to its present status, began to take shape about 1952 and can be almost dated from the appointment of Professor *Herbert M. Bosch* as Professor of Public Health Engineering in 1952 and Miss *Marion Murphy* as Director of Public Health Nursing in 1953. In 1947, Mr. *Harold Whittaker,* Director of the Division of Sanitation of the State Health Department, and nationally recognized as a leader in his field, transferred to full-time in the University, being succeeded in the Health Department by Mr. Bosch who, on his return from war duty, was being courted by Johns Hopkins University. While Mr. Whittaker did much to add to the stature and prestige of the School, he was too close to retirement to build a strong and continuing environmental health program. With his retirement in 1952, he was succeeded by Professor Bosch, who had left the State Health Department two years earlier to establish and direct the first Environmental Sanitation Section of the World Health Organization at Geneva. In

returning to the School, Professor Bosch brought not only a well-established international reputation but also a forceful and imaginative approach to training of the public health engineers and sanitarians.

In public health nursing, Miss Taylor had done much to develop a master's program and had obtained a special Mental Health Institute grant for training nurses in public health aspects of mental diseases but the undergraduate program, after its sudden post-war expansion, had begun to fade. Miss Murphy, with a background of practical experience in Minnesota, New York and Michigan, and academic experience at the University of Michigan, gave new life to the program at both undergraduate and graduate levels. An imaginative person and a good teacher who was already nationally recognized, she quickly attracted more students than the School was prepared to accept owing to limitations of staff. The advent of both categorical and general purpose federal training grants later provided support for the requisite staff expansion, with the result that by the end of the decade the School was operating the country's largest public health nursing programs at both the undergraduate and graduate levels.

Construction of the Mayo Memorial building in 1954 marked the beginning of a new era for the School in that temporarily it provided space for the increasing number of students, laboratory facilities and conference rooms, and room for the added staff. Prior to this, the School had been seriously cramped and at the same time badly scattered between Millard Hall, the State Health Department Building on the opposite side of the campus, an area beneath the stadium and two widely separated temporary buildings. Provision of two and a half floors of the Mayo Memorial (originally planned for three floors) permitted consolidation of most of the activities of the School other than the Laboratory of Physiological Hygiene and that portion of the Biostatistics Division teaching basic courses of general registration throughout the University. Urgently needed staff could now be added to the extent that funds were available, and a better program of graduate instruction could be developed based upon laboratory facilities in statistics, epidemiology and environmental health.

The requisite funds soon became available through federal grants for both training and research. Passage of the Hill-Rhodes Act in 1957, providing funds for operation and maintenance of schools of public health, furnished staff support. This Act, designed to help equalize

the burden of the several schools, especially those that were tax supported and could not be expected to carry the burden of training students from all other states in the Union as well as from other countries, provided funds in excess of those allotted by the University. Simultaneously, the further development of various categorical programs at the national level made funds available for specific purposes, such as training in epidemiology, biostatistics, air pollution, radiological health and chronic diseases. All of these were areas that badly needed development that would have been impossible had there not been funds to support staff and space to house the several programs.

Student enrollment rose rapidly due in large part to the establishment of federal training programs. Early in the postwar period, the Public Health Service, through the National Institutes of Health, had already made provision for student stipends in mental health, biostatistics and epidemiology but funds were not available for students with other interests or professional backgrounds. This void was filled by passage of the General Purpose Public Health Training Act in 1956 which provided generous federal support for a wide variety of students. Designed as a recruitment device to help fill the many vacancies in health agencies, this Act provided substantial funds that could be used to support physicians, engineers, sanitarians, nurses, educators, dentists, veterinarians and many other professional groups essential to public health programs but with interests less specialized than those covered by existing categorical grants. It resulted in a marked increase in student enrollment in all schools of public health as well as other institutions conducting appropriate training programs. At the same time, it brought about an improvement in quality of student, inasmuch as the number of stipend applicants so far exceeded the available funds that the School could be more critical in its selection. Shortly after passage of the training act, the concept of student stipends was further incorporated in a series of new categorical training acts making stipends available in a wide range of specialized subject matter. The total result of these several acts was a sharp increase in the School's graduate enrollment, which rose from 98 in the fall of 1954 to 235 in the fall of 1964 and 270 two years later.

During this period of post-war development and expansion, the School had established a definite place for itself on both national and international health scenes. Students were coming from all states in the

Union, while the World Health Organization, the foreign aid program of the Department of State, and numerous foreign countries were sending students for professional study. By 1966, students had come from every State and from 78 foreign nations. The summer ground water courses established at the request of the foreign aid program (International Cooperation Administration, later Agency for International Development) had in eight brief years brought 214 engineers from 54 foreign nations, while 485 students from other countries had been registered in degree programs. The international stature of the School was further attested by the many requests for staff to serve on short term foreign assignments.

So rapid had been the expansion, however, that even in the early 1960's the School was showing evidence of overcrowding, pointing to the need for additional space. This had been particularly noticeable in the areas of biostatistics and environmental health. Some relief for the former was found through conversion of conference rooms into offices. Expansion for environmental health was made possible by the generosity of the University Health Service which allocated an unfinished basement floor in the new West wing so that expanded research laboratories might be developed. In this area, the use of the balance of the Mayo endowment (about $150,000.00) provided matching funds to qualify for a federal research construction grant, almost doubling the laboratory space assigned to the division. Rental of space in outside buildings later provided facilities for research projects in hospital administration, maternal and child health, and additional space for the Laboratory of Physiological Hygiene. Thus, within 10 years after construction of facilities which, on the planning board, had seemed quite adequate, the School found itself faced with such crowding as to prevent or seriously curtail further development of research and training programs, even though funds to provide staff for such expansion were available.

Meanwhile, schools of public health in other universities were growing rapidly, with the result that the School, which in 1960 had had the largest enrollment of any school in the nation, by 1965 had slipped to third or fourth place in student enrollment and, in terms of space, had less than half of the national average. Lack of space had again become a serious handicap to recruitment of staff. Space limitations were again limiting student enrollment which in turn was affecting the

School's financial problems since so large a fraction of the federal training funds available for staff and maintenance was dependent upon student enrollment. Thus, by the middle of the 1960's the School had, momentarily at least, reached its peak and the spectre of imminent retrenchment was hovering over it.

BIOSTATISTICS

Biometry first appeared in the University curriculum in 1924 when Dr. *J. Arthur Harris* came to Minnesota from the Carnegie Institution at Cold Spring Harbor, Long Island, as head of the Department of Botany. An outstanding botanist of international reputation, Dr. Harris was far ahead of his colleagues at that time in recognizing the need for a mathematical approach to biologic problems rather than confining interest to classical taxonomy and morphology. With the characteristic humor that marked his personality, it is reputed that Dr. Harris defended the development of Biometry in the Department of Botany as the only way in which a botanist might obtain a square root. With the assistance of Miss *Edna Lockwood,* who came with him from Cold Spring Harbor and stayed until 1928, Dr. Harris provided introductory courses in Biometry to small groups of students majoring in various biological sciences who were interested in statistics as a tool in biologic research. Prominent among his early students was an Australian, *Alan Treloar,* whose Ph.D. studies in cereal chemistry had involved a need for use of statistical methods. As the courses grew in size and in number, and as research programs developed, Dr. Harris's staff was joined by Miss *Borghild Gunstad,* Miss *Marian Wilder,* and in 1929 by Alan Treloar as a full-time research associate.

The sudden illness and death of Dr. Harris in April 1930, brought about the appointment of Dr. Treloar as Assistant Professor in the Department of Botany but with full responsibility for the biostatistical courses. The first half of the 1930's saw the program's further growth under Dr. Treloar's guidance with the establishment of advanced courses and recognition of Biometry as a separate department of the Graduate School, with provision for both majors and minors. Thus, while continuing administratively as a component of the Department of Botany, Biometry acquired separate Graduate School recognition.

The conversion of the Department of Preventive Medicine and Public Health in the Medical School to a full-time basis in 1936 and ex-

Alan E. Treloar

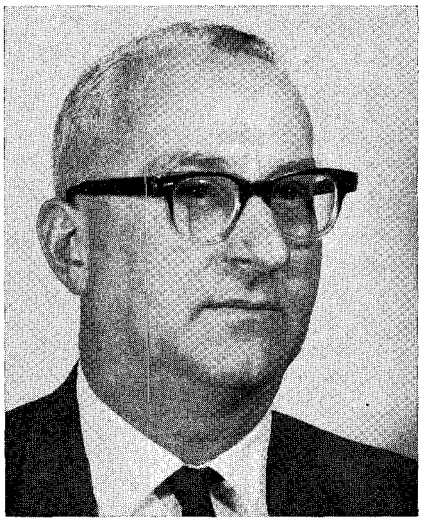
pansion of its graduate programs in Public Health brought about the transfer of Biometry during the year 1936-37. Under this arrangement, the biometric unit became administratively a component of the Department of Preventive Medicine and Public Health but retained its separate status as a department of the Graduate School. In its new home, Biometry (now changed in name to Biostatistics in accord with Public Health custom) found a more sympathetic environment and greater opportunity for expansion than had prevailed in Botany after the death of Dr. Harris. The development of Public Health graduate courses required more attention to vital statistics, while location in the Medical School involved assumption of responsibility for statistical instruction of medical students that had been initiated by Dr. *Richard Scammon,* while serving as Distinguished Professor in the Graduate School. While it had been expected that the transfer to the Medical School would result in decreased registration in the general statistical courses taken by graduate students throughout the University, the converse occurred with the result that the unit, which now consisted of Dr. Treloar, Dr. Gunstad, part-time services of Dr. Marian Thornton (formerly Marian Wilder) and several part-time teaching assistants, was barely able to keep up with the student demand.

The war years, involving a temporary absence of Dr. Treloar for work in the War Department, brought about some reduction in load. The

tremendous increase in total University enrollment during the post-war years, however, resulted in so heavy a student demand that not only was an expansion in staff required but also an increase in physical facilities. The cramped laboratories of Millard Hall became completely inadequate for class demand, with a resultant restriction of class enrollment. Courses that at their inception under Dr. Harris had attracted only a handful of graduate students had expanded to the point that in the early 1950's the basic course had to be offered 4 times in the year, serving 226 students, the intermediate course served 67 and the advanced course also served 67. At the same time, the number of students working for Master's and doctoral degrees in Biostatistics had become so large that provision of space for them had become a serious problem.

With the planning for the Mayo Memorial, it had been hoped that adequate space would be provided for Biostatistics. Curtailment in plans for this building, resulting in reduction of 1/6 of the contemplated space for the School of Public Health, necessitated a physical separation of the general courses in Biostatistics whereby the general courses for students from other parts of the University were offered in space outside of the Mayo Building, the latter providing space only for the Public Health and medical courses as well as the graduate students majoring in Biostatistics. Outside space was temporarily provided, first in the chemistry building, later successively in Mechanical Engineering, Architecture and Ford Hall, but always under highly cramped conditions both as to teaching laboratories and space for staff. This separation had the further serious disadvantage of breaking up the unity of the biostatistical staff, thus greatly impairing the efficiency of the division and decreasing staff cohesiveness. In no way did it reduce the number of students electing the courses or majoring in this area.

The plans for the Mayo Memorial had been based on the assumption of a staff of three or four and a corresponding number of graduate students. Development of the post-war programs of research grants under the National Institutes of Health accented the need for biostatistical guidance of such research projects. In 1953, the National Institutes of Health therefore provided grants for training of biostatisticians in each school of public health, a program which greatly increased the number of graduate students in this division. This program was in its early stages of development at Minnesota when Dr. Treloar accepted an appointment with the American Hospital Association, from which



Jacob E. Bearman

he later transferred to the National Institutes of Health at Bethesda. With his departure from Minnesota, responsibility for the program was transferred to Dr. *Jacob Bearman,* at one time a member of the Department of Mathematics, who, after a couple of years in Israel, had returned to Minnesota as associate professor of biostatistics.

Under Dr. Bearman's guidance, the program for training of biostatisticians continued to grow to the point that, by the early 1960's, it far exceeded that of any other accredited School of Public Health. Space that had been designed in 1952 for only three or four graduate students had now been forced to accommodate as many as 25, of whom 18 were engaged in master's programs and 7 in doctoral programs. In the meantime, the growing demand for statistical instruction of graduate students in the biological sciences had resulted in establishment of a biostatistical unit on the St. Paul campus, thus reducing the number of students from the Institute of Agriculture who came to the Minneapolis campus for general courses in Biostatistics.

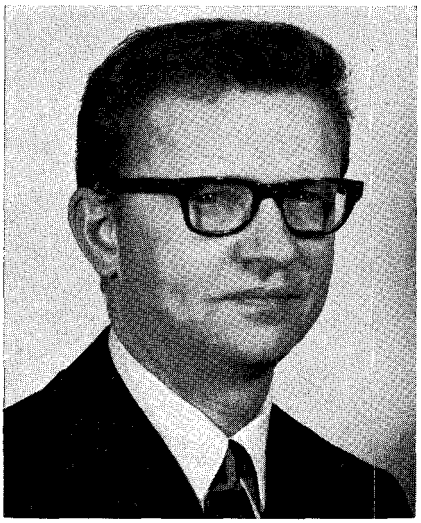
These several developments brought about a rather basic change of Biostatistics within the School of Public Health. Rapid expansion of the public health training programs, establishment of the course in Hospital Administration, the growth in the number of graduate students, especially in Environmental Health and in Public Health Nursing, and the increase in size of Medical School classes, required development of

special course particularly applicable to different needs of the several groups. No longer could three or four basic courses serve the needs of students of such diverse backgrounds and needs. At the same time, the tremendous increase in the number of students majoring in biostatistics brought about a shift in emphasis whereby the program for the training of biostatisticians became a major concern of the division, which simultaneously found itself in a new relationship to the entire College of Medical Sciences.

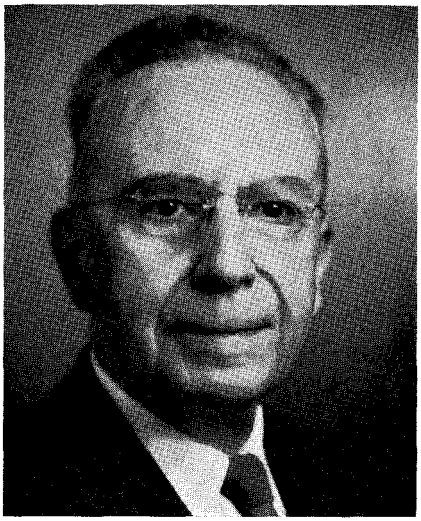
Before his departure, Dr. Treloar had incorporated into the division a statistical service component to be of help to various departments within the College. The establishment of this service meant that the division quickly became a statistical consultant on research programs throughout the College. Although this role placed a heavy burden upon staff, it did serve to bring the division and the School of Public Health into closer relationship with the various departments of the Medical School, thus cementing a relationship that does not exist in many universities having schools of public health. At the same time, it provided extremely valuable training for graduate students in biostatistics, who, as a part of their education, had the opportunity to work with a wide variety of problems in various aspects of medical science.

The expansion of this graduate training program for biostatisticians meant, however, that staff had to be expanded and new advanced courses developed. A unit that in 1937 consisted of a staff of only 2½ full-time equivalent appointments and offered only four different courses, had by 1966 grown to be a staff of 14 providing 34 courses in various aspects of Biometry (a return to its original designation, effective 1965.) Changes in statistical technology involving a shift from calculating machines to electronic computers further necessitated new or changed courses of instruction. This culminated in 1965 in the establishment of a computer center within the College, a center which, though not under the direction of the Biometry Division, remains closely related in both staff and program, furnishing not only specialized calculating service throughout the College but also an invaluable training facility for graduate students in Biometry.

With the end of the academic year 1964-65, Professor Bearman, who had been so instrumental in the expansion of the program and whose services on federal committees and study sections had become



Byron W. Brown



Harold A. Whittaker

a major burden, relinquished administrative responsibilities to his colleague Dr. *Byron W. Brown.*

ENVIRONMENTAL HEALTH

University instruction in sanitation began with the move of the State Board of Health onto the University campus in 1893 though even before that time Dr. Hewitt, then secretary of the Board, had been providing lectures on "sanitary sciences" covering such matters as disposal of sewage and ventilation, lighting and heating of private homes. Throughout the first quarter of the present century, the only formal instruction in sanitation was provided by members of the Health Department staff, not all of whom had concurrent academic appointments. Among those who contributed actively to this program were Dr. Wesbrook, who was later to be Dean of the Medical School, and Mr. *Richard Frederick Bass,* who served as Director of the Division of Engineering of the State Health Department from 1910 to 1915 and later became professor of municipal and sanitary engineering in the University and even later chairman of the Department of Civil Engineering. Following Professor Bass's transfer to the University, this instruction was given by Mr. *Harold Whittaker,* who succeeded him in the Health Department, and by various members of Mr. Whittaker's staff. By

1922, this relationship had been formalized by the appointment of Mr. Whittaker as a Clinical Assistant Professor in the newly created Department of Preventive Medicine and Public Health. Lectures on sanitation were provided to students in medicine and public health nursing and in the School of Embalming.

Although there is little in the records of the University to indicate clearly the magnitude of this contribution, the records of the State Board of Health show a constantly increasing amount of time devoted to this instruction. By the fall of 1929, the teaching burden carried by Mr. Whittaker and his colleagues had increased to 83 hours, including lectures, medical student field trips, and demonstrations of the activities of the Division of Sanitation. During the calendar year 1930, this load had increased to 115 hours, or the equivalent of four three-credit courses as currently calculated. In the meantime, Professor Bass had developed formal instruction in sanitary engineering within the Department of Civil Engineering, a program that was entirely apart from and not correlated with the instruction being given in the Medical School by Mr. Whittaker and his colleagues.

Passage of the Social Security Act and the expansion of the professional training leading to the ultimate establishment of the School of Public Health immediately precipitated a demand for more extensive teaching in sanitation. The decision taken jointly by the University and the State Board of Health to establish a formal program of instruction for public health personnel, brought to the University a small number of engineers and physicians from state health departments within the region. During the first two years of this program, Mr. Whittaker and his colleagues in the State Board of Health bore the burden of instruction of the engineers and the teaching of sanitation to the handful of health officers. Thus, the records of the State Board show that 535 hours of instruction were provided within the University in 1935, 503 hours in 1936, and 329 hours in 1937. Formal courses dealing with various aspects of sanitation were established and conducted in their entirety by Health Department staff.

In the fall of 1936, Professor *George Pierce,* who for ten years had been a member of Mr. Whittaker's staff, transferred to the University where, under Mr. Whittaker's direction, he took responsibility for the organization and conduct of these courses, which were then referred to as Sanitation and Public Health Engineering. Two years later, Pro-

fessor *Theodore Olson,* likewise transferred to the University though, like Professor Pierce, he continued close affiliation with the Health Department where he also had served for 10 years as a biologist. Thus, the burden of instruction carried by the State Board of Health was gradually transferred to the University. While the records of the State Board show that in subsequent years relatively few hours were given to University instruction, the burden that its staff continued to carry was actually far greater than these records would imply, for the close working relationship that Professor Pierce and Professor Olson had maintained with Mr. Whittaker meant that the line of demarcation between instruction given formally by University staff and that given informally by conference and visits of students to the Division of Sanitation was so vague that no accounting of time was possible.

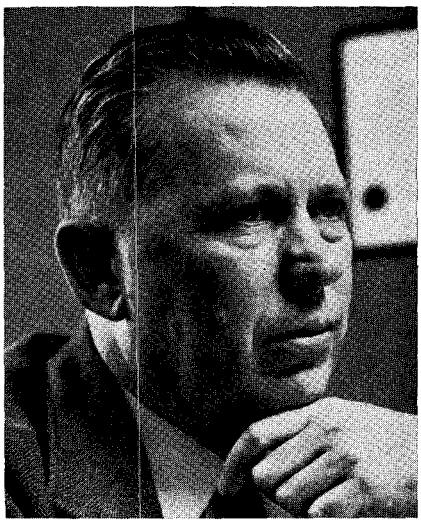
From this early beginning in the middle of the 1930's until the United States involvement in World War II, a small program in Public Health Engineering was slowly evolving under the immediate direction of Professor Pierce. The outbreak of war brought this to an abrupt close, partly because of a lack of students working in sanitation and later the induction of Professor Pierce and Dr. Olson into military service, the former joining Dr. Anderson in the Division of Medical Intelligence in the Office of The Surgeon General of the Army, the latter assigned to the Seventh Service Command Headquarters. Instruction in sanitation did not, however, cease even though the State Health Department was so depleted with staff in military service as to be able to provide little or no assistance. Instruction was continued by Mr. *Richard G. Bond,* then a member of the Health Department of Iowa, whose services were loaned to the University for one academic quarter each year.

The end of the war and the return of staff to both the University and the Health Department brought about a rejuvenation of the program in Public Health Engineering. Mr. Whittaker, who had held the State Health Department Division together during the war years, resigned from the department in 1946, transferring on a full-time basis to the University as Professor of Public Health Engineering. His place in the Health Department was taken by Mr. *Herbert M. Bosch* who, prior to entering military service, had been Mr. Whittaker's assistant. As Mr. Whittaker was nearing the retirement age, it was recognized that this was at best an interim appointment to get the Public Health Engineering program started again within the University.

Mr. Whittaker's eminence within his profession made him an ideal person for such a role. Trained originally as a chemist, he had joined the State Health Department in 1907, served as Chief of the Water and Sewage Laboratory from 1909 to 1911, Assistant Director of the Laboratory Division in 1912-1913, and was appointed as Director of the Division of Sanitation in 1915, with the transfer of Mr. Bass to full-time in the University. During these many years of service, Mr. Whittaker had established himself as one of the two or three most outstanding public health engineers of the nation. He had served on innumerable national committees as consultant to the Public Health Service and more than any one person had been the power behind the scene in collaborating with the late Mr. Leslie Frank in the development of the U.S.P.H.S. Standard Milk Ordinance. Universally respected and honored within his profession as one of its leaders, he was in a position to give immediate stature to whatever program he could develop within the University.

During these years, with the assistance of Professor Pierce and Dr. Olson, Professor Whittaker was able to pick up the work that had been interrupted by the outbreak of war and to develop a graduate program that was beginning to attract engineers and sanitarians from distant as well as local health agencies. Invaluable assistance was given by the State Board of Health which provided space in its building for the establishment of a teaching and research laboratory in sanitary biology under the direction of Dr. Olson. Here, the laboratories stayed until the completion of the Mayo Memorial building in 1954. Thus for seven years, the State Health Department at no small sacrifice of its own crowded quarters provided facilities without which the program in Public Health Engineering could not have been properly developed.

With the retirement of Professor Whittaker in 1951 (and his transfer as a consultant to World Health Organization in Geneva), his place was taken by Mr. Herbert M. Bosch who returned from Geneva as Professor of Public Health Engineering, effective September 1952. A Missourian by birth and background, Professor Bosch had at one time been director of the Division of Sanitation of the Missouri Health Department. In 1935, he had come to the Minnesota Health Department as assistant director under Professor Whittaker. This role had continued until he had been called into military duty, shortly after the United States' entry into World War II. During four years of active



Herbert M. Bosch

military service, Professor Bosch served as regional engineering consultant for the Seventh Service Command and later as a civil affairs officer and Assistant Chief of Staff, G-5, XIX Corps in Europe, service for which he was decorated by the governments of Belgium, France, and the Netherlands. With the termination of war and his return to civilian life, other universities and health departments had eagerly sought his services but the transfer of Mr. Whittaker from the State Health Department to the University opened up a position in Minnesota that brought about Professor Bosch's return as Chief of the Environmental Sanitation Section of the Health Department. He continued in this position, however, for only four years when in 1950 he was induced by the World Health Organization to accept responsibility for the development of its program in sanitation, serving as the first director of its Environmental Sanitation Section. His work in this capacity brought him into contact with public health engineering problems and leaders in all parts of the world. With the retirement of Professor Whittaker, Professor Bosch, who had now become a well-recognized international leader in sanitation, was the logical successor as Professor of Public Health Engineering, a position which he occupied with increasing distinction until his untimely death in September 1962, while on a cultural exchange mission in the Soviet Union.

The ten years of Professor Bosch's tenure as director of the Division

of Public Health Engineering were marked by rapid growth and change in character of the program. The number of students increased rapidly as did the course offerings. Instruction particularly suited to the several professional groups within the School of Public Health was developed and closer working relationships were established with other parts of the University offering instruction of value to students in the field of sanitation. Notable in this regard were the relationships with the Division of Sanitary Engineering in the Civil Engineering Department in the Institute of Technology and with the Food Technology group in the Institute of Agriculture on the St. Paul Campus. A man with vision of the role of sanitation and the recognition of the emerging problems, Professor Bosch was able to develop within his division a special program on control of air pollution under the direction of Professor *Harold Paulus* and to make a beginning on a program for control of radiation hazards, a program developed in close collaboration with the Department of Chemical Engineering in the Institute of Technology.

Of special significance to the development of the program in Public Health Engineering (later changed to Environmental Health), was the collaborative relationship that Professor Bosch developed with the University Health Service. In 1949, Dr. Ruth Boynton, then Director of the Health Service, had recognized the importance of developing within the University an active program for control of environmental hazards, problems almost universally neglected within colleges and universities throughout the country. To head up such a division in the Health Service, Dr. Boynton had brought to the University Professor *Richard G. Bond* who, while a member of Iowa Health Department, had been so helpful during the war years and had, in the meantime, gone to Cornell University as Assistant Professor in Sanitary Engineering. With a clear vision of the importance and role of environmental sanitation in a university setting, Professor Bond, under the direction of Dr. Boynton (later Dr. Cowan), and with the enthusiastic support of Professor Bosch, succeeded in developing a control program that brought to him well-deserved recognition, both in this country and abroad. This was truly a pioneering program that has since been copied in many other universities.

The development of this active program within the Health Service provided unique instructional facilities for the School. Professor Bond and his colleagues held joint appointments in the Health Service and

the School, the former as a service activity to the University, the latter in an instructional capacity. Active service programs were developed in control of a wide variety of environmental problems, including water and food sanitation, air pollution, radiation hazards, accident prevention, laboratory safety, occupational hygiene, housing and hospital sanitation. These varied programs provided ideal teaching facilities for the School, which was able to combine its teaching of theory with everyday practice. Although close working relationships were continued with the State Board of Health, the availability of practical work through the Health Service greatly reduced the demand upon the staff of the State Health Department, since the University now had an active ongoing service program in Environmental Health. Thus, by 1960, the State Health Department, which had played such a vital role in the establishment and early development of the environmental health program, now played a somewhat secondary but still very essential role. Without the Department's early support and active collaboration, however, the program could never have been started.

Professor Bosch's wartime and international experience had made him keenly aware of the problem of water supply as a factor in not only public health but also the economic development of many nations. This vital interest found expression in 1959 in the establishment of a unique summer course on ground water development made possible by a grant, and later a contract, from the ICA (later AID) program of the Department of State. Under this program, engineers selected by their respective countries but supported either through AID or WHO grants were brought to the University for a ten-weeks summer program in Ground Water Development. As this has developed throughout the years, it has provided instruction for over 200 engineers from over 50 countries, engineers who on their return are responsible for water supply developments. The courses have consisted of six weeks of formal academic work on the campus, supplemented by four weeks of field training conducted at the Forestry Experiment Station in Cloquet where the men have had the opportunity of getting out into the field and applying the theoretical knowledge that they gained from the first part of the course. The School has also assumed responsibility for developing a comparable course at the University of Colombia in Bogota, having twice sent staff to Bogota for the conduct of the program and assistance to the local personnel in development of a continuing course that can be offered

Richard G. Bond

in Spanish for engineers not prepared to come to the United States. The success of this has resulted in the establishment of an AID contract whereby the School assumes responsibility for the development of future courses in both Asia and Africa. This program in Ground Water Development, envisioned and initiated by Professor Bosch, has indeed placed the School in a unique position as a collaborator in international health. Much of the success of this program has been due to Professor *Rexford D. Singer,* who, under the direction of Professor Bond, has assumed immediate responsibility for its conduct both at the University and overseas.

With the sudden death of Professor Bosch in September 1962, responsibility for the Environmental Health Division was transferred to Professor Bond who accepted full-time appointment in the School in November. During the previous 13 years, while in charge of the environmental health program of the University Health Service, Professor Bond had worked in such close collaboration with Professor Whittaker and later Professor Bosch that separate identity of their programs was hardly discernible. Thus, the death of Professor Bosch, though tragic in the loss to the School and the field of public health, did not result in interruption of the programs he had developed or envisioned.

Under Professor Bond's direction, the division has grown both in size and in the character of its programs. Coordination with the Health

Service program in Environmental Health and Safety, now under the direction of Professor *George Michaelsen,* has been continued as before and possibly with even closer cooperation. The establishment of enlarged research laboratories, for which the Health Service provided the space, has made possible the rapid expansion of research activities and the development of doctoral programs. A unique program in Hospital Engineering is slowly taking shape as is an expanded program in control of radiation hazards. By 1966, the environmental health program, which had all but disappeared by the end of World War II, had grown to accommodate 60 students, 15 of whom were on their doctoral programs. From a non-existent research program in 1946, research activities made possible by laboratories in the Mayo Building and the Health Service had developed to the point of attracting grants of more than $660,000 per year. A special limnological station had been developed on Lake Superior in collaboration with the Department of Biology of the University of Minnesota at Duluth and special training programs which had attracted federal support had been established in the fields of air pollution, radiological health, sanitary biology, accident prevention and hospital engineering. From a simple beginning, supported almost entirely as a side activity of staff of the State Health Department, the program in Environmental Health had truly become of age and today constitutes a major activity not simply in the School of Public Health but also in the College of Medical Sciences.

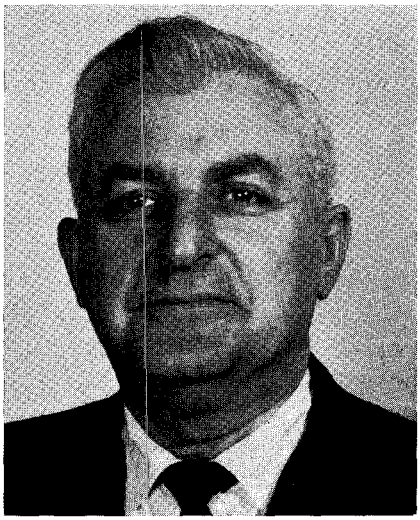
EPIDEMIOLOGY

The first formal University recognition of epidemiology as an academic subject appeared in 1922 with the creation of the Department of Preventive Medicine and Public Health. At that time, an elective course in epidemiology was developed, responsibility for instruction being shared by several members of the Department as well as by staff of the State Department of Health. With the establishment of formal graduate training programs in 1936, this course, which until this time had been limited to lectures and discussions, was directed toward medical and nursing personnel, with development of a separate course for engineers. The transfer of Biostatistics into the Department of Preventive Medicine and the influence of Dr. Maxcy (later Dr. Anderson) resulted in the incorporation of laboratory exercises of a statistical nature as an integral part of epidemiological instruction. Much of this was temporarily dis-

continued during the war years but was revived immediately post war. By this time, however, the idea of separate courses for different groups of students at the graduate level had been discontinued, all students working on a master's program being required to take the same basic course in epidemiology. Conduct of laboratory work was, however, seriously hampered because of lack of physical facilities, a limitation that continued until the occupancy of the new Mayo Memorial building in 1954.

Throughout this period, instruction in epidemiology had been carried by staff who had concurrent responsibility for other types of teaching. In 1950, the appointment of Dr. *Franklin Top* as Professor of Epidemiology, with joint appointment in the Department of Pediatrics, marked the first recognition of this subject as a separate discipline within the School of Public Health. Dr. Top was well known nationally from his role as Medical Director of the Herman Kiefer Hospital for infectious disease in Detroit. With a sound pediatric background and clinical orientation, Dr. Top had at the same time a broad epidemiologic training which had been reflected in extensive epidemiologic and clinical studies. At the time of his appointment at Minnesota, he was already one of the three or four best known persons in the field of infectious diseases in the United States. Unfortunately, his stay at Minnesota was brief for, in 1952, he accepted appointment as Chairman of the Department of Hygiene and Preventive Medicine at the University of Iowa, where he developed not only an outstanding teaching program but pioneered in the establishment of a unique Institute of Agricultural Medicine. While Dr. Top provided stimulating instruction in epidemiology, his stay at Minnesota was too short to permit him to do more than help lay the foundation for future developments.

Dr. Top was succeeded in 1954 by Dr. *Leonard M. Schuman.* A graduate of Western Reserve where he had done graduate work in bacteriology and public health, Dr. Schuman had served as an officer of the Public Health Service in charge of a community nutrition study and later as Director of the Divisions of Venereal Disease Control and of Preventive Medicine of the Illinois State Health Department, positions in which he had established himself as a highly competent scholar and an imaginative investigator. At the time of his appointment, he was being courted by several state, national and international agencies. His appointment at Minnesota marked the real beginning of specialized



Leonard M. Schuman

graduate work in epidemiology as well as the development of an active research program.

In the early days of Dr. Schuman's tenure, instruction in Epidemiology had been offered merely as an essential component of graduate work in various fields of public health. While new courses were developed, the basic concept of the unit was incorporation of epidemiologic instruction as part of the basic master's program of all students. Development of advanced training in Epidemiology was made possible in 1957 through a federal grant for preparation of epidemiologists. Through this grant, funds became available not only for staff expansion but also for stipends for students who might be engaged in post-master's programs. This led logically to the recognition of Epidemiology as a separate discipline within the Graduate School in 1958 and approval of a program leading to the Ph.D. degree. This constituted the first time in the country that Epidemiology had been recognized as a distinct academic discipline, study of which might lead to a Ph.D. degree. In certain schools of public health, epidemiology had been recognized as leading to a doctor of public health degree but not to the Ph.D. through the Graduate School.

This recognition of Epidemiology as an academic entity worthy of doctoral status in graduate study was accompanied by expansion of a research program that had been initiated coincidental with Dr.

Ruth E. Grout

Schuman's appointment. Federal research funds soon became available for studies in leukemia, toxoplasmosis, congenital defects and for expansion of existing studies on silo-fillers' disease. At the same time the program began to attract advanced students from both the United States and abroad. Epidemiology, beginning in 1922 as a subject to be taught through a series of semi-connected lectures dealing with specific diseases, had become of age in Minnesota as an academic discipline with a set of basic principles and procedures applicable to the study and understanding of the occurrence of disease.

HEALTH EDUCATION

Formal instruction in Health Education began in 1942 when Dr. *Ruth E. Grout* was appointed jointly in Public Health and the College of Education. Her arrival in the University was, however, delayed a year because of a request for her services in Washington during the early years of World War II. A graduate of Mount Holyoke with a doctoral degree in education from Yale University, Dr. Grout had for 6 years directed a program of community health education in Cattaraugus County, New York, under the Milbank demonstration. Following this, she had served for three years as an educational consultant with the Tennessee Valley Authority. She was known not only for the success of these assignments but also for her writings.

The joint appointment was envisioned as providing instruction on educational techniques for students in Public Health and on school health problems for students within the College of Education, including the required instruction on school health and advanced course work for selected students on the graduate level. Unfortunately, the hopes for her role within the College of Education were not realized. Instruction in health of the school child required a medical rather than an educational approach, while at the graduate level, the College of Education failed to take advantage of the unique talents and background possessed by Miss Grout, preferring to assign responsibility for this instruction to staff with a background in women's physical education rather than public health. The required course on Health of the School Child was ultimately discontinued by the College, leaving the students with no more knowledge of health than could be gained from the required general course on Personal and Community Health. Unfortunately, this could not provide the requisite technical knowledge to prepare the future teacher or administrator for the health responsibilities that he would ultimately have to assume. With the discontinuance of the course on school health as a requirement of all students in the College of Education, nothing was provided at the graduate level for those who as principals or superintendents would be administratively responsible for such programs, the few courses that were available through the College being heavily oriented to physical education rather than to health maintenance.

In the meantime, the health education work within the School of Public Health proceeded slowly, attracting a small number of students from widely scattered parts of the United States and overseas. The students majoring in this program were trained to work in public health agencies as part of or as directors of the educational program of the agency. At no time did the enrollment become large, due essentially to the fact that the School attempted to adhere to somewhat higher academic standards than characterized similar programs in several other universities. Out of the large number of those who sought admission, less than one applicant in ten was accepted as meeting the minimum standards of either the School of Public Health or the Graduate School.

Much of the difficulty in this program came from the fact that, in contrast to the other professional groups, those seeking admission in Health Education presented no uniformity of background. Those com-

ing from overseas were largely physicians whereas those applying from the United States had such diverse backgrounds as journalism, nursing, biology, psychology, sanitation or education. A high proportion of the applicants had had no experience in community work and obviously required a longer period of study than did those who had been working a number of years in public health programs. In too many instances, those applying had achieved little if any success in their own area of work and were hopefully turning to health education as an escape. In an attempt to attract better students into this area, the School developed a two-year program for those coming directly out of college and lacking experience. Unfortunately, however, the number of promising students who could be interested in this type of program was disappointingly small.

Throughout these years, Dr. Grout was alone in the development and teaching of this program. The students whom she trained were highly successful, occupying positions of major responsibility in the United States and foreign areas. At the same time, she provided instruction in Health Education to all other students in the School of Public Health, the School believing some knowledge of education to be so essential that it should be a required part of any master's program regardless of the primary professional focus of the student. Although this instruction was not popular among students while in school, there was an almost uniform change of mind when the student got out on the job, finding that of all the courses taken within the School this had in reality been one of the most valuable.

In 1963, the health education staff was increased by the appointment of Mr. *Norman Craig* who, with the retirement of Miss Grout in 1967, will take over direction of this program. A graduate of the University of California, Mr. Craig had spent over 11 years in various parts of Latin America as a part of the staff of the Pan-American Health Organization. During the last four of these, he had been director of the Organization's health education program and had established for himself a role as one of the real leaders in health education on the international scene.

HOSPITAL ADMINISTRATION

The establishment of the course in hospital administration at Minnesota resulted from the interest of the Kellogg Foundation, which con-

ceived the idea that a number of programs of this character should be established as a part of Schools of Public Health. The University of Chicago and Northwestern University had for several years conducted such programs but allied with their schools of business administration and thus oriented more toward the business aspect of the hospital than toward its role as part of the broad community program of health care. It was the thought of the Foundation that, if the hospital is to play its proper role as a community agency, it should be closely allied with the public health program and that, therefore, those who are to administer the hospital should have in their professional background adequate training in and understanding of various aspects of the community health program.

With this thought in mind, the Kellogg Foundation during the early 1940's, when the United States was still engaged in World War II, approached several universities, including the University of Minnesota, with offers of financial assistance to help initiate graduate instruction in the field of hospital administration. At the University, the Department of Preventive Medicine and Public Health of the Medical School had been changed into the School of Public Health but so large a fraction of its staff was absent on military duty that delay until the end of the war seemed imperative. Early in 1946, however, the Foundation made a specific offer of $20,000 a year for three years to help establish a graduate program in Hospital Administration. With preliminary clearances from the Administrative Committee of the College and the Board of Regents, Dr. Anderson and Mr. Amberg, Superintendent of the University Hospital, traveled to Battle Creek for conferences with Mr. Graham Davis of the Foundation, following which a formal decision was made to establish such a course and to place it as a division of the newly created School of Public Health. The first students were admitted to this program in the fall of 1946.

Mr. *James A. Hamilton,* then Director of the New Haven Hospital, was named as director of this program upon suggestion of the Kellogg Foundation. A Dartmouth graduate who had served jointly on the staff of the Tuck School of Business Administration at Dartmouth and superintendent of the Mary Hitchcock Memorial Hospital, Mr. Hamilton had later served as superintendent of the Cleveland City Hospital before going to Yale. Recognized nationally as one of the leaders in the field of hospital administration, Mr. Hamilton was at the same time

James A. Hamilton

actively engaged in hospital consultation work. He came to the University as a part-time director with the understanding that he could devote the balance of his time to the development of hospital consultation. He brought with him one of his former Yale associates, Mr. *James W. Stephan,* then director of the Aultman Hospital at Canton, Ohio, and a graduate of the hospital administration program at the University of Chicago. Others, including Mr. *Hazen Dick* and Mr. *Douglas Kincaid,* later joined Mr. Hamilton in the hospital consultation work but closely allied with the program, even though at first lacking formal academic appointments. Mr. Stephan alone came as a full-time member of the University staff but as years passed he, too, shifted onto a part-time basis, devoting the balance of his time to hospital consultation in collaboration with Mr. Hamilton.

The program, which began in the Fall of 1946, was planned to encompass two years of graduate study in the School of Public Health rather than in the Graduate School, inasmuch as it represented professional training comparable to that which is associated with other professional schools. The first year was planned as one of formal courses, partly in hospital administration and partly in public health, thus giving the student a somewhat broader appreciation of medical and public health points of view than would have been possible had the program been centered in the School of Business Administration. The year of

formal academic study was to be followed by a year of administrative residency, the student being assigned to work in a hospital under the personal direction of an administrator who had been carefully selected to serve as a clinical preceptor. With the beginning of the program in the fall of 1946, 11 students were selected and completed their work in June 1948, being awarded the degree of master of hospital administration. The decision of the University to create this new degree was based upon the feeling that it would more clearly portray the background of the student than was possible were he to be awarded the degree of master of science or master of public health. Minnesota was the first university to use this degree.

From this small beginning in the fall of 1946, during which time neither Mr. Hamilton nor Mr. Stephan was in permanent residence, the program grew rapidly, quickly reaching the point at which the number of applicants far exceeded the number of students that could be accepted. When in 1949 the initial three-year grant from the Kellogg Foundation terminated, the program was so well established that it was taken over by the University. Fortunately, however, the Kellogg Foundation continued to provide supplemental support for specific projects within the program, such support continuing until 1967. Without this initial and continuing support, the program could never have been established nor could it have grown as it did during these years to a role of leadership among universities offering this type of study. During ensuing years, the number of students steadily increased to the point when, in 1966, 40 new students were selected from about 250 qualified applicants. By the end of the 1965-66 academic year, 499 students had completed their programs and were occupying positions in every state as well as many foreign countries. Students had come not only from almost every state but also from many foreign countries including Brazil, Canada, Chile, Colombia, Finland, Iran, Korea, Mexico, Nepal, Peru, Philippines, and Scotland. Selection as one of the clinical preceptors had become a true mark of distinction among hospital administrators and graduates of the program were serving not only as administrators of some of the leading hospitals in the country but also as directors or staff members of other university programs in hospital administration.

As the program progressed during its second decade the need for development of more advanced programs of study became apparent. A program that led merely to professional training but without the stimulus

of collateral research could be thought of academically as only half a program, not truly worthy of academic recognition at the graduate level. The role of the hospital as an integral part of a broad community-wide program of health care rather than as a closed institutional unit was becoming increasingly apparent and there was need for development of scholars who might play a future role in the study of the hospital in its relationship to the total community.

With these thoughts in mind, a plan was evolved for the development of an advanced program of study and research which would lead to the Ph.D. degree through the Graduate School. This idea found enthusiastic support from the Kellogg Foundation which, beginning in 1961, provided a series of generous stipends to support students engaged in doctoral study.

The idea of a doctoral program likewise found support and acceptance within the Graduate School, though there were legitimate questions as to its true nature and identity. There were those who felt that "Hospital Administration" was a misnomer and might better be replaced by such terms as Medical Economics or Medical Sociology inasmuch as the focus of the program was directed toward the role of the hospital in its relationship to the community and not to a study of internal management problems. Although, in retrospect, one might argue that the program might better have been called "Health Care," the term "Hospital Administration" seemed at the time most suitable in that it involved the work of a unit of the University already clearly recognizable administratively. Approval of this program by the Graduate School contained, however, the clear stipulation that the area of research study by doctoral candidates should be community oriented and not deal with problems of management. As a consequence, the program was placed under the direction of the Graduate School Division of Social Sciences, and later transferred to the new Division of Allied Health Sciences. At the same time, initial provision was made for joint advisors, one from the field of hospital administration and the other from one of the social sciences, a provision that, as time passed, was not strictly observed.

The creation of this program and its administration within the Division of Hospital Administration under the aegis of the Graduate School initiated interest in a phase of public health that had been, and to a high degree still is, badly underdeveloped within the School, namely

health care administration. It brought into the School staff oriented more toward the community health problems than toward the hospital, staff with a social science background and capable of and interested in pursuit of studies in the realm of community health care needs and service. For some years, even before the creation of the doctoral program, the senior medical students and students throughout the School of Public Health had been given limited instruction in the social and economic aspects of medical care. Establishment of the doctoral program meant a far greater development in this area. The School has recognized the need for a strong program in this area which is receiving increasing attention on the national level. While progress has been made through the courses developed in connection with the program in Hospital Administration, there is still a serious need for further development in this area and very possibly the creation of a separate unit in health care administration closely allied with but no longer a part of the Division of Hospital Administration, which would remain as a unit for professional development of hospital administrators. The retirement of Mr. Hamilton in 1966 paves the way for possible development of a separate division of this character.

While the arrangement for part-time direction and a staff that was so largely on a part-time basis had its elements of weakness, it did at the same time provide many advantages in that it kept the program from becoming too theoretical and "ivory towerish." The close relationship with staff of the Hamilton Associates engaged in hospital consultation work throughout the country provided to the students a continuing guidance from persons who were seeing current hospital administration problems under the widest variety of circumstances. The material that could thus be brought into the classroom for student discussion and the opportunity that the students had for personal conferences with persons actively studying such problems provided an unique and highly valuable addition to the program. It did, however, have the disadvantages that are inherent in any part-time arrangement, the same disadvantages that had been experienced in medical education and had been the basis for the transition from part-time to full-time clinical faculty. With the retirement of Mr. Hamilton in 1966, plans are underway for transfer of major academic responsibility to a full-time basis, supplemented by part-time appointments of persons engaged in hospital consultation or administration.

LABORATORY OF PHYSIOLOGICAL HYGIENE

The Laboratory of Physiological Hygiene had its origin in 1937 when Dr. *Ancel Keys* was appointed Associate Professor (full professor in 1939) of Physiology in the Medical School with joint appointment in Men's Physical Education. Dr. Keys came to Minnesota with a background of academic positions in physiology and biochemistry at Cambridge (England) University, Harvard, and the Mayo Clinic, recent experience in research on physical activity and high altitude physiology, and convictions about the need for work on human physiology as applied to the preservation of health. This area of study was promptly translated as "Physiological Hygiene" and suitable laboratories were developed in Millard Hall, special equipment being donated by local firms or built in the basement workshop.

Although from the outset Dr. Keys and his associates recognized that physiological hygiene should be concerned with the many variables of the environment and the mode of life, the initial emphasis in the fledgling division was on the lessons to be learned from the physiological responses to physical activity and to alterations in the inspired air. Among the physiological parameters, primary attention was given to cardiovascular and pulmonary function. The obvious relevance of this work to physical fitness was recognized by responsible officers in the War

Ancel Keys

Department long before the United States entered World War II and resulted in requests for studies of immediate military importance. This early recognition by the military was to influence the direction of the research program and was to lead to rapid expansion in order to comply with the many requests for assistance.

In response to an appeal from the Army Quartermaster Corps for help in designing and testing rations to promote combat fitness, the focus of the Laboratory was soon directed to diet and nutrition. Experiments carried on by the Laboratory soon disposed of fanciful claims for vigor and endurance from vitamin preparations. Then, in the spring of 1941, in cooperation with the Army, it developed a combat ration for the parachute corps then being organized. This ration, later designated the "K Ration," was tested by the Laboratory in trials at Fort Benning, on Mount Rainier and elsewhere, and in 1942 became the official all-purpose and emergency combat ration of World War II.

Early in the war, in response to military requests, the work of the Laboratory turned to studies on vitamin deficiency, bed rest, heat stress, experimental malaria and fitness evaluation. In the search for human subjects who could be used in controlled experiments, the Laboratory, with the "peace churches," especially the Society of Friends and the Church of the Brethren, took the lead in obtaining permission from the Selective Service System for the use of conscientious objectors as "guinea pigs" in physiological experiments. By the latter part of 1943, the Laboratory staff, forecasting that starvation would be the major physiological problem of the war years and their aftermath, had decided that the most urgent need was to obtain experimental data that could be applied to the conditions expected to be met in populations grossly underfed as a result of the war. Using a group of conscientious objector volunteers housed in the Stadium and subjected to starvation diets, the Laboratory carried out the now famous Minnesota Starvation Study including a rehabilitation phase that extended into 1946, a study generally recognized as the classic work on the physiological problems of famine.

The urgent demands for more space for war related research had led in 1942 to the removal of the Laboratory from Millard Hall to hastily prepared "temporary" quarters under the University Stadium, a logical temporary and emergency location inasmuch as the Department of Physical Education at that time shared ultimate responsibility for its

support. While these quarters had been satisfactory for the immediate and pressing war-time needs of the Laboratory, as in so many comparable situations "temporary" soon became "permanent." In spite of two expansions and over a million dollars worth of overhead that the Laboratory was to bring to the University, the temporary quarters of 1942 are still occupied with no prospect of replacement or move. Equally serious was the fact that the University, in spite of the overhead that it had received, had assumed no responsibility for normal maintenance or upkeep, having been assured by the Department of Physical Education that all such costs would be borne by said department. Undoubtedly, this had been the department's intention when the Laboratory's interests were focused on physical exercise but the war-time shift of its studies toward nutrition carried little interest to Physical Education. When in 1946 the Laboratory, at its own request, was transferred into the School of Public Health, physical education felt its early promises of maintenance were cancelled, yet no provision was made for University assumption of responsibility comparable to that extended to other parts of the University and carried as a normal physical plant responsibility rather than as an assessment against departmental budgets. The inevitable result was a shocking deterioration in physical facilities which seriously impaired the Laboratory's potential efficiency and productivity in later years in spite of improvisations to make it livable most of the time.

With the war over, and a unique background of experience in nutritional studies, the Laboratory's interests were logically directed toward areas of peace-time importance. It was agreed that the major health problems of ensuing years in the United States would be those associated with an aging population, especially in what was recognized to be an emerging epidemic of coronary heart disease. Accordingly, 300 middle-aged business and professional men in the Twin Cities were enlisted in a long-time followup study of cardiovascular degeneration (CVD), with a view to observing the aging process and the antecedents of coronary heart disease in initially healthy men. This group has been followed with annual examinations for over 20 years during which time they have been subjected to a wide range of physiological and chemical tests. The pattern of this study has been adopted in many other studies, including the Framingham Study of the Public Health Service. From this approach, with consistent results from all of these programs, including

the Minnesota CVD Study, have come the identification of certain risk factors, especially serum cholesterol concentration, that currently dominate the thinking on the problem of prevention of coronary heart disease.

In an effort to provide facilities and subjects for controlled dietary studies, the Laboratory organized a metabolic unit (to accommodate 30 men) at the Hastings State Hospital in the late 1940's. There, until 1963, when the unit was transferred to the Faribault State School and Hospital, controlled dietary experiments were continuously carried out on the effect of the diet, especially the constituent lipids, on cholesterol and fat metabolism. From that work came practical, quantitative answers, confirmed elsewhere, about the effects of the various fatty acids and dietary cholesterol on serum cholesterol in man. The scientific developments in this field, in which the Laboratory has played a key role, have already had significant repercussions in the food industry and on practical thinking about the possible control of coronary heart disease by dietary adjustment. In 1966, the locus of this program was moved from the State hospitals to rented apartments near the Stadium, with students serving as the subjects.

These several studies utilizing the epidemiological approach which started with the C.V.D. program led naturally to the question as to whether the findings in the controlled dietary experiments have their counterpart in free-living populations, that is, in the "experiments of nature" which may be found in suitably selected parts of the world. A year of preliminary studies in England, Italy and Spain not only yielded a qualified affirmation, but also led directly to the thesis that populations differ greatly in the frequency of coronary heart disease and that a major explanation for these differences is provided by the character of the diet and its effect on the level of cholesterol in the blood.

This thesis was long attacked, not only by statisticians skeptical of vital statistics and of imputing cause and effect to what might be mere association but especially by food industries that had vested interests at stake. The preliminary studies in England, Italy and Spain served as a pattern for the subsequent development of studies in Finland, Greece, Hawaii, Japan, South Africa and later Yugoslavia. These several studies involved the establishment of temporary overseas research facilities equipped and staffed from the Laboratory. The results of these several studies, confirmed by other investigators, provided answers to some of the critics and strengthened the thesis of a dietary relationship to coro-

nary disease, a thesis that has become a major factor in all discussions of the epidemiology of coronary disease and possibilities of its control.

Still, all of these explorations by the Laboratory and other groups, suffered from the limitations of ill-defined samples and lack of follow-up studies on incidence. In an effort to remedy these defects, in 1957 the Laboratory organized international research teams to develop and test a standardized protocol for examination and study of middle-aged men in rural areas of Italy and Greece. The success of these trials allowed the initiation of a series of international long-term projects, coordinated by the laboratory in Minnesota, on the epidemiology of coronary heart disease. In 1958, this systematic program began in two areas of Yugoslavia (Dalmatia and Slavonia) and, in parallel, with a study directed by Dr. Henry L. Taylor on employees of twenty railroad companies in the United States.

This Cooperative International Program on the Epidemiology of Cardiovascular Disease was extended over the years 1959-63 to cover a total of over 12,000 men in 18 population samples in Finland, Greece, Italy, Japan, the Netherlands and the United States. By the end of 1966, 5-year follow-up re-examinations had covered 11 of these samples and the plan was to extend the follow-up to ten years. The results clearly showed great differences in the incidence of heart disease in the several populations and indicated that these differences are related to the character of the diet and corresponding differences in the concentration of cholesterol in the blood serum. This program has been impressive in the high degree of cooperation obtained in the different areas; over 95% of all eligible men became volunteers in most of the population samples.

In response to the facts and ideas about the epidemiology of coronary heart disease to which the Laboratory contributed so much, the Public Health Service in 1963 sponsored the "National Diet-Heart Study" to test the feasibility of large-scale dietary adjustments for middle-aged Americans. This D-H Study, conducted in the Twin Cities and in four other metropolitan areas in the United States, was completed in 1966. It is too early to forecast the likelihood of a full-scale sequel of a 5-year trial with 50,000 more American families but it is already clear that the results from this National Diet-Heart Study will long influence public health thinking about the role of the diet in efforts to prevent coronary heart disease.

In spite of so much emphasis on diet as a controllable factor in physi-

ological hygiene, the Laboratory never abandoned interest in the role of exercise and physical activity. Attention to this question has been included in the international cardiovascular program and a major purpose of the study on railroad employees was to contrast men in occupations differing in their requirements for physical activity. In the Laboratory itself, experimental studies on the physiology of exercise and the effects of training have been continued and have led to systematic efforts to develop an "experimental epidemiology" approach to the study of exercise with a view to the possibilities of this approach to the prevention of coronary heart disease.

In the course of its various studies, the Laboratory has directed its research interests into numerous related areas of investigation. Of special importance have been the electrocardiographic studies conducted over many years by Dr. *Ernst Simonson* with the collaboration of Dr. *Henry Blackburn* and many research fellows and associates. Besides much theoretical work, the Laboratory has taken the lead in providing quantitative standards in electrocardiography and has produced the "Minnesota Code," a classification system now widely used internationally. Similarly, the Minnesota Starvation Experiment involved problems of estimating the composition of the intact human body and led to extensive work on densitometry and the measurement of subcutaneous fat thickness. Through these and related studies, the Laboratory has been active in the development of concepts concerning body composition and methods for its study.

Though the Laboratory has been primarily a research unit, it has contributed significantly to the teaching within the School of Public Health, carrying responsibility for several courses in nutrition, a seminar on public health aspects of cardiovascular diseases and a periodic course on the physiology of exercise. Because of its early connection with the Department of Physical Education, the Laboratory for more than 20 years was responsible for courses in physiology for physical education majors and still serves in an advisory capacity in such courses. But the major teaching contribution of the Laboratory has been in the direction of post-graduate and especially post-doctoral training. In spite of severe space limitations that have restricted acceptance of such students, the Laboratory has provided extended specialized training to over 60 scholars, many from foreign lands, who have participated as post-doctoral research fellows on various research programs. Many former research

and medical fellows in the Laboratory currently occupy responsible positions in other lands—Japan (6), Finland (3), Italy (3), Yugoslavia (3), France (2), Brazil, Chile, England, Greece, Guatemala, India, Mexico, Norway, the Philippines, Poland, Sweden, Switzerland and experience in epidemiological field work has also been provided to scores of young doctors in countries where the Laboratory has been conducting its field research programs, doctors who, by participating in the studies, have gained an insight into research methods.

From its inception, the Laboratory has been staffed on the concept that Physiological Hygiene is an interdisciplinary science drawing upon the contributions of physiology, biochemistry, psychology, anthropology, clinical medicine and public health. In keeping with this philosophy, it has enjoyed the active participation of scientists of quite diverse professional backgrounds, some of whom after several years on the staff of the Laboratory have gone to positions of major responsibility in other institutions.

Current long-time members of the senior staff of the Laboratory besides Dr. Keys, who continues as director, include Dr. Henry L. Taylor, the assistant director who joined the Laboratory in 1939, Dr. Ernst Simonson, Dr. Francisco Grande, Dr. Joseph T. Anderson, and Dr. Henry Blackburn. Former senior staff members include Dr. Olaf Mickelsen, now Professor of Nutrition at Michigan State University, Dr. Austin F. Henschel, now director of a research division on environmental health in the Public Health Service, Dr. Carleton B. Chapman, formerly Professor of Medicine at Texas Southwestern Medical School, President of the American Heart Association and now Dean of the Dartmouth Medical School, and Dr. Josef Brozek, now Professor of Psychology at Lehigh University.

Publications from the staff of the Laboratory include six books and monographs and over 600 technical papers in the scientific literature. Staff members are also active in editorial work; currently the Laboratory is represented on the editorial boards of over a dozen major scientific and medical journals.

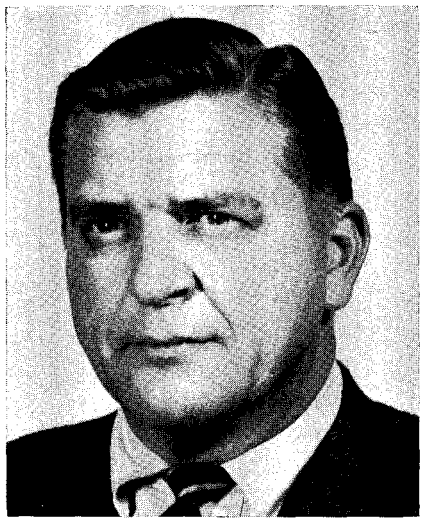
MATERNAL AND CHILD HEALTH

With the establishment of a separate Department of Preventive Medicine and Public Health in 1922, instruction in Maternal and Child Health was made a part of the course offerings at the undergraduate

level. A professional course was incorporated into the program for public health nurses and a more popular one made available as a general elective, taken largely by presocial work students in the College of Science, Literature and the Arts, as well as by students in the Institute of Child Welfare. Courses carrying graduate credit were not developed until 1938 as a part of the expanded program for training of health officers.

For many years, this instruction was carried as a part-time responsibility of Dr. *Ruth Boynton,* one of the original members of the Department of Preventive Medicine and Public Health, whose primary appointment was in the Student Health Service of which she ultimately became Director. From 1923 to 1927, Dr. Boynton had served simultaneously as Director of the Division of Child Hygiene of the Minnesota State Health Department. Because of her interests and availability and the high quality of her instruction, there was little incentive to change this arrangement even though it delayed the development of Maternal and Child Health as a major component of the School.

Simultaneously with the move into the Mayo Building in 1954, funds became available through the Children's Bureau which made possible the development of a full-time unit. In 1956, Dr. *Helen Wallace,* a nationally recognized leader in this field, who brought to the School a broad background of experience as well as a high degree of professional competence, was appointed Professor of Maternal and Child Health. An imaginative person with an intense drive, Dr. Wallace quickly developed a small but relatively short lived program, as after three years, she moved to the Children's Bureau in Washington and later assumed charge of the Maternal and Child Health program in the University of California, School of Public Health at Berkeley. After four interim years, marked by short temporary appointments, Dr. *Allyn Bridge*, at that time Director of Maternal and Child Health in the Minnesota State Health Department, assumed responsibility for this program. A medical graduate of Yale with specialized training in pediatrics, Dr. Bridge had developed an active pediatric practice in Minneapolis before shifting to public health work. He thus brought to the program of the School a point of view based on clinical as well as administrative experience. This orientation provided an important and much needed liaison with clinical pediatrics, a relationship that had lagged since the departure of Dr. Top in 1952. Dr. Bridge's service



Allyn G. Bridge

in the Pediatric Outpatient Department permitted more contact with medical students. Simultaneously, it was possible to develop a joint program with the clinical services. This latter was enhanced through a Children's Bureau grant to the Department of Pediatrics, which provided additional medical staff on joint appointments to help develop not only formal instruction but also demonstration community programs.

The funds provided through the Children's Bureau grant for the Maternal and Child Health program made possible its expansion within the School, providing positions for a nurse, a social worker and a nutritionist. This latter position was filled by Miss *Ruth Stief* who, like Dr. Bridge, transferred to the School from the State Health Department where she had had many years of experience in development of community nutrition programs. At the time of her appointment in the School, her services were being sought by the Children's Bureau as its consultant on nutrition for the Pacific coast and island areas. Working in close collaboration with the staff of the Laboratory of Physiological Hygiene and the School of Home Economics of the Institute of Agriculture, Miss Stief was able to develop an active and high quality graduate program for public health nutritionists, an area in which the School had been definitely weak until her appointment. The nursing position, filled successfully by Mrs. *Barbara Stocking* and Mrs. *Delphie Fredlund,* greatly strengthened specialized instruction of the

large public health nursing group, while the position for a social worker not only enriched the content of several courses but also, through joint appointment, served to bring the School into closer relationship with the School of Social Work. Thus, by 1966, the Maternal and Child Health program, which had developed slowly over many years, had ultimately been put on a firm full-time foundation and was ready for growth in the direction of teaching, research and community service.

PERSONAL HEALTH

As pointed out elsewhere in this chapter, instruction in personal health had been a part of the University curriculum from its very beginning, being required of all students. Originally, this instruction was offered by Dr. *Charles N. Hewitt,* first Secretary of the State Board of Health, who was appointed by the Board of Regents in 1873 as non-resident Professor of Public Health, a title later changed to Professor of Preventive Medicine and even later to Professor of Sanitary Science. At first, this instruction was required in the senior year but was later shifted to the freshman year. The subject matter covered was delineated in the University Calendar of 1874-5 as "Personal hygiene as depending on soils, water, air, food, clothing, etc.; public hygiene including sewerage and drainage of towns, heating, lighting and ventilation of dwellings and public buildings; epidemic diseases, intemperance and so forth." In addition to this course required of all students, Dr. Hewitt provided two elective courses on sanitation. Although Dr. Hewitt withdrew to Red Wing in 1897 following Governor Clough's failure to reappoint him as Secretary of the Board of Health, he continued his weekly lectures on personal health until 1901 at which time he relinquished his title as Professor of Sanitary Science.

With the discontinuance of Dr. Hewitt's lectures, responsibility for health instruction of the men passed to Dr. *L. J. Cooke* who had come to the University in 1897 as Director of the Gymnasium, in which capacity he had been providing a required program of regulated exercise labelled in the *University Bulletin* as Physical Culture. In this program, he had been assisted by *Jennings C. Litzenberg,* then a medical student who was later to become head of the Department of Obstetrics and Gynecology in the Medical School and one of the country's most prominent and influential obstetricians, a militant leader of the school for conversative obstetrics. As assistant and later instructor in Gymnastics,

Dr. Litzenberg continued his formal association with Dr. Cooke until 1909, carrying much of the responsibility for the lectures on personal health, lectures that were required for the men as a part of their program of physical training. During this period the instruction, though required, was not accorded normal academic recognition, as a department of physical education had not yet been established.

While Dr. Cooke and Dr. Litzenberg were providing instruction in personal health to the men as a component of Physical Culture, the "lady students" were provided merely with a program of calisthenics, first under the direction of *Louise G. Kiehle,* and later *Anna M. Buttner.* There is no evidence that instruction on personal health was incorporated into this course in Physical Culture for Women. In fact, the *University Bulletin* throughout this period states very frankly that "the purpose of this course is to develop a strong and symmetrical physique with a graceful and easy carriage."

In 1910, the programs for both men and women referred to as Physical Culture were retitled Physical Training but without apparent change in content or academic recognition. This came two years later when departments of Physical Education were created and formal courses identified by academic numbers established. Evidence of a change in concept is contained in the *Bulletin* for 1912-13 in which the perennial statement as to the purpose of the courses for women was replaced by the announcement that the course on "Physical Education for Women . . . is under the direction of a Health Officer—a woman trained in medicine, but not engaged in practice,— among her duties to give a physical examination to the women students at the beginning of each year . . . to give instruction in hygiene to the entering class; to give sanitary inspection to lodging houses; to examine into cases of illness in the dormitory and lodging houses . . .". Some of these duties were obviously forerunners of those assigned to the Student Health Service when it was created seven years later.

To carry responsibility for these many duties, Dr. *J. Anna Norris* was appointed as Assistant Professor of Physical Education for Women, a post which (with appropriate changes in academic rank) she continued to occupy until her retirement in 1941. With the appointment of Dr. Norris came the establishment of a variety of elective courses ranging from Hygiene of the Family ("hygiene of maternity and infancy and the essentials of home nursing") to Social Dancing. At the same

time, in keeping with her announced duty, "to give instruction in hygiene to the entering class," she established a course on Preliminary Hygiene covering "the most essential aspects of the care of the body." While this was required of the women and contained an "examination at end of course," it carried no academic credit, quite in contrast to the elective courses on Personal Hygiene (3 credits) and Hygiene of the Family (3 credits) offered for the upper classes.

In the meantime, with establishment of a Department of Physical Education for Men, the component of health instruction that had been included in the required physical culture program was separated out as a numbered course, required but carrying no credit, even though it also included a final examination. From its beginning, it had contained a substantial component of sex hygiene, a topic supplemented in subsequent years through "a special sex hygiene lecture . . . given during the first ten days of the autumn semester, with required attendance on the part of all freshmen" (*SLA Bulletin* 1913-14, p. 123). For many years, this lecture was given by Dr. Litzenberg even after his official connection with Dr. Cooke and the Department of Physical Education had been discontinued or by Dr. *Henry L. Williams* who, in addition to his duties as football coach, maintained a private practice of medicine with offices in what is now known as "Dinkeytown" (14th Ave. S.E.). In these sex lectures, so much emphasis was placed on the horrors of venereal disease that student gossip attributed to Dr. Litzenberg and Dr. Williams a friendly rivalry to see which could cause the greater number of freshmen to faint during the lecture.

With the creation of the two departments of physical education and the academic responsibilities assigned to them, instruction in personal health was again accorded academic recognition. This recognition, which had continued from 1873 until Dr. Hewitt's retirement in 1901, had been lost when this instruction had been essentially submerged as a part of a course in required calisthenics for men and was not even recognizable in the course to promote the "graceful and easy carriage" of the women. Lack of academic credit for the personal health courses did, however, inevitably limit the respect and serious attention accorded them by the students. This situation continued throughout the ensuing 15-18 years, required but non-credit courses on personal health being given by Dr. Cooke for the men and Dr. Norris for the women.

Although the Regents' resolution of 1922 creating a Department of

Preventive Medicine and Public Health clearly indicated that it should have responsibility for these "health courses," they continued to be offered on a non-credit basis by the departments of Physical Education. In the meantime, the new Department of Preventive Medicine had established a three-credit senior college course on Personal and Community Health (PM & PH50) and in 1924 a two-credit junior college course (PM & PH3). Originally, these served as electives which could supplement whatever knowledge the student might have acquired from the Physical Education courses. As years passed, however, they came to be recognized as suitable substitutes for the Physical Education health course, this recognition appearing first with respect to the course for men but not until several years later for the Preliminary Hygiene course given to the women. During this early period, the Preventive Medicine courses also recognized a separation of the sexes, PM & PH3 being given originally only to the men but later providing for a separate section for the women.

These courses were first taught by Dr. Harold Diehl assisted by Dr. William P. Shepard, who was on the staff of the Student Health Service and was later to become Vice President for Health and Welfare of the Metropolitan Life Insurance Company and president of both the National Tuberculosis Association and the American Public Health Association. Responsibility was shared by many others including Dr. Leonard Larson, Dr. Laurence Cady, Dr. Harry de W. Lees and Dr. *William A. O'Brien* who in ensuing years was to develop state-wide stature as a leader in the teaching of personal health. A separate course on Increasing the Span of Human Life (PM & PH4) was developed in the 1920's by Dr. J. A. Myers, who in 1923 had transferred into the Department of Preventive Medicine and Public Health and was later to concentrate upon instruction in the field of his specialty, namely tuberculosis. By the end of the decade, the course in Men's Physical Education had been completely replaced by PM & PH3 but that for women continued through the academic year 1929-30 as a requirement for nurses and dental hygienists but was replaced for other students by the Preventive Medicine course. Thus, it is not until the beginning of the new decade, eight years after the Board of Regents had prescribed that instruction in health should be concentrated within the Department of Preventive Medicine and Public Health that this decision had been finally implemented.

In the meantime, the Department had developed a wide range of of courses designed primarily for the cultural development of students not professionally interested in public health but having in some instances a secondary concern as a complement to their area of primary interest. Courses dealing with mental health, tuberculosis control, maternal and child health and health of the school child were developed for special groups. Of special note was the course on Health of the School Child developed for the students in the College of Education and for a number of years carried as a requirement of that College. All of these courses were, however, carried as a secondary interest of the instructors, whose prime responsibility was of a clinical nature within the Student Health Service and who were not interested in making a career of this type of instruction. The result was inevitable, that responsibility for such courses was shifted rapidly from one year to the next with an inevitable degree of incoordination and lack of continuity. In some instances, they were well taught but in other instances were looked upon as an unfortunate duty that could not be avoided by the instructor whose major concern was elsewhere.

The first break in this came when Dr. *O'Brien,* who had joined the staff of the department in 1925, assumed responsibility for the big junior college course (PM & PH3) which to a very high degree was being used to satisfy a college requirement. Although Dr. O'Brien was not to give his full time to the development of this type of instruction, continuing his responsibility in the Department of Pathology, later direction of the course in Medical Technology and even later development of post-graduate medical education, he did have an absorbing interest in the problem of conveying technical information to a non-technical audience. This interest was further manifested through his development of radio programs, through both the University radio station (KUOM) and the Minnesota Medical Society. To the personal health courses, Dr. O'Brien brought a unique personality as well as a gift for lecturing and for public speaking. Blessed with an unusually outgoing personality, he was popular with students and staff alike and quickly became one of the best known instructors around campus. Meeting undergraduate students through his personal health courses and the public through the radio programs as well as his role as a popular after-dinner speaker, Dr. O'Brien came to be widely and affectionately known throughout the State. To most students, who

Stewart C. Thomson

were unaware of other courses given by the Department, Dr. O'Brien personified public health. In their thinking, his name was almost synonymous with it. His easy going, jovial personality was reflected in his courses and earned for him a tremendous following, which continued up to his death in November 1947. Throughout this period, his courses were, however, quite independent of the other activities of the Department of Preventive Medicine and Public Health, not because of any lack of interest on his part but merely because his physical location and his concern with post-graduate medical education made it difficult to extend his activities into the professional training program to which he could have contributed richly from his experience with health education of the public.

Immediately after termination of World War II, it became apparent that the increasing student burden and Dr. O'Brien's deteriorating health made it necessary to obtain the services of a second person for this program. This need brought to the University another unique personality, Dr. *Stewart C. Thomson,* who was destined to pick up where Dr. O'Brien left off and further develop an active program of health education at the University level. The son of a rural Illinois physician, he came from a Scotch Presbyterian background, was educated in the Byron, Illinois schools, did his college work at the University of Illinois and obtained his medical training at Loyola University of Chicago.

After his internship, he returned to Loyola as an Instructor in Anatomy and later was appointed as Assistant Dean, a position he held when he was called into military duty for World War II, serving under Dr. (then Lieutenant Colonel) Anderson, as liaison officer between the Division of Medical Intelligence of the Office of The Surgeon General and G2. His anatomical interests were coupled with an intense devotion to the study of medical history, particularly as related to the English and Scottish schools of medicine, an interest increased during several months spent at the University of Edinburgh just before the opening of World War II on leave of absence from Loyola. Few persons of the present day have been more devoted to this aspect of medical history.

While serving as Assistant Dean of Loyola, Dr. Thomson had become interested in the difficult and, to many persons, thankless task of imparting technical knowledge to the non-technical public and had become greatly impressed with the need for scientifically sound but popularly presented health instruction of the public. With this thought in mind, he had taken leave of absence from Loyola to attend the Harvard School of Public Health but was quickly called into military service and, after a brief orientation period, was assigned to the Medical Intelligence Division where he served with distinction as the medical department's representative on the G2 document panel.

With the end of the war, Dr. Thomson returned to Loyola as Acting Dean of the Medical School. Shortly after his own return from military service and seeing the need for relief for Dr. O'Brien, Dr. Anderson persuaded Dr. Thomson to come to the University in the Fall of 1946 to finish his studies for a master of public health degree and at the same time teach on a part-time basis, a position that continued until September 1947 when he accepted full-time appointment to work with Dr. O'Brien on the undergraduate personal and community health courses. With Dr. O'Brien's death two months later, Dr. Thomson took over full responsibility for this program, a position he still holds and in which he has advanced from the rank of Assistant Professor to full Professor and Associate Director of the School of Public Health. He also has continued Dr. O'Brien's weekly program over KUOM.

The appointment of Dr. Thomson put the instruction of the personal health courses for the first time on a full-time basis, as Dr. O'Brien's responsibility for Continuation Medical Education was assumed by Dr. *George Aagaard*. The change was one from an outstanding Irish per-

sonality to an equally outstanding Scotch personality, for rarely has there been a greater extrovert than either Dr. O'Brien or Dr. Thomson. Prepared to devote his full time to health instruction, Dr. Thomson gradually took over some of the other courses that had previously been farmed out to staff carrying only part-time appointments in the School and primarily interested in their clinical work in the Health Service. This shift in faculty responsibility gave greater coherence to the entire undergraduate program of health instruction and did much to raise the quality of teaching.

At the same time, it brought a change in the character of the courses for, with a Calvinistic background, Dr. Thomson operated on the theory that a course in health should not be a popular and easy subject, as in so many institutions, but should be taught with the same academic dignity and standards as would be demanded of a course in chemistry, calculus or the classics. With a sound classical background and his intense interest in history and literature, as well as a broad medical knowledge, Dr. Thomson possessed the unique capacity to interpret health in terms of not only the personal and community life of the individual student but also in relationship to the student's major academic interests. To the student majoring in history, or political science, he brought interpretation of the significance of health in the history of the nations and in their respective political, economic and social development. To the student with an interest in biology, he interpreted health as an essential biological phenomenon, while to the students in agriculture and engineering he was able to convey the importance of health measures in the development of present day agricultural and industrial technology. While an outspoken champion of high academic standards and a strict grader, Dr. Thomson, through his outgoing personality, quickly became one of the best known and best loved members of the University faculty. With a rare gift for remembering people and an intense interest in people, his courses became among those best remembered by the graduates who, after leaving the University have kept in touch with him far more than with other instructors. Many is the student who resented the requirement of a health course but on completion of it acknowledged it to have been one of the most interesting, valuable and stimulating courses taken throughout the four undergraduate years. His teaching was characterized not only by its content but by its method of presentation for, throughout his instruction, the personality of Dr. Thomson

was constantly present. His courses like those of Dr. O'Brien derived their value not only from what he said but from the way in which he expressed himself.

Intolerant of the student who tried to do as little work as he could and still stay in college, Dr. Thomson demanded accuracy as well as work. He was impatient with the student who was careless or slovenly with respect to such details as accuracy in spelling or use of good grammar or of the student who in his written work failed to apply to this course the material that he should obviously have learned in his other courses in the University. At the same time, few if any faculty have ever been so generous of their time with students for, although his courses have been enormous in size, he personally read student examinations and book reports and spent long hours with students who were having difficulties on mid-quarter examinations.

Unfortunately, much of this was an unnecessary burden because too many such students were merely seeking better grades rather than knowledge. In spite of such frustrations, Dr. Thomson has continued to give unsparingly of his time to student conferences, too often at the sacrifice of his own health and personal professional interests. His concern for teacher-student relationships was well exemplified by his practice of many years of sending a personal letter of congratulations to every student who received a grade of A in any of his courses. Many such letters are cherished and preserved by alumni of the University.

Over the years, Dr. Thomson has taught over 70,000 students at Minnesota, for a course in personal health was for many years required as a prerequisite to graduation from most of the undergraduate colleges or programs. So well known has he become through these courses, which each year are currently adding some 5,000 students to his record, that wherever he goes he finds former students who greet him as a beloved teacher. Whether in the stores of Minneapolis, on the train to his Illinois home, or on his numerous trips to Europe, Dr. Thomson constantly meets former "PH 3" or "PH 50" students who, while as students complaining of his strictness as a teacher, remember and greet him with an affection and regard rarely accorded to teachers by former students.

Unfortunately, this affection was not shared by a small but highly vocal student group which, throughout the years, complained of his strictness and adherence to high standards. To them (and all too often

to advisers in the College of Liberal Arts) a collegiate course in health was regarded in the same light as in the elementary and secondary schools where it is so commonly taught without regards for standards and consequently lacking the respect accorded to other parts of the curriculum. As a result, and in response to this agitation from the poorest element in the student body, the College of Liberal Arts, while professing to train the student for "life," ultimately removed the health requirement at the same time that other colleges in the nation were seeking assistance and advice from Dr. Thomson in the development of their courses. Fortunately, other parts of the University which required a health course did not follow the College of Liberal Arts in this backward step toward a college degree without an education.

PUBLIC HEALTH NURSING

Public Health Nursing instruction in the University began in the Fall of 1918, when the School of Nursing "responsive to the increasing demands for nurses qualified for service in public health fields" established a four-month course in public health nursing "with the cooperation of the American Red Cross, the Minnesota Public Health Association and the several social service and relief agencies of Minneapolis and St. Paul." Thirteen graduate nurses were accepted in this program for a study period running from November 1918 to March 1919. A second course, March to July 1919 attracted 19 nurses, among whom was Miss Pearl M. McIver who was destined to become the Director of Public Health Nursing for the United States Public Health Service. This program in the School of Nursing, under the immediate direction of Miss *Louise Powell* with the assistance of Mrs. *Dorothy Kurtzman,* continued until 1922 as a series of four-months courses offered twice each year and attracting an increasing number of students from not only the Midwest but also from distant states. By July 1922, it had provided instruction to 144 nurses, 7 of whom, on the basis of continuing work, had been awarded a Certificate in Public Health Nursing.

Effective with the academic year 1920-21, the four-months period was extended to a full academic year consisting of an eight-month course of two equal parts, the first devoted to Fundamental Principles and Practice, the second to "special phases." Three full days of each week were devoted to practical field work. The Certificate in Public Health Nursing was issued to those completing eight months of study. Admitted

Anna Mariette

to the program were graduates of recognized three-year training schools or "advanced senior students referred by recognized schools of nursing willing to accept the four months (first part) as a contribution to the training of their students." Field work was provided by several public health nursing agencies of the Twin Cities. While emphasis was being placed on the full academic year of training, most of the nurses entering the program limited their period of study to the first part dealing with principles.

With the establishment of a Department of Preventive Medicine and Public Health, the leaders of which has a vision of ultimate creation of a multi-discipline School of Public Health, the program in Public Health Nursing was transferred from the School of Nursing to this new department of the Medical School and the four-months course discontinued. At this time, Miss *Anna Jones* (later Mrs. Ernest Mariette), one of the early graduates of the four-months course, was appointed as Instructor in Public Health Nursing to direct this program within the newly-created department, a position that she occupied until the appointment of Miss *Eula Butzerin* in 1924. Mrs. Mariette continued for many years as an active leader of health programs in Minneapolis and the suburban area of Hennepin County.

The establishment of the program in the Department of Preventive Medicine and Public Health provided a degree of academic recognition

Eula B. Butzerin

that had been lacking within the School of Nursing. With this went the establishment of various courses carrying credit toward a bachelor's degree, which, at its outset, was placed within the College of Science, Literature and the Arts. Apparently, there was realization, however, that discontinuance of the four-months course deprived many nurses of a much needed opportunity for training, for short courses of limited scope were introduced into the 1923 summer session. These courses, serving a large group of nurses who were unable to get away from their home or employment for an academic quarter or year, attracted an increasingly large number of students for many years, ultimately dwindling in the 1960's.

When Miss Butzerin succeeded Miss Jones as director of the program, she brought to the course the idea of training not only the nurses who were to fill routine staff positions but also those who were to assume responsibilities of supervision and leadership in public health nursing work. Trained as a nurse at Presbyterian Hospital in Chicago and with a bachelor's degree from Teachers College of Columbia University, where she was currently on the staff, Miss Butzerin had had ten years of varied nursing and teaching experience in the Midwest as well as the East. She assumed direction of a course that at the time was being shifted from a four-months short course to a full academic year, though it was recognized that many of the students supposedly registering for

the academic year might remain in residence for only a four-month period. The nine-months course was, however, carrying academic credit and thus could lead to a bachelor's degree. Under her leadership, the course grew rapidly both in numbers and in areas served. In 1925, only 29 new students were registered for the regular year and only 28 attended the summer session. By 1930, the registration had already risen to 76 new students and 71 in the summer session.

Although the basic plan of the course was that of a full academic year credit for which would count toward a bachelor's degree, large numbers of students continued to come for only a portion of the year. So heavy was this latter demand that courses were developed for both extension and summer session, each year serving an increasingly larger number of students from a growing number of states. Thus, while the program was being aimed at a full academic year of study and received many students on this basis, it continued to serve an even larger number of students who were compelled to limit their period of study to a single academic quarter or even one five-week term of the summer session. Many of these did, however, return in subsequent years for additional periods of study, some ultimately completing their Bachelor's degree requirements. Unquestionably, the program, even with its recognized academic limitations, served a highly useful purpose in improving the quality of public health nursing throughout the upper Midwest.

In 1930, with changes in the curriculum requirements of the College of Science, Literature, and the Arts, the degree program was transferred to the College of Education, ostensibly to permit the nurses to qualify for teachers' certificates which would permit them, if employed in the public schools, to conduct classes in health in addition to their nursing duties. Here, the program rested until 1938 when it was transferred from the College of Education back to the Department of Preventive Medicine and Public Health in the Medical School, the students earning their bachelor's degrees through this latter medium. The usual student coming to the University with only a hospital nursing background had to stay in the program for two-and-a-half to three years to earn this degree. It was thus inevitable that only a few of these students would earn a bachelor's degree, the majority receiving only a certificate. Students who were receiving their education in the School of Nursing of the University and had thus had more formal academic work in basic science as well as collateral subjects could, however, earn the degree with only

one year of public health study after completion of their basic nursing training. These "five year" students were rapidly becoming more numerous, constituting a valuable core of well-trained younger nurses many of whom were to go on to nursing positions of major responsibility on the state or national level. By 1935, the number completing the degree requirements had markedly increased, at which time the award of a certificate was limited to those who at the same time received a degree or those who, previously possessing a bachelor's degree in nursing, now completed the additional year in Public Health Nursing.

Although still recognized as an undergraduate course in terms of academic credits, the Public Health Nursing program was becoming essentially post-graduate in concept, in that it provided specialized instruction beyond that which was possessed by the usual graduate nurse. Some recognition had been given to this additional knowledge through the award of bachelor's degrees to those who supplemented their nursing training by suitable academic work. On the other hand, there remained a group of nurses who carried responsibilities of a supervisory or administrative character, duties which were more truly characterized by training at the graduate level. In recognition of this, Dr. Diehl, as head of the Department of Preventive Medicine and Public Health, recommended in 1932 that Graduate School recognition be accorded to staff of this program and that suitably qualified nurses be admitted as candidates for a master's degree. It was not until this recommendation was implemented the following year that the first public health nurse enrolled in the Graduate School.

With this recognition, Miss Butzerin had indeed moved the program from one of a four-months refresher course through the intermediate stages of recognition as an element in undergraduate education to acceptance at the graduate level. When she had come to the University in 1924, she had assumed direction of a small course of only 35 students, mostly local and providing what was essentially supplemental training. Almost single-handed, and certainly without the assistance that her duties demanded, she had built the program into one of recognized national stature, attracting nurses from all parts of the country who came to Minnesota because of the reputation of the program and its director. During the academic year 1934-35, the program had served 106 nurses from 20 states and the special summer session course had attracted an additional 154 students from 18 states. During these years,

Margaret G. Arnstein

she had elevated the program academically to the point at which it was no longer a mere expedient to help meet urgent community needs, but had become an essential component of nursing education at the collegiate level. Miss Butzerin had become a widely recognized leader, helping to build public health nursing as a profession rather than a vocation. Announcement of her departure in 1937 was, therefore, received with general dismay and was looked upon as a severe loss and setback not only to Minnesota but also to the field of public health nursing education.

Miss Butzerin left the University to assume direction of a new graduate program at the University of Chicago that was conceived as leading to a Master's degree. She was succeeded at Minnesota by Miss *Margaret Arnstein,* who at the time of her appointment was Consultant in Communicable Disease Nursing with the New York State Health Department. A graduate of Smith College, with nursing training at Presbyterian Hospital in New York, Miss Arnstein had spent a year at the Johns Hopkins School of Hygiene, being at the time the only nurse who had been accepted for and had completed the master of public health requirements. She brought to the program at Minnesota a new point of view, conditioned by a number of years of practical public health nursing in a different section of the country and supplemented by a broad training in aspects of public health apart from nursing. Her

arrival at Minnesota, coincidental with that of Dr. Anderson as head of the Department of Preventive Medicine and Public Health, resulted in numerous changes in the program, including transfer of the students from registration in the College of Education to registration in the Department of Preventive Medicine and Public Health under the College of Medical Sciences. At the same time, it gave new impetus to the advanced training for nurses who had already completed basic degree programs in Public Health Nursing and were now ready for true graduate work leading to a master's degree that would qualify them for supervisory or administrative positions. As this was the period when master's degree programs were being actively developed for physicians and engineers, it provided the opportunity for coordinated training of these several professional groups as a public health team.

In 1940, after only three years of service at the University, Miss Arnstein returned to the New York State Health Department serving as regional consultant in the New York City office. From this post, she went to the Public Health Service where she rose rapidly to chief of its Division of Nursing. During these three years, Miss Arnstein had effected a revitalization of a program soundly conceived and directed by Miss Butzerin, but somewhat narrowly focused on nursing to the exclusion of its relationships to other parts of public health. At the same time, Miss Arnstein had succeeded in incorporating the idea of an understanding of public health nursing on the part of all public health students, health officers and engineers alike, an idea that to many seemed at that time quite radical and even today is not fully accepted in all schools of public health.

Miss Arnstein's departure was followed by a year of interim direction by Miss *Mellie Palmer* at one time Supervisor of Education in the Des Moines schools and later Director of Public Health Nursing in Newton, Massachusetts from which post she had come to Minnesota in 1936 as a member of the Public Health Nursing staff. In 1941, permanent direction of the program was assumed by Miss *Ruth Freeman*, who, at the time of her appointment, was on the staff of the Public Health Nursing faculty at New York University. Almost unknown within national circles, Miss Freeman had already shown exceptional teaching ability in New York where it was commonly said that nurses would flock to any course so long as she would teach it. A stranger to the Midwest and to non-urban nursing problems, Miss Freeman quickly adapted to

Ruth B. Freeman

the new situation and began attracting students from a rapidly widening area. The outbreak of war only a few months after she arrived unfortunately impeded the potential growth that could have been expected during her tenure. In spite of this, the program did grow both in size and scope, being one of the few public health activities continued by the University during the war years. During this period her flair for teaching, her imaginative approach and her demonstrated leadership quickly brought her to national attention, so much so that, by the end of the war, she was being courted by numerous other agencies. Finally, in the summer of 1946, Miss Freeman, for purely family reasons, submitted her resignation to accept a position as Director of Nursing for the American Red Cross in Washington. In five short years, she had climbed from virtual obscurity to one of the top public health nursing posts in the country. Her departure, just as the post-war program was developing and nurses released from military service were flooding the colleges, constituted a severe setback for, like her predecessors, she had established herself as a leader in nursing education and was attracting students from all parts of the country seeking admission to the program for the privilege of studying under her direction.

Miss Freeman was succeeded by Miss *Margaret Taylor,* Chief Nurse of the Tuberculosis Control Division of the Public Health Service and formerly Director of Public Health Nursing at the University of Buffalo.

Miss Taylor brought to the program a highly academic and intellectual approach. Endowed with a sharp and incisive mind, she provided a real stimulus to students at the graduate level, but was less suited for the teaching of the nurse who was still working on her basic public health nursing training. Under her direction, the graduate program flourished, but the undergraduate program began to fade. Part of this latter was undoubtedly due to Miss Taylor but an equal part was a forewarning of the ultimate phasing out of the demand for the undergraduate program, as collegiate schools of nursing more and more were incorporating instruction in public health nursing as a part of the basic curriculum.

Miss Taylor did, however, introduce important concepts that were to influence the developments of subsequent years. Notable among these was the establishment of a program in the mental health aspects of public health nursing, supported by the first federal grant that the School of Public Health had received for any type of special academic programs. This grant provided for staff and for student stipends to train advanced public health nurses for positions as consultants in the mental health component of public health nursing programs. In collaboration with Dr. *Adelaide Johnson* at the Mayo Clinic, Miss Taylor developed a program whereby a few highly selected nurses, after an academic year of formal graduate study during which special consideration was given to mental health, could have a six-month period of practical field experience, in collaboration with the staff of the Rochester-Olmsted County Health Department, the Mayo Clinic, and the Rochester State Hospital. This program, conceived by Miss Taylor and placed under the immediate direction of Miss *Ruth von Bergen,* was later under Dr. Marion Murphy to be the basis for comprehensive mental health training of all of the nurses at the master's level rather than limiting this type of experience to the few on a specialized program. Miss Taylor likewise developed a number of short courses, including one on cancer nursing which set the pattern for future short courses under federal grants.

Miss Taylor's resignation in 1952 to pursue further graduate study was followed by a year of interim appointment, during which Miss *Ann Houser* served as Acting Director pending the arrival of Miss *Marion Murphy* as permanent Director. A graduate of the University under the tutelage of Miss Butzerin, Miss Murphy had served with the Min-

Marion I. Murphy

neapolis Infant Welfare Society and Community Health Service from 1932 to 1937 when she went to New York as Director of Nursing in the Milbank health demonstration in Cattaraugus County. After six years in this position, she had moved to Michigan, first as Educational Director in the Nursing Division of the State Health Department and later as a member of the faculty of the University of Michigan School of Public Health, from which position she came to Minnesota in 1951, staying until January 1, 1967, when she assumed the position as Dean of the School of Nursing at the University of Maryland. While at Michigan, she had begun her work toward a doctoral degree, a program which she completed while at Minnesota, receiving her Ph.D. degree in 1959.

The thirteen years of Dr. Murphy's tenure were marked by radical changes within the Public Health Nursing program as well as within other parts of the School of Public Health. Notable in this regard was the ultimate discontinuance of the undergraduate program which had been the basis for the original establishment of Public Health Nursing on the academic level. Although the number of nurses in this program had picked up temporarily after her arrival, it slowly dwindled, largely because of the increasing incorporation of Public Health Nursing in the basic curriculum of Schools of Nursing, so that the younger nurses who were being employed had had equivalent

training. Before deciding to phase out the undergraduate program, however, the School, in response to requests from the Directors of Nursing in several Midwestern health departments, had conducted for three years a unique extension program to meet the needs of nurses who, for one reason or another, could not be away from their jobs or homes for even a single academic quarter or summer term. During the Fall of 1957, Miss Murphy had traveled every other week to Wichita, Kansas, to conduct a three-hour evening class on Basic Principles of Public Health Nursing, a class attended by nurses employed by health departments but lacking suitable training. In some cases, nurses came as far as 100 miles each way to attend these classes.

After this demonstration year, the School obtained the services of Miss *Lorena J. Murray* of the Public Health Service, who was detailed to the School for one year and granted leave of absence and supported by the School for two more years. For three years, Miss Murray "rode the circuit," conducting evening classes in Des Moines, Sioux Falls, Omaha, Kansas City, Wichita, and St. Louis. Coming to the School from several years in Indonesia and Alaska, Miss Murray was ideally suited by temperament, interest and background for teaching of this character. After three years, during which 795 nurses were registered in these classes, the program had to be discontinued as the Public Health Service was no longer willing to either detail her or grant her the necessary leave of absence. In the meantime, however, the program had upgraded the work of a sizable number of nurses who were locally employed and without adequate background.

By 1960, the number of nurses seeking to come to the School for a year or more of undergraduate study, or even for a short summer course, had so declined, however, that continuance of the undergraduate programs seemed hardly justified. A survey of state directors of nursing indicated that they no longer felt a need for it though they would have welcomed a continuance of the local extension courses had a suitable replacement for Miss Murray been available. Finally, in 1964, the few nurses seeking this were transferred to the School of Nursing, leaving the School of Public Health to confine its attention to a graduate program.

This latter had in the meantime grown so rapidly that the School was in a position of making a careful selection of its students from a large number of applicants drawn from all parts of the country and

representing a wide variety of public health nursing backgrounds. Increasing attention was given to mental health and the care of the handicapped and rehabilitated. Special emphasis was placed upon an understanding of newer developments in the rehabilitation of the handicapped, the School having added to its staff Miss *Eleanor Anderson,* who had served as consultant in rehabilitation nursing for the National League of Nursing and quickly established close working relationships with the Department of Physical Medicine and Rehabilitation. Short courses in rehabilitation nursing and care of cardiac patients were developed by the School and the number of short-term institutes through the Center for Continuation Study was rapidly expanded.

In 1961, the School obtained a federal grant for the preparation of teachers of public health nursing. While the School, in the planning of its masters program, had envisioned that its graduates would be in positions in supervision or administration, it was discovering that a very high proportion were actually moving into academic work even though, at the time they had been students, no special thought had been given to their preparation for teaching. The growing emphasis on incorporation of public health nursing within the undergraduate program of collegiate schools of nursing was creating a demand for personnel to fill academic positions. This program, under the immediate direction of Miss *Marie McIntyre,* who came to the School from Russell Sage College with a background of 14 years of public health nursing and teaching experience, quickly attracted a large number of students.

As these various programs developed under Dr. Murphy's direction, it became increasingly apparent that the conventional period of one academic year was completely inadequate and must be extended to provide for incorporation of more course instruction and field experience than was possible in a nine-month's period. Gradually, the program was lengthened, first to twelve months, later fifteen, then eighteen, and at the time of her departure plans had been formulated for extending it to two full academic years, thus bringing it more in line with many of the master's degree programs in other parts of the College of Medical Sciences. At the same time, an increasingly large number of the nurses, especially those seeking training for teaching, were working on programs under the Graduate School leading to the master of science rather than the master of public health degree, thus giving to the program more of an academic than a professional slant. During her thirteen

Gaylord W. Anderson

years at the University, Dr. Murphy had thus shifted the emphasis from undergraduate to graduate education and from a purely professional to a true academic basis. At the same time, she had built a graduate program which in size and number of applicants was not only the largest in the country, but was attracting students from all parts of the nation as well as from foreign countries.

Dr. *Gaylord West Anderson* who prepared the historical sketch of the School of Public Health was born in Minneapolis in 1901. When he was 12 years old, the family moved to Hanover, New Hampshire where his father was Professor of History at Dartmouth College. There, Gaylord was elected to Phi Beta Kappa and in 1922 received the degree of bachelor of arts, summa cum laude with honors in chemistry and German. The next year he was a student at the Sorbonne in Paris and at the University of Zurich. In 1923-1924, he was a teaching fellow in chemistry at Harvard University. There, as a student in the School of Medicine he was elected to Alpha Omega Alpha and in 1928 was awarded the degree of doctor of medicine cum laude. In 1928-29, he interned at Albany Hospital.

From 1929 to 1930, he was epidemiologist for the Massachusetts Department of Public Health. In 1930, he became assistant director and in 1931 Director of the Division of Communicable Diseases, Massachusetts Department of Public Health. From 1931 to 1937, he was

also Deputy Commissioner of Public Health in Massachusetts and at the same time he was assistant in Public Health Administration, Harvard School of Public Health. From 1935 to 1937, he served as Executive Secretary of the Massachusetts Legislative Commission to Investigate Public Health Laws and Policy.

In 1937, Dr. Anderson became professor and head of the Department of Preventive Medicine and Public Health, University of Minnesota. In 1942, the degree of doctor of public health, magna cum laude, was conferred upon him by Harvard University. From 1942 to 1946, he was on leave of absence from the University while he served with the Medical Corps, Army of the United States, in the Office of The Surgeon General in Washington. At first, he was in charge of venereal disease education and later Director of the Division of Medical Intelligence.

In 1944, he was appointed founding Director of the School of Public Health, University of Minnesota and in 1946 he was the first person named to the newly created Mayo Professorship.

From the time Dr. Anderson returned to Minneapolis in 1937, he has contributed magnificently to health projects throughout the State of Minnesota. He has devoted large amounts of time and energy to those who call upon him for help, whose numbers seem legion.

He has served on the Health Action Committee of the Minneapolis Board of Public Welfare, a committee formed to strengthen local public health services. He has been an active participant and one-time chairman of the Health and Medical Care Section of the Community Welfare Council. He was chairman of a committee which was advisory to the State Health Department on policy regarding polio vaccination. He is responsible for the pre-service and in-service training of many health workers who become engaged in state and local health services.

Dr. Anderson has contributed to the formulation of policies which have affected many health programs in the city. Among them have been policies regarding: 1) Selection of qualified personnel for important health posts; 2) Coordination of inter-relational services; 3) Re-evaluation of existing facilities and services, and 4) Establishment of new or modified facilities and services necessitated by changing times and program emphases.

On the campus, he has developed a most outstanding School of Public Health which attracts students not only from this country but also from around the world. Thus, he has been called upon to serve as

Chairman of the Senate Library Committee, the Bio-medical Library Committee, the President's Committee for the selection of the new Dean of the College of Medical Sciences and of the Medical School when Dr. Robert B. Howard was chosen. He has been President of the Campus Club and president of local chapters of Phi Beta Kappa, Sigma Xi and Alpha Omega Alpha.

In addition to his outstanding ability as an administrator and consultant, Dr. Anderson is a cherished teacher. Dr. Stewart Thomson recently said: "Students soon learn that he holds and demands a high standard of scholarship, for this they and his colleagues on the faculty have deep respect." Students in all sections of this country and in many other nations of the world remember him not only as a teacher of marked ability, but as one who always found time to talk over problems which confronted them.

Dr. Anderson has contributed significantly to public health literature. He collaborated with Miss Margaret G. Arnstein, R.N., in the preparation and publication of a textbook entitled *Communicable Disease Control.* It was first published in 1941. This book is now in its fourth edition with editions in Spanish, French and Portuguese. He is one of the co-authors of *Global Epidemiology* together with Dr. James S. Simmons, Dr. T. F. Whayne, and Dr. H. M. Horack. These volumes deal with the geography of disease and sanitation. He contributed the chapter on "The Principles of Epidemiology as Applied to Infectious Disease" for the fourth edition (1965) of *Bacterial and Mycotic Infections in Man* edited by Dubos and Hirsch. Dr. Anderson has published numerous articles in public health and medical journals with special interest in streptococcal diseases, typhoid fever and poliomyelitis. In 1959, he was the recipient of the Harrington Award conferred by the Minneapolis Junior Chamber of Commerce. He qualified for this award by having been chosen as the person who had contributed most to public health of the city that year.

Nationally, Dr. Anderson enjoys confidence and respect not only of public health workers but also those working in other fields. He has served as president of the Association of Schools of Public Health. He is a Diplomate of the American Board of Preventive Medicine and was one of its original trustees. He joined the American Public Health Association in 1930 and since that time his name has graced the membership of that organization. He has continuously contributed significantly

to the elevation of its standards and usefulness. He has long been a member of the Committee on Communicable Disease Control and is presently the senior member in years of service on this committee. Every five years this committee has published a manual on the control of communicable diseases in man. Dr. Anderson has participated in the preparation of the last five editions of this manual. He has been Chairman of the Lasker Awards Committee and elective counselor for three separate terms. He held membership on the Committee on Professional Education for eight years, and the Technical Development Board for a period of two years, and various other committees.

In 1951, Dr. Anderson was elected President of the American Public Health Association and the same year he became President of the American Epidemiological Society. He is also a member of the American College of Preventive Medicine. He was recently Chairman of the Task Force on Environmental Health for the National Commission on Community Health Services.

In 1963, he received the Sedgwick Memorial Medal which is the highest honor conferred by the American Public Health Association. In presenting this medal, Dr. Edward S. Rogers said: "Over the years, you have earned the deep respect and affection of all who have been fortunate enough to come under your guidance as an inspiring teacher; to encounter your keen insights and meticulous standards as an administrator; to feel the powerful influence of your wisdom as a statesman; or just to know you as a friend."

Internationally, Dr. Anderson's accomplishments are so recognized that he is in great demand and has often served as special adviser to the World Health Organization. As a special consultant to the Department of State he served in missions to Argentina, Brazil, Chile, and Peru in 1948, and the next year to Colombia and Ecuador. In 1950, he was again in Chile and in Korea in 1954. He was a member of the United States Delegation to the World Health Assembly in 1951 and again in 1958. As a member of a group of leaders in public health, he headed the World Health Organization missions to Egypt in 1953, and India, Iran and Egypt in 1958. In 1963, he visited schools of public health in England, the Netherlands, Scotland, Sweden and Yugoslavia as a consultant to the World Health Organization. In the winter of 1965, he was on a World Health Organization Mission to Egypt, Lebanon and Turkey and to Brazil, Chile, Mexico and Peru in 1967.

He has been elected honorary fellow of the Royal Society of Health of England and in 1967 was decorated by Peru with the order of Hipolito Unanue, rank of Commander.

In all of his activities, local, national and international, for Dr. Anderson "No task is too difficult, no day too long to help others solve their problems. The other person's problems are never too trivial to command his attention or never too difficult to summon his best efforts." He lives to initiate, promote and perpetuate all that is good.

Chapter XXXVIII

Medical Biochemistry At the University of Minnesota

BIOCHEMISTRY, as a recognized unit within the Medical School of the University of Minnesota, is but 27 years of age, having achieved the status of a division called Physiological Chemistry in the Department of Physiology in 1940. Yet, its concepts and methods have evolved to the point that today virtually no problem in basic or clinical medicine can be fully explored without a thorough investigation of the underlying biochemical phenomena. Concomitant with this invasive diffusion of the concepts and methods of biochemistry, the department has sent out its emissaries to set up foci of biochemical teaching and research in other disciplines. Its graduates occupy important teaching and/or research positions in essentially every medical discipline from anatomy to surgery—as well as in such related disciplines as nutrition and zoology—in medical schools, research institutes and universities from Bangkok and Goteberg to New Haven and Palo Alto.

As of 1967, the department consists of 23 members. Ten of these members hold their primary appointment in the department and occupy offices and laboratories in Millard Hall, Owre Hall, or Lyon Laboratories. The other 13 members hold their primary appointments in the Departments of Medicine, Laboratory Medicine, Pediatrics or Microbiology, or are located at the Veterans Administration Hospital or the Hormel Institute in Austin.

In 1966-67, the faculty of the department has been responsible for offering courses in medical biochemistry, at several levels of complexity depending on the preparation of the students, to students in Nursing, Dental Hygiene, Medical Technology, Dentistry, Veterinary Medicine, and Medicine. In addition, in collaboration with the faculty of the Department of Biochemistry of the College of Biological Sciences, courses are given in fundamental biochemistry to beginning graduate students from both biochemistry departments and from other departments of

the University and to seniors in the Institute of Technology and the College of Liberal Arts. Four courses, restricted to advanced graduate students, were offered during 1966-67 and three other courses will be offered during 1967-68. Graduate student seminars and individually tailored guidance on research problems in biochemistry round out the teaching responsibilities. However, it should be realized that under the innocent sounding phrase "guidance on research problems" is encompassed the advising of 55 students seeking advanced degrees in biochemistry. Furthermore, each member of the faculty engages in research of his own, presents and/or participates in seminars in other departments, and serves on one or more committees at the department, college or all-university level.

This, in brief, is a sketch of medical biochemistry at the University of Minnesota in the late 1960's. How has it evolved to its present state?

THE FORMATIVE YEARS 1888-1914

When the College of Medicine and Surgery of the University of Minnesota was established in 1888, there was no curriculum in biochemistry but courses of a related nature were offered in physiology and chemistry. The catalogue for that year gives no indication of the facilities and subject matter for these disciplines but does say that such courses were taught during the first two years of the three-year curriculum of the College and that the same courses were offered simultaneously to students in the Colleges of Homeopathic Medicine and Surgery and of Dentistry which, along with the College of Medicine and Surgery, comprised the University's Department of Medicine.

These courses in physiology and chemistry, the progenitors of courses in biochemistry, were taught by men whose influence on medical education is significant. J. C. Bell, of the University Department of Chemistry, taught the courses in 1880 in the Department of Medicine. The number of chemistry courses offered and the laboratory and classroom space were both increased, providing adequate facilities until chemistry, *per se,* was assigned a preparatory role in the medical curriculum. Richard Olding Beard became the first Professor of Physiology in 1888. For ten years, Beard assumed sole responsibility for the teaching of physiology and for the next ten years carried on this responsibility with the help of a single assistant, Dr. M. Russell Wilcox. Beard remained in teaching and in administrative activities until he retired in 1925.

When Medical Hall was constructed, Physiology and Chemistry each occupied suites within the building. Physiology maintained laboratory rooms on the second floor equipped for special studies as well as for general work, but for work in physiological chemistry it was necessary to take the prepared material to the new Medical Chemistry Building. Microscopic work in physiological chemistry was done in the laboratory of histology, in the same building.

No indication was given in 1893 as to what courses were offered by Dr. Beard in physiology. However, due assurance was given that the laboratory contained excellent apparatus, and that proper facilities existed for the care of laboratory animals. We know that the curriculum was clearly defined for chemistry. During the first year of the three-year course of study, students were given lectures on inorganic chemistry and received laboratory training in general chemistry and qualitative analysis, while during the second year lectures were attended on medical chemistry, elements of organic chemistry, toxicology and analysis of urine, with laboratory work relating directly to the lectures.

By analyzing this statement of the chemistry curriculum in medicine, one may see that it then provided instruction which today is found in premedical preparation. Also, the subject matter and the procedures encompassed under the headings of "toxicology" and the "analysis of urine" are today covered by the Departments of Pharmacology and Laboratory Medicine, respectively. Indeed, the place of chemistry, as such, in the medical curriculum was a temporary one. After 1914, all chemistry courses preparatory to work in the medical sciences were taught within the School of Chemistry. Though only in the curriculum a short time, chemistry was important to the evolution of biochemical instruction, because it provided the facilities and preliminary training which helped the Department of Physiology to establish the framework out of which arose the Department of Biochemistry. As Dr. *M. B. Visscher,* present head of the Department of Physiology, has put it, "The Department of Physiology very early began to serve a kind of marsupial nurture function for other emerging disciplines."

In 1894, the courses in physiology and chemistry were still given to the first and second year students in the Department of Medicine. For the year 1896, it is possible to reconstruct with some assurance of accuracy the role played by the Department of Physiology in nurturing the growth of biochemistry. In that year, the Department of Physiology,

still consisting solely of Dr. Beard, moved into the newly completed Laboratory of Medical Sciences (now Wesbrook Hall). The entire southern half of the building (11,569 square feet) was shared by Beard and Wulling (Professor of Pharmacy), with physiology's facilities being described in the catalogue of that year as follows:

> The chair of physiology occupies a suite of rooms in the laboratory of medical sciences, including a general laboratory of physiological chemistry and physiology, a demonstration room for experimental work and the library and office of the professor of this branch.
>
> Class work in physiological chemistry is conducted in the laboratory of chemistry, occupying the adjoining building (Laboratory of Medical Chemistry Building).
>
> In the basement of the laboratory of medical sciences, the chair maintains a spacious and comfortably equipped animal-room, which is furnished with a large aquarium, frog-tanks, rabbit and guinea pig enclosures, breeding cages, and dog and cat kennels.

From the course descriptions in the catalogue for 1896, one can infer that during the first two years of the four-year curriculum students received from Dr. Beard about 15 hours of lecture and demonstration and 45 hours of laboratory work that could be considered biochemical in its orientation. The remaining 105 hours of lecture and 45 hours of laboratory work, presented by Beard to first and second year students, dealt with topics of physiology. Thus, during this period of evolution of medical education, students received the equivalent of about 3 quarter-credits of instruction in biochemistry, compared to 16 quarter-credits today.

In addition to these required courses, Dr. Beard offered an elective course on The Digestion and Metabolism of Sugars as well as two elective courses dealing strictly with physiology. Furthermore, the catalogue for 1896 notes that "Opportunity will be afforded in the laboratories of physiology and physiological chemistry, for the pursuance of special courses of study, in both experimental and chemical physiology"; thus, graduate training may be said to have been available in 1896.

In 1896, Dr. Beard, by himself it would appear, gave instruction in physiology and physiological chemistry to 150 first-year students and 94 second-year students enrolled in one or another of the four Colleges of the Department of Medicine. He gained an assistant in 1897, in the person of *M. Russell Wilcox* who was graduated in medicine at the

University of Minnesota that same year, and who served as demonstrator in physiology for the next nine years and then as Assistant Professor of Physiology from 1906 until his retirement in 1920.

The decade 1906 to 1916 saw many changes in the Department of Physiology. Among those who joined the faculty during this interval several may be mentioned as having a primary or a substantial interest in the biochemical aspects of physiology.

J. P. Sedgwick, a pediatrician who offered a course on metabolism in infancy, was appointed as instructor in physiological chemistry in 1906, assistant Professor of Physics and Chemistry in 1910, and Associate Professor of Pediatrics in 1915.

Frederick H. Scott, whose interests encompassed both the experimental and the chemical aspects of physiology, was appointed Assistant Professor of Physiology in 1908 and was elected to membership in the American Society of Biological Chemists the following year. He moved up through associate professor to full professor in 1918, the rank he held until his retirement in 1944.

Robert B. Gibson, a charter member of the American Society of Biological Chemists, joined the faculty as Assistant Professor in Physiological Chemistry in 1911, but left in 1914 to become Professor of Physiology in the Philippines.

In 1912, *Chauncey J. V. Pettibone* became Instructor in Physiology. He was elected to membership in the American Society of Biological Chemists in 1916, rose through the rank of assistant professor to that of associate professor in 1920, and held this rank until his death in 1929.

Francis B. Kingsbury became Instructor in Physiological Chemistry in 1913, assistant professor in 1917, associate professor in 1920, and resigned in 1923 to accept a position with the Metropolitan Life Insurance Company.

Elias P. Lyon became Dean of Medicine and head of the Department of Physiology in 1913. One of the first appointments to the faculty in physiology after Lyon became chairman and dean was *Jesse F. McClendon* as instructor in 1914. McClendon became a member of the American Society of Biological Chemists, also in 1914, rose through the assistant and associate professorial ranks to become Professor of Physiological Chemistry in 1920, a rank he held until 1939 when he became Research Professor of Physiology at Hahnemann Medical College. When one examines the threads that weave through the evolving disci-

Jesse F. McClendon

pline of medical biochemistry at Minnesota, McClendon assumes a central role, for he served as major advisor to *Wallace D. Armstrong,* who became the first head of the Department of Physiological Chemistry, created in 1946, and remains as head of the Department of Biochemistry today.

THE YEARS OF PREPARATION AND CONSOLIDATION 1915-1940

One theme of our story deals with the biochemical content of the medical school curriculum and, therefore, deals only with the Minneapolis department, since the faculty members in biochemistry at Rochester are affiliated solely with the Graduate School of the University of Minnesota, whereas faculty members in Minneapolis are, first, members of the faculty of the College of Medical Sciences and may also be members of the faculty of the Graduate School.

It may be recalled that in 1896 medical students were receiving instruction in biochemical topics to an extent that would represent about 3 quarter-credits. In 1916, the curriculum for medical students included lectures and laboratory work of a biochemical nature that would be equivalent to about 9 or 10 quarter-credits. Throughout the next twenty years, this biochemical emphasis slowly increased so that in 1926 it amounted to 13 quarter-credits. Involved in the biochemical instruction

Gorge Burr

of medical students during this period were McClendon (1914-1939), Pettibone (1912-1929), Kingsbury (1913-1923), Esther Greisheimer (1918-1935), Grace Medes (1924-1932), Truman A. Pascoe (1925-1930), Allan Hemingway (1925-1951), Jesse W. Cavett (1930-1937), Robert H. Hamilton, Jr. (1931-1936), and Wallace D. Armstrong (1932- . .). By 1940, the period of preparation was drawing to a close and the period of "internship and residency" was about to begin.

The parallel theme being developed during this period, along with medical biochemistry, dealt with graduate training in biochemistry, and here the names of *Edward C. Kendall* at Rochester and McClendon in Minneapolis shared top billing on the marquee.

The first master of science degree in physiological chemistry was awarded in 1921 to *Arnold E. Osterberg* who had studied with Kendall. Parenthetically, Osterberg was also the first to receive the degree of doctor of philosophy (in 1925) with Kendall serving as his major advisor Osterberg then became Assistant Professor of Physiological Chemistry at the Mayo Foundation in 1928, associate professor in 1931, professor in 1944 and left for a position at Abbott Laboratories in 1945.

From 1921 through 1940, the Graduate School awarded 19 master of science degrees in medical biochemistry, 3 having done their work in Rochester and 16 in Minneapolis. During this same period, 18 doctor of philosophy degrees were awarded; for 5 of these individuals Kendall

served as major advisor while the other 13 did their work on the Minneapolis campus, 9 with McClendon, one with Dr. K. W. Stenstrom (Professor of Physiology and later Professor of Radiology and Physical Therapy), and 3 with Dr. M. B. Visscher and/or Dr. George O. Burr (then Professor of Botany but shortly to be named Professor and Chief of the Division of Physiological Chemistry). Of the 18 individuals who were granted the doctor of philosophy degree during this period, 12 went on to careers in academic medicine or chemistry and 6 into clinical or pharmaceutical research positions.

In 1940, the Regents designated Physiological Chemistry as a Division of the Department of Physiology and named *George O. Burr* as its chief.

MEDICAL BIOCHEMISTRY COMES OF AGE

Internship and Residency 1940-1946

When *George Burr* assumed direction of the newly created Division of Physiological Chemistry in 1940, its faculty, in addition to himself, consisted of Wallace D. Armstrong, Leo T. Samuels and Allan Hemingway (associate professors) and L. Earle Arnow (assistant professor), Karl Sollner (chemist) and Richard H. Barnes (instructor).

The ensuing six years, terminating with the achievement of departmental status was a period of rapid turnover—four members of the faculty leaving to assume new positions elsewhere.

Arnow was the first to leave, in 1942, to become director of biochemical research at Sharp and Dohme, then in 1944 he become director of research and enticed Barnes away from Minnesota to assume his former position as director of biochemical research. Samuels, after having become associate professor, also left in 1944 to become Professor and Head of the Department of Biochemistry at the University of Utah. In 1946, Burr left to become head of the Department of Physiology and Biochemistry at the Experiment Station of the Hawaiian Sugar Planters Association.

During this six-year period, several additions were made to the faculty. *Cyrus P. Barnum, Jr.,* who received the degree of doctor of philosophy from Minnesota in 1940 and spent the next two years as a research fellow at the Scripps Metabolic Clinic in California and at Minnesota, joined the staff as instructor in 1942 and attained the rank of Professor

in 1963. He served with distinction until his death on July 26, 1965.* Harland Wood came from the University of Iowa in 1943 as associate professor and the following year brought Merton F. Utter to join him as assistant professor. However, in 1946, Dr. Wood left to become head of the Department of Biochemistry at Western Reserve and took Dr. Utter along with him. Also in 1944, *Walter O. Lundberg* became Assistant Professor of Physiological Chemistry and Research Director at the Hormel Institute. In 1949, Dr. Lundberg shifted his University affiliation to the Department of Biochemistry on the St. Paul Campus. *Ralph T. Holman* served as Instructor in Physiological Chemistry from 1944 to 1946 then spent two years in laboratories in Sweden, followed by three years at Texas A and M College. He then returned to Minnesota in 1951 and a position at the Hormel Institute which he currently holds together with an affiliation with the Department of Biochemistry of the College of Medical Sciences at the rank of professor.

To complete the story of faculty who were associated with the division during this six-year period, it should be noted that *Allan Hemingway* became Associate Professor of Physiology in 1945 and in 1951 left to become head of the Department of Physiology at UCLA. *Karl Sollner,* after moving up through the professorial ranks to full professor, shifted his scene of operations to the NIH in Bethesda in 1947 but continued to serve as thesis advisor for several students until his formal affiliation with the University was terminated in 1963.

These six years during which physiological chemistry remained as a division of physiology saw the awarding of 15 master of science degrees and 12 doctor of philosophy degrees. Included among those who received graduate degrees during this period, two are now department heads (dermatology and pediatrics) and four are professors (three in biochemistry and one in zoology).

Independence and Growth 1946 -

In 1946, *Wallace D. Armstrong* was named professor and head of

*Dr. Barnum became one of the truly prominent members of the Medical School faculty. Indeed, he labored diligently with the assistance of Mr. Edward Buckbee in assembling the data and preparing this historical sketch of the Department of Biochemistry. When the sketch was nearing completion, Dr. Barnum died suddenly from coronary thrombosis. His death was not only a serious loss to his department and the school of medicine but also to the entire University. J.A.M.

the newly designated Department of Physiological Chemistry and he promptly set about the task of re-building a faculty that had been decimated by the departures of the previous four years. Four new staff members joined the faculty in 1946.

David Glick came as associate professor in April 1946. He had received the degree of doctor of philosophy in biochemistry from the University of Pittsburgh in 1932, had spent two periods in the Carlsberg Laboratories in Copenhagen, had served as chief chemist at hospitals in San Francisco and in Newark and as head of vitamin and enzyme research at the Russell-Miller Milling Company in Minneapolis prior to joining the faculty.

Saul L. Cohen, who received a degree of doctor of philosophy in biochemistry from Toronto in 1936, studied in Switzerland, then served as Instructor in Physiology at Ohio State University and as Assistant Professor of Physiology at the University of Michigan prior to joining the faculty as Assistant Professor of Physiological Chemistry in the fall of 1946.

Elizabeth G. Frame also joined the faculty as assistant professor in the fall of 1946. She received the degree of doctor of philosophy in physiological chemistry from Yale University in 1942 after having served as instructor and Assistant Professor of Zoology at Smith College from 1930-39. Just before coming to Minnesota, she served as Instructor in Urology at Johns Hopkins Hospital and as a Fellow at Harvard University.

Charles W. Carr received the degree of master of science in analytical chemistry from Minnesota in 1939, worked as a chemist in the Department of Physiology for two years and then returned to graduate study and was awarded the degree of doctor of philosophy in physical chemistry at Minnesota in 1943. After three years of work on the war-time rubber research program in the school of chemistry at Minnesota, he joined the faculty in physiological chemistry as instructor in the Fall of 1946.

With the faculty thus reconstituted attention was turned to the teaching program. The several courses for medical students, medical technologists, veterinary medical students, dental students and students in nursing and dental hygiene were continued. The only change that might be noted here was that the accelerated programs, instituted during the war years, dropped back to normal. The medical school again admitted a new class each fall instead of every nine months and the courses for

nurses, which had been scheduled four quarters of the year and totalled some one thousand nurses per year during some of the war years again resumed as one course in the fall and one in the spring.

The major change in the teaching program involved the institution of six formal courses in advanced biochemistry for graduate students. These courses supplemented the seminars and individualized problems courses and constituted a recognition that the knowledge of biochemistry had far outstripped what could be presented in adequate depth within the time limitations imposed on the basic course which was taken by both medical and graduate students. The six courses which were offered one per quarter over a two-year period, covered advanced work in endocrinology and steroid chemistry, in radiotracers and mineral metabolism, in histochemistry, in nitrogen metabolism, in intermediary metabolism, and in biochemical laboratory techniques. In addition, a histochemistry laboratory course was offered.

This pattern of graduate course work has continued with certain modifications and additions. The course in nitrogen metabolism was discontinued in 1953 when Dr. Frame left to become Chief of the Biochemistry Service in the Department of Clinical Pathology at the Clinical Center of the National Institute of Health. With the appointment of *Paul D. Boyer* as Hill Family Foundation Professor of Physiological Chemistry in 1956, much of the subject matter of intermediary metabolism was incorporated into his course on metabolic enzymology and some of the material on nitrogen metabolism was incorporated in a new course on nucleic acid and protein metabolism. The course in histochemistry was discontinued in 1961 when Dr. Glick left to become head of the division of histochemistry in the department of pathology at Stanford University but additional areas of advanced biochemistry have been added to the graduate curriculum. In 1962, Dr. Ivan Frantz established a course in Lipid Metabolism.

In 1964, Dr. *Donald Wetlaufer* offered a course on Protein Chemistry and in 1965 one on Biopolymers. With the departure of Dr. Boyer in 1963 to become head of the Division of Biochemistry in the Department of Chemistry at the University of California at Los Angeles, his course on Metabolic Enzymology was given by Dr. Joseph Larner, his successor as Hill Professor.

In the 19 years since the acquisition of departmental status and the institution of formal graduate courses in several areas of advance

biochemistry, 39 master of science degrees and 54 doctor of philosophy degrees have been awarded. Included in this figure of 54 were six who had received the master of science degreee during the 19-year period and two who had received the master of science degree during the preceding period of divisional status.

Of those who constituted the faculty of the newly designated department in 1946 (Armstrong, Barnum, Carr, Cohen, Frame, Glick, Hemingway, Holman, Lundberg and Sollner) Armstrong, Barnum and Carr have retained a continuous affiliation and Holman, after leaving in 1946, returned in 1951 to the Hormel Institute and a renewed affiliation with the department. In July 1952, Saul Cohen was admitted to the University Hospitals in deep coma. After discharge, for several years he continued to advise graduate students and to conduct his graduate course in endocrinology but his condition slowly worsened. In 1957, he returned to Toronto where he had family as well as academic ties. He recovered so as to become a Research Associate in the Department of Obstetrics and Gynecology at the University of Toronto.

A number of faculty members have come, stayed for varying periods of time, and then moved on during the period since 1946. Jack Schubert came as assistant professor in 1947 but left in 1948 for a position at the Argonne National Laboratory. Ernest B. Brown joined the faculty as instructor in 1948 but the following year transferred his affiliation to the Department of Physiology. In 1949, Bryant Dunshee came as instructor but with the serious budgetary retrenchment of 1952 left to accept a position as research chemist with General Mills. William O. Caster served on the faculty as assistant professor from 1951 to 1963 when he left to become Associate Professor of Nutrition at the University of Georgia. Bo. G. Malmström served as instructor during 1953-54 after which he returned to Sweden where he currently serves as head of biochemistry at the University of Gothenburg. Curtis H. Carlson served as instructor from 1957 to 1961 and as assistant professor until he left in 1964 to join the Department of Psychiatry and Neurology. Finally, George J. Schroepfer, Jr., served as assistant professor during the year 1963-64 after which he accepted a position in the Division of Biochemistry at the University of Illinois. Richard W. Von Korff, who received the degree of doctor of philosophy at Minnesota in 1951, had post-doctoral experience at the Enzyme Institute in Madison and returned as research associate in pediatrics and instructor in physiological

chemistry in 1952. By 1963, he obtained the rank of Associate Professor of Biochemistry but he resigned in 1966 to accept the position of Director of Biochemical Research supported by the Friends of Psychiatric Research in a Maryland State Hospital in Baltimore.

THE FACULTY OF THE DEPARTMENT OF BIOCHEMISTRY AS OF 1967

In addition to Armstrong (professor and head) Holman and Carr (professors), who were affiliated with the department in 1946, the present faculty consists of the following members.

Leon Singer, who received the degree of doctor of philosophy from the University of Florida in 1949, joined the faculty as instructor that same year and today holds the rank of Professor of Biochemistry with a joint appointment in dentistry and occupies the chair of Hill Professor for Basic Dental Investigation.

John F. Van Pilsum, after receiving the degree of doctor of philosophy from the University of Iowa in 1949 and serving on the faculties of the Long Island College of Medicine and of the University of Utah, came to Minnesota as assistant professor in 1954. Today he holds the rank of associate professor.

Two members who held their primary appointments through the Minneapolis Veterans Administration Hospital also have joint appointments in the Department of Biochemistry. *Helmut R. Gutmann* arrived in 1952 and holds the rank of professor. *Ulysses S. Seal* joined the Veterans Administration staff in 1957 and holds the rank of lecturer in biochemistry.

Ivan D. Frantz, Jr. came to Minnesota from Harvard in 1954 as Clark Research Professor in the Department of Medicine where he still holds his primary appointment. In 1956, he was given a joint appointment as Professor of Biochemistry.

Frank Ungar received the degree of doctor of philosophy from Tufts College in 1952. He served on the research staff at the Worcester Foundation and on the teaching staff at Clark University before joining the faculty at Minnesota in 1958 as Associate Professor of Biochemistry. He was promoted to professor in 1966.

Quenton T. Smith received the degree of doctor of philosophy in biochemistry at Minnesota and became instructor in 1959. His primary appointment is in the Division of Dermatology where he holds the

rank of research associate with a joint appointment as Assistant Professor of Biochemistry.

Shortly after receiving the degree of doctor of philosophy in biochemistry at Minnesota in 1961, *Mary E. Dempsey* became an instructor in the department. Currently, she holds the rank of Assistant Professor of Biochemistry with a joint appointment, at the same rank, in Laboratory Medicine.

James F. Koerner received the degree of doctor of philosophy in biochemistry from Iowa State University in 1956, spent 5 years as a post-doctoral fellow and research associate at Massachusetts Institute of Technology and joined the department of biochemistry at Minnesota as assistant professor in 1961. He was promoted to associate professor in 1965.

Robert W. Bernlohr received the degree of doctor of philosophy in biochemistry from Ohio State University in 1958, spent two years at the Oak Ridge National Laboratory as a post-doctoral fellow, then returned to Ohio State as Assistant Professor of Biochemistry. In 1962, he came to Minnesota as Assistant Professor of Microbiology with a joint appointment as Assistant Professor of Biochemistry. In 1964, he was advanced to Associate Professor of Microbiology and Biochemistry.

Also in 1962, *Ernest D. Gray* returned to Minnesota to accept a research position in pediatrics with the rank of assistant professor. He had received the degree of doctor of philosophy in biochemistry from Minnesota in 1958 and spent four years in post-doctoral research in Glasgow and at Columbia University. In 1963, he received a joint appointment as Assistant Professor of Biochemistry.

Donald B. Wetlaufer, who joined the department as associate professor in 1962, had received the doctor of philosophy degree from the University of Wisconsin in 1954. He served as research associate at the Enzyme Institute in Madison and then as a post-doctoral fellow at the Carlsberg Laboratory in Copenhagen. In 1956, he returned to Harvard where he served as post-doctoral fellow, research associate and tutor until 1961 when he joined the faculty at Indiana University as Assistant Professor of Biochemistry.

Bernard Pollara received the degree of doctor of philosophy from Minnesota in 1963, then completed his training for the doctor of medicine degree. As of 1964, he became research associate in pediatrics and Assistant Professor of Biochemistry.

Joseph Larner joined the faculty as Hill Professor of Biochemistry in the special field of Metabolic Enzymology in 1964. He had received the doctor of medicine degree from Columbia University in 1945, a master of science degree from Illinois in 1949, and a doctor of philosophy degree in biochemistry from Washington University in 1951. He returned to Illinois as Assistant Professor of Chemistry and in 1957 joined the Department of Pharmacology at Western Reserve as associate professor (1957-63), acting director (1962-63), and professor (1963-64). In 1963, he received a Research Career Award from the National Institute of Health and spent the year 1963-64 as a Commonwealth Fellow in England before joining the faculty at Minnesota.

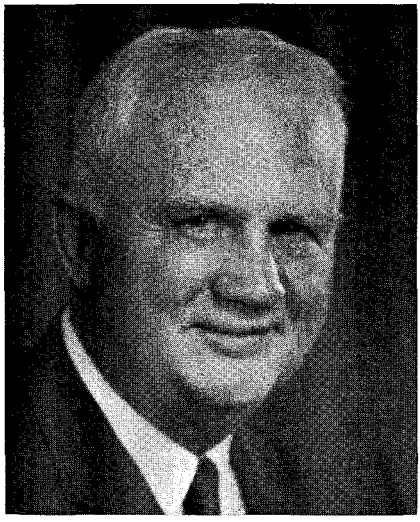
Ronald Edstrom joined the department as assistant professor in 1965. He received the doctor of philosophy degree at the University of California (Davis) in 1962. He spent one year at the University of Michigan and two years at Johns Hopkins in post-doctoral work in biochemistry.

James Bodley is a native of Oregon who received the doctoral degree in biochemistry at the University of Hawaii in 1964. Prior to joining the department in 1967, he worked as a post-doctoral fellow at the University of Washington in biochemistry.

Finn Wold is a native of Norway and was appointed to a professorship in 1967. He holds the master of science degree from the Oklahoma State University (1953) and the doctor of philosophy degree from the University of California (1956). He worked at the Fleming Institute in London and at the University of Sheffield in 1960-61. Dr. Wold was a member of the faculty in biochemistry at the University of Illinois from 1957 and was an associate professor in that institution beginning in 1962.

EPILOGUE

As biochemistry sets forth on the second quarter-century since its recognition as a division and then a department with the medical school, it does so with a faculty whose background and research interests cover a wide range of the many specialized areas of the field. This diversity of background and interest is reflected in the graduate training program through the many formal advanced courses as well as through advising on special problems and on thesis research. Coupled with this graduate program, and receiving strength and stimulation from it, is the



Wallace D. Armstrong

basic biochemical teaching program for qualified undergraduate students and beginning graduate students and for students in the professional curricula of medicine, dentistry, medical technology and nursing.

As new concepts and new areas of medical teaching and research unfold in the future the faculty must be prepared to examine and to exploit them so that the role and the usefulness of biochemistry in the health sciences may continue to grow.

Thus, Dr. *Wallace D. Armstrong* who began working in biochemistry at the School of Medicine in 1929 has directed the activities in this field in an admirable manner. He was born on an East Texas farm on July 8, 1905. He earned a bachelor's degree in chemistry at the University of Texas in 1926. He spent a post-graduate year at the same University as an American Petroleum Institute Fellow and from this work he derived his first paper, "Estimation of Nitrogen in Petroleum and Bitumens." He was a graduate student and research assistant in organic chemistry in New York University in 1927-28 and wrote his master of science thesis on the synthesis of ethers of choline.

Dr. Armstrong entered the Graduate School of the University of Minnesota in 1929 to pursue studies in physiological chemistry under Professor *Jessie F. McClendon.* He received the doctor of philosophy degree in 1932, and the doctor of medicine degree in 1937. He was promoted to assistant professor in 1937, to associate professor in 1940

and to professor in 1943. In 1946, when the Division of Physiological Chemistry became a department, Dr. Armstrong was the first head. The name of the department was changed to Biochemistry in January 1963.

Dr. Armstrong was led into the field of fluoride biochemistry by Professor McClendon. Fluoride analysis has continued to occupy the attention of Dr. Armstrong and his colleagues and by application of new principles of analysis particularly by diffusion of hydrogen fluoride, it is now possible to make determinations of submicrogram quantities of this element in plasma, soft tissues, bones, teeth, waters and foods. These analytical procedures have permitted investigations of the biology of fluoride in Dr. Armstrong's laboratory which would otherwise not have been possible.

Dr. Armstrong's work on fluoride analysis soon induced him to focus his interests on the chemistry and physiology of bones and teeth and, in his earlier work, he enjoyed the collaboration of the late Dr. *P. J. Brekkus,* Professor of Dentistry. From these extensive studies, Dr. Armstrong is now rated as one of the world's experts in the field of fluoride metabolism in relation to dental caries prevention and with regard to the health safety of water fluoridation. He has been called upon to assist in major legal battles over fluoridation in this country and as far away as Dublin, Ireland. He has been able to demonstrate to the courts that properly fluoridated water is non-toxic and provides a very large measure of protection against dental decay.

Dr. Armstrong has been an active contributor in the elucidation of the constitution of the complex calcium phosphate, called apatite, which is the mineral part of calcified tissues. His studies with radioisotopes have demonstrated that the skeleton is not a static stone but is a dynamic system in which the chemical elements are constantly turned over and replaced.

Dr. Armstrong has had three periods of foreign study, two of which were as a Fellow of the Commonwealth Fund and one while a Fellow of the Rockefeller Foundation. In 1937-1938, he worked in the laboratories of Professors August Krogh and Georg de Hevesy in Copenhagen and for a shorter period at the Lister Institute with Professor Robert Robison. Professor Hevesy introduced Armstrong to the field of radioisotopes as tracers and he, over the years, has been a leader in radioisotope methodology at the University of Minnesota. In 1960,

he worked on microradiographic and x-ray diffraction techniques at the Institute for Medical Physics of the Caroline Institute in Stockholm.

Since the beginning of the Extra-mural Grants Program of the National Institutes of Health, Dr. Armstrong has served continuously as a consultant to this program by membership on the Dental Studies Section, the Dental Advisory Council and the Dental Training Committee. He has also been a member and chairman of the Board of Scientific Councilors of the National Dental Research Institute and is a consultant to that Institute's Intramural Program. Dr. Armstrong serves as a member of the Atomic Energy Commission's National Advisory Committee on Medical Uses of Radioisotopes. He was President of the International Association of Dental Research in 1945-1946, Chairman of the 1959 Gordon Research Conference on Bones and Teeth, and Chairman of the Macy Foundation Conference on Metabolic Interrelation from 1949 through 1953.

Dr. Maurice Visscher recently wrote: "Wallace Armstrong has not shunned controversy. As a department head, he has had to argue with deans for proper support for the discipline he represents. Although the University of Minnesota is one of the very largest universities in the country, it has achieved the degree of academic excellence which it has by virtue of careful husbanding of economic resources which have not been as ample as those of many smaller institutions. Furthermore, it has required that the administrator and staff obtain private foundation and Federal grant supports for much of its scholarly work. In this, Dr. Armstrong has been successful as indicated by the existence of two Hill Family Foundation Professorships in his Department; one in enzymology and one in dental biochemistry as well as by ample support from the United States Public Health Service and other agencies. Wallace Armstrong has promoted his discipline well and has occasionally raised a few hackles among his colleagues in so doing. However, despite the fact that on occasion his tongue appears to be a bit on the acid side of neutrality, he is universally respected for his honesty and forthrightness and beloved for his genuine interest in the welfare of his students and colleagues."

Chapter XXXIX

Department of Physical Medicine and Rehabilitation

THE EARLIEST USE OF physical modalities at the University of Minnesota was the employment of conventional diathermy in the student health service. Mr. Ray Amberg was then a pharmacist and served as the technician for application of this treatment.

In 1928, when the Eustis Hospital was built, a small physical therapy department was included. It consisted of three rooms, one of which was occupied by a very inadequate therapeutic pool. The second contained a few treatment booths and the third served as a small gymnasium.

Miss *Sara Kollman* came from Gillette Hospital to the University on January 1, 1932, to give massage, exercises, and pool treatments under Dr. Cole's direction. Stall bars, weights and pulleys, posture mirror, and other equipment which had been stored in the unused therapeutic pool room were installed and the department began to function. Gradually, patients began to be referred by the Departments of Medicine and Neurology as well as by Orthopedics. A limited number of out-patients also received treatment.

However, the department was divided. Doctor *Wilhelm K. Stenstrom,* a biophysicist in charge of deep x-ray therapy was in charge of electrotherapy. *Bernice Harlow Swanson* and later *Laura Becklund Plank,* nurses from the x-ray department gave diathermy and ultraviolet treatments three times a week.

At least three research projects were pursued at this time. Treatment of peripheral vascular disease by suction pressure boots and cuffs was investigated; Doctor *Flagstad,* an orthopedist, studied vital capacity in scoliosis, and intensive mechanical fever therapy using the Kettering Hypertherm was directed by Doctor *Malcolm M. Cook.*

During my time as a medical student (1924-1930), the only mention of physical therapy was contained in two lectures given by Dr. Stenstrom principally on the physics of diathermy and radiant energy.

My own interest in physical therapy stems from my concern about adequate treatment and restoration of function in fractures during my surgical residency at the Minneapolis General Hospital from 1930 through 1933. Upon completion of this surgical residency, I was appointed chief of the Department of Physical Therapy at Minneapolis General Hospital. Realizing that I knew almost nothing about the field I made arrangements to spend two weeks at Michael Reese Hospital in Chicago with Dr. Charles Molander and also accompanied Dr. John F. Coulter on his rounds of several of the hospitals in Chicago.

In spite of the total lack of interest in my surgical training many doctors were asking me questions about physical therapy and it seemed that this field could be developed. Therefore, an office was rented in the Medical Arts Building and my name was placed on the door with the notation, "Practice limited to Physical Therapy."

After three years of living on borrowed money, work began to increase so as to pay office expenses and most of my living expenses. In 1935, Dr. *Frank H. Krusen* came to the Mayo Clinic to develop a department of physical therapy. Then there were two specialists in physical therapy in the State of Minnesota.

In 1939, an invitation came to take charge of the physical therapy division at the University. At that time, the division was administratively under the department of radiology but was divided. The personnel consisted of Miss *Kollman,* the graduate physical therapist, Miss *Laura Becklund,* the nurse assigned part-time from deep x-ray therapy, and *Olga Olson,* an aide.

Our first administration change was to unify the division under my direction. Miss Kollman was anxious to start a training course for physical therapists and we began preparations immediately for that accomplishment. In 1941, our first enrolled class consisted of five students, three men who were graduates in physical education, and two women who were graduate nurses. This certificate course was arranged to start with the summer session so that physiology, physics, anatomy, and other basic courses could be taken during the summer. The actual training in physical therapy techniques and patient care would begin with the fall quarter and end in the spring. We felt that we could handle a small class such as these five students. To our dismay when the registration for the summer session was completed there were more than 20 students registered. However, when the actual physical therapy began in the

Fall our fears were allayed because the original five students were the only ones who passed the courses. The rest were looking for easy courses and all had failed. Our five original students not only graduated but passed the national examination of the American Registry of Physical Therapists.

There was no University budget for this course. Miss Kollman and Miss Becklund were salaried employees of the University but they had not only teaching duties but also regular treatment duties. I was part-time and non-salaried. Since there was no budget, I purchased any needed supplies with my own very limited funds. Applicants for the course increased and Miss *Ruby Green* was added to the staff as technical director of the physical therapy course. She was a graduate of our class of 1943 and in order to qualify her as a teacher we sent her to Stanford University for a year where she received her master's degree.

Fever therapy developed about this time and we were able to add a room in which a Kettering hypertherm was placed and Dr. *Malcolm Cook* was placed in charge of the fever therapy. This program continued until penicillin and other antibiotics which were much safer, became more available and made fever therapy obsolete.

From the first class which graduated in 1942, consisting of five members, we proceeded to eight in 1943, then because of the pressure of the war, we stepped up our program so that we had two classes a year. By 1946, we had 26 students in the class.

In the meantime, we had decided to start a degree course and gradually phase out the one-year certificate course. Dr. *Catherine West,* who had been my associate, resigned in 1945 to become a full-time mother and Dr. *Alice Brill* took her place.

Affiliation with the Minneapolis General Hospital provided greater clinical facilities and a massage and corrective exercise laboratory.

The first degree course students graduated in 1947 and they obtained a bachelor of science degree as well as a certificate. During the war, a need was recognized for the establishment of an occupational therapy course and we had many meetings with various members of the University staff and representatives of the war effort in order to get this started. In 1946, Miss *Borghild Hansen* came to the University to organize the course in occupational therapy.

During the war also, Dr. *Frederic J. Kottke* was induced to take a Baruch fellowship in physical medicine, receiving training in a number

Miland E. Knapp

of centers throughout the country. He then came back to the University of Minnesota in 1947 to become the full-time director of our division. Under his leadership, it has expanded with remarkable speed and to undreamed-of dimensions in all phases of teaching, research, and clinical practice.

Soon after I assumed direction of the division at the University Hospital, attempts were made to introduce a required course in physical medicine into the medical school curriculum. After much negotiation and largely through the efforts and cooperation of Dean Diehl, we were able to get one lecture a week for one quarter.

Dr. *Miland E. Knapp* who wrote the above early history of the department, was born in Minneapolis in 1905. After graduating from high school, he entered the University of Minnesota where he received the degree of bachelor of science in 1926. He then entered the Graduate School and was awarded the degree of master of arts in physiology in 1928. The next year he was granted the degree of doctor of medicine with distinction. From 1930 to 1933, he completed a fellowship in surgery at the Minneapolis General Hospital. He then became Chief of the Department of Physical Therapy at the Minneapolis General Hospital and the next year began to specialize in physical therapy as the first physician specializing in this field in the State of Minnesota.

THE DEPARTMENT FROM 1945 TO 1965*

The twenty-year span from 1945 to 1965 was a period of remarkable growth and development in physical medicine. The necessary talent, coupled with the motivation for teaching and training doctors in the proposed new specialty of physical medicine, for teaching and training occupational therapists and physical therapists, and for conducting research in basic sciences as well as on clinical problems was available in the medical school of the University of Minnesota at the time when our country became aware of the needs for and potentialities of physical medicine.

During the civilian manpower shortage which developed when men were drafted for service in World War II, industry was forced to hire some handicapped people in order to meet production schedules. When the performance of these people was evaluated it was found that their productivity was good, absenteeism and accidents were actually less among this group than among the non-handicapped workers, and they tended to stay at their jobs.

At the end of World War II, there were many disabled soldiers who required rehabilitation before they could return to civilian duties. The impetus to study the needs for physical medicine on a nationwide basis was given financial support by Bernard M. Baruch, financier, philanthropist and advisor to presidents, whose father Dr. Simon Baruch (1840-1921) was a physician practicing medicine during the period of the Civil War. Dr. Simon Baruch had been convinced of the efficacy of physical agents, and in particular, of the value of hydrotherapy for the treatment of disabilities. In memory of his father, Bernard Baruch made available an initial sum of $1,100,000 of his personal fortune to be used to determine the needs of the people of our country for physical medicine.

A committee of distinguished doctors and scientists from educational institutions, the Armed Services, including the Navy, was selected in 1943 to promote the advancement of the science of physical medicine. Dr. Frank Krusen,* very active in the area of physical medicine in the

*This section of the history of the department was prepared by Miss Mildred E. Olson, Associate Scientist in Physical Medicine and Rehabilitation.

*Then head of the Department of Physical Medicine at the Mayo Clinic, head of the Department of Physical Medicine, Temple University 1964.

State of Minnesota, became the director of the work of the Baruch Committee. A committee on War and Post-war Physical Rehabilitation and Reconditioning was also established in the same year. The first report of the Baruch Committee stressed the need for a comprehensive program, including physical rehabilitation, psychosocial treatment and vocational re-training for demobilized veterans as well as for those members of the civilian population who each year become handicapped by disease and accidents or are born with handicaps. The number of physicians qualified to teach and use physical medicine was found to be extremely limited, so the recruitment and training of new men had to be accelerated. It was realized that a great deal more basic and clinical research would have to be done to build up the body of knowledge in the discipline of physical medicine.

Included in this first report of the Baruch Committee was a statement which John Galsworthy had made in 1919 at the Allied Conference on the After Care of Disabled Men, held in Washington, D.C.:

"Statement of John Galsworthy"

"Restoration is at least as much a matter of spirit as of body, and must have as its central truth:—Body and spirit are inextricably conjoined. To heal the one without the other is impossible. If a man's mind, courage and interest be enlisted in the cause of his own salvation, healing goes on apace, the sufferer is remade; if not, no mere surgical wonders, no careful nursing, will avail to make a man of him again. Therefore I would say: 'From the moment he enters the hospital, look after his mind and his will; give him food; nourish him in subtle ways; increase that nourishment as his strength increases. Give him interest in his future. Light a star for him to fix his eyes on, so that, when he steps out of the hospital, you shall not have to begin to train one who for months, perhaps years, has been living, mindless and will-less, the life of a half-dead creature.'

"That this is a hard task none who knows hospital life can doubt. That it needs special qualities and special effort, quite other than the average range of hospital devotion, is obvious. But it saves time in the end, and without it success is more than doubtful. The crucial period is the time spent in the hospital. Use that period to recreate not only the body, but mind and will power, and all shall come out right; neglect to use it thus and the heart of many a sufferer and of many a wouldbe healer will break from sheer discouragement. A niche of usefulness and self-respect exists for every man however handi-

capped; but that niche must be found for him. To carry the process of restoration to a point short of this is to leave the cathedral without spire. To restore him, and with him the future of our countries, that is the sacred work."

It was felt that since physical medicine encompassed such a broad field, that these terms required definition: physical medicine, rehabilitation, and occupational therapy. The following definitions were evolved:

Physical Medicine includes the employment of the physical and other effective properties of light, heat, cold, water, electricity, massage, manipulation, exercise, and mechanical devices for physical and occupational therapy, in the diagnosis or treatment of disease.

Medical Rehabilitation is the restoration of people handicapped by disease, injury or malformation as nearly as possible to a normal physical and mental state. Medical rehabilitation fills the gap between the customary end point of medical attention and the real necessities of many patients.

Occupational Therapy provides a graded program of activity to rerestore maximal physical and mental function or seeks to divert a person and improve morale by arousing his interest, courage and confidence.

Speaking of the establishment of combined programs of teaching and research in the medical schools, the Baruch Committee recommended that there be two key men in physical medicine, one, a physician, with graduate training in physical medicine and the other a research man specially trained in physics or physiology, or both. The committee further recommended that "These two key men should gather around them a group of interested teachers and research workers in allied fields and should have working with them a number of fellows who will eventually be trained to teach either the clinical aspects or the basic research aspects of physical medicine in other medical centers."

Following its preliminary survey, the Baruch Committee recommended that the funds which had been made available by Mr. Baruch be distributed as follows: Three large grants to centers to become 'model' centers for the country, and smaller amounts to educational institutions to be used for the purpose of establishing or strengthening existing programs of teaching and research in physical medicine. Columbia University received $400,000 for the development of a 10-year program in physical medicine, New York University received $250,000 to develop a center in physical medicine, special emphasis to be placed on

structural mechanics of the body, and the Medical College of Virginia received $250,000 for a center of physical medicine with special emphasis on hydrology.

The University of Minnesota Medical School was one of the centers chosen to receive support from the Baruch Foundation and an expanded program of teaching and research in the field of physical medicine was begun in January 1945, with the receipt of $40,000 for this purpose.

A committee was formed to direct the project at the University. This committee under the chairmanship of Dr. M. B. Visscher, Professor and Head of the Department of Physiology, consisted of Dr. Harold S. Diehl, Dean of the Medical Sciences; Dr. Miland E. Knapp, Director, Division of Physical Therapy; Dr. Frank H. Krusen, Professor of Physical Medicine, Mayo Foundation; Dr. William A. O'Brien, Director of Post-graduate Medical Education; Dr. Wesley W. Spink, Associate Professor of Medicine; and Dr. Karl W. Stenstrom, Professor of Biophysics.

Men who were to become "the two key men" as recommended by the Baruch Committee were well along in their training. Dr. *Frederic J. Kottke,* M.D., who had a doctor of philosophy degree in physiology, with a minor in pathology, was chosen to be a Baruch Fellow in Physical Medicine. Dr. *W. G. Kubicek* was completing his advanced studies in physiology and physical chemistry and carrying out basic research in physiology.

In the report to the Baruch Committee for the period ending December 31, 1946, Dean Diehl stated in conclusion:

> "The Minnesota Committee for the administration of the Baruch grant is now fairly well satisfied with the general plans for work in Physical Medicine at the University of Minnesota. Until recently, it was impossible to obtain many competent students and workers in this field. We now have nearly completed the training of Dr. F. J. Kottke, who will soon, we expect, take over responsibility for work in this field, and we have several other competent workers in training.
>
> "During the past year, we expended $9,400 of Baruch funds and we expect to spend somewhat more during the current years."
>
> "We propose to 'make progress slowly' by basic research on fundamental problems, because we have no hope of being able to solve the practical problems of Physical Medicine without more fundamental research. This is not the spectacular way to proceed, but we are sure that it is the only way to be certain of ultimate success."

On July 1, 1947, Dr. Kottke was made Assistant Professor of Physical Medicine. Dr. William G. Kubicek, Assistant Professor of Physiology, became a permanent member of the faculty of Physical Medicine in 1948. The departmental office was located on the second floor of a wooden temporary building west of the University Hospitals.

In addition to Drs. Knapp, Kottke, and Kubicek, the teaching staff for the period of January 1, 1948 to June 30, 1949 was composed of: 1 clinical instructor, 3 fellows in physical medicine, 1 director of the school of physical therapy, 1 instructor in the school of physical therapy, 1 director of the school of occupational therapy, 1 instructor in the school of occupational therapy and 1 instructor of biophysics.

In the clinic at that time, there was 1 physical therapy supervisor, 4 physical therapists, and 1 fever therapist, while in the research section there were two medical technologists.

YEARS OF EXPANSION AND DEVELOPMENT

Financial support from the Baruch Foundation ended in 1951, but a substantial beginning had been made. Under the energetic leadership of Dr. Frederic J. Kottke, augmented by the strong support of Dr. Kubicek in the area of research, the years from 1947 on were years devoted to the expansion of physical facilities at the University of Minnesota to permit total treatment and care of patients requiring rehabilitation services and to the increase in scope of research related to problems encountered in physical medicine. These years were also devoted to the strengthening of the curriculum in physical medicine which was a division of the Department of Radiology until 1952 when Physical Medicine and Rehabilitation was made an autonomous department of the Medical School with Dr. Kottke as head.

The first major expansion was the location of the Rehabilitation Center on the 7th and 8th floors of the Mayo Memorial in 1954. Crippled Child Relief initially made a gift of $58,000 toward equipping the center. The Minnesota Legislature appropriated funds for the construction of the facility. In 1961, Dr. *Glenn Gullickson, Jr.* was made Director of the Rehabilitation Center.

When completed in 1954, the new Rehabilitation Center was lacking space for speech therapy, a sufficient number of examining rooms, and space for a pre-vocational try-out shop for the adequate evaluation of the employment potential of patients. Funds from the State Division of

Vocational Rehabilitation, The National Office of Rehabilitation, and Crippled Child Relief made possible an expansion on the south and southwest wings of the 7th floor of the Mayo Building. Many persons worked for this expansion. Governor Orville Freeman was actively interested in the potentials of this project and encouraged its support. These facilities for speech therapy, work evaluation, vocational counseling and medical examination were activated in 1957.

Occupational therapy required laboratory space so that students could become experienced in the handling of power equipment. Crippled Child Relief again followed its policy of assisting the rehabilitation program by providing $10,000 toward the remodeling of part of the former physical therapy clinic on the first floor of the University Hospitals to make a modern laboratory and classroom. Students began using the laboratory in 1958.

Several factors were operating which would ultimately lead toward the construction of a separate rehabilitation facility for children. Exploration of possible sources of funds was begun in 1960. Encouragement and assistance were provided by Dr. Robert N. Barr and Dr. Helen L. Knudsen of the Minnesota Department of Health. Funds for the building came from a number of sources. Proceeds from the sale of the William Eustis property provided funds to cover 55% of the cost and Hill Burton Funds and private sources provided the remainder. The six and one-half floor Children's Rehabilitation Center was activated in the summer of 1964 and dedicated on November 7, 1964.

Physical Medicine and Rehabilitation* provides a 3-year residency after which a doctor is eligible to write the board examination for physiatrists. Programs leading to the master's and the doctor of philosophy degrees are also available for the doctors who aspire to the teaching of physical medicine and rehabilitation. Summer fellowships are offered to medical students. Under the comprehensive clinic plan, undergraduate doctors have an opportunity to follow patients in rehabilitation. Doctors Kottke, Kubicek, Gullickson and Knapp direct the programs of advanced study in the field.

The occupational therapy course became established as a four-year degree course in 1946 and received accreditation in 1948. Miss Borghild

*In 1953, the term "rehabilitation" was officially added to the designation of the specialty of physical medicine.

Hansen* was director of the course since its beginning. The physical therapy became a four-year degree course in 1948. Ruby Green (Overmann) became the director of the course in 1947 and was succeeded by Wilbur Moen in 1957.

By 1965, the teaching staff, besides Doctor Kottke, Doctor Kubicek and Doctor Knapp had increased in number to 45.

In the clinic, the number of physical therapists at various levels of responsibility totaled 18, and occupational therapists number 16. Full-time laboratory personnel in research numbered five and there was a kinematics mechanician and an electronics man full-time.

The rehabilitation center staff also included speech pathologists, a social worker, vocational counselors and psychometrists.

In 1961, the Vocational Rehabilitation Administration designated the University of Minnesota Medical School and Sister Kenny Rehabilitation Institute to be one of five regional rehabilitation centers to receive financial support for teaching and research in the field of rehabilitation.

With this support, the Rehabilitation Center will be able to continue improving the curriculum in physical medicine and rehabilitation and thereby be enabled to render better service to the handicapped, not only in the State of Minnesota but nationally and internationally through the people who shall have been trained at the Rehabilitation Center. (See Appendix J. for staff list.)

Dr. *Frederic J. Kottke,* head of the department, was born in Hayfield, Minnesota in 1917. After graduating from high school, he entered the University of Minnesota where he received the degree of bachelor of science in 1939. He then enrolled in the Graduate School and was awarded the degree of master of science in 1941 and doctor of philosophy in 1944 in physiology with a minor in pathology. In 1945, he was awarded the degree of doctor of medicine. The next year he was a Fellow in Physical Medicine, University of Minnesota. During the year 1939-1940, Dr. Kottke was teaching assistant in physiology and instructor from 1941-1944.

He rapidly advanced from an assistant professorship of Physical Medicine in 1947 to Director of the Division of Physical Medicine in 1949 and head of the Department of Physical Medicine and Rehabilitation in 1952 and professor in 1953. He holds membership in numerous organizations in his special field including the American Academy of

*Deceased September 1966.

Frederic J. Kottke

Physical Medicine and Rehabilitation, the American Physiological Society, the International Society for Rehabilitation of the Disabled, the Society for Experimental Biology and Medicine, and the National Rehabilitation Association. He holds membership on the Editorial Boards of the *Archives of Physical Medicine* and *Modern Medicine.*

In the American Congress of Physical Medicine and Rehabilitation, Dr. Kottke advanced from 5th vice-president in 1954 to president-elect in 1959 and president in 1960. He became a member of the American Board of Physical Medicine and Rehabilitation in 1955 and president of the Board in 1963. He is a member of the Minnesota State Board of Health and continues to contribute significantly to the welfare of many other organizations. In 1959, he received a Citation by the President's Committee on Employment of the Physically Handicapped. Two years later, he was awarded the Distinguished Service Key of the American Congress of Physical Medicine and Rehabilitation.

Chapter XL

Department of Anesthesiology

When the University of Minnesota Hospital opened in 1909 in an old residence on Washington Avenue Southeast and State Street, the first surgical patient, a Mr. John J. Hough, was admitted on March 22. On March 27, he was operated upon for appendicitis. The surgeon was Dr. *James E. Moore* (see Chap. XXVI) and the anesthetist was Dr. *Frederick H. Poppe*, a 1907 University of Minnesota Medical School graduate. (See Chapter XXVII.)

As was the custom in those days, the anesthetist, in addition to his other duties, wrote the record and description of the surgery as well as of the anesthesia. Apparently everything went so smoothly and normally that there seemed very little to record. The pre-anesthetic medication was recorded as Morphine sulphate, grain ¼, and Atropine sulphate, grain 1/150, half an hour before anesthesia. For the next two years, the conduct of anesthesia followed pretty much this routine.

In 1911, when the Elliott Memorial Hospital was opened, the operating room on the fifth floor was under the supervision of Miss *Gertrude McBrien,* who later became Mrs. *Franklin R. Wright.*

Teaching of anesthesia to the medical students consisted of instruction in the Department of Pharmacology concerning the characteristics and actions of ethyl ether, chloroform and possibly one or two other drugs used more rarely, such as ethyl chloride, plus the more casual observation of the work of a nurse anesthetist, Miss *Katherine Dougherty,* in the operating room. The junior and senior students also attended surgical clinics in Minneapolis City Hospital, St. Paul Ancker Hospital and several other Twin Cities hospitals. There they could observe the induction and maintenance of anesthesia by the nurse anesthetists or interns and the often critical remarks of the surgeons as to the results, rarely by way of how to make them better, except to "pour on more." One outstanding bit of student education in that year was a remark by a prominent surgeon, when the anesthetist looked over the screen to ob-

serve the relaxation, was the rebuke: "You give the anesthetic, I'll do the operation."

All told, the students seemed to receive enough anesthesia instruction through these various channels to stand them in good stead when later, as graduates, they were called upon to render people insensible to pain. Open or semi-open drop ether was practically the universal method. Some of the more experienced physicians turned to chloroform for short cases and for intermittent use in obstetrics.

By the middle of the decade, no physician seemed available and nurse anesthesia was solidly established in all of the hospitals. There is very little on record concerning the status or progress of anesthesia at the University. During this period, a nitrous oxide machine was obtained.

From July 1, 1919 to June 30, 1920, Dr. *James W. George* was assistant professor with duties of teaching and supervising anesthesia. Dr. George was a general practitioner in Minneapolis who, in addition to his other work, administered some anesthetics in private practice. He presented one or two papers before the Hennepin County Medical Society, especially dealing with the role of nitrous oxide in good anesthesia. Few surgeons were impressed with any advantage in having a physician-anesthetist.

Having returned from World War I surgical service in France, the writer became Instructor in Surgery (Anesthesia) on July 1, 1920 under Dr. *Arthur C. Strachauer,* Head of the Department of Surgery. (See Chapter XXVI.) At that time, at least in this area, anesthesia was still looked upon by most surgeons and most patients as a simple, routine, unpleasant, necessary, but relatively unexacting and unimportant adjunct to surgery. Dr. Strachauer had a more penetrating and far seeing view of it. He sensed that a good knowledge of physiology, physiological chemistry and pharmacology could make a good deal of difference in the quality of anesthesia for surgery and in the physiological welfare of the patient.

When operations were performed, the senior medical students occupied the gallery of the operating room. Three or four of them gathered around the head of the table. One of these administered the anesthetic under the guidance of the instructor while the others listened and watched the demonstration.

As a basis for the demonstrations, six lectures on clinical anesthesia were given to the senior students. Ethyl ether provided the ideal medium

for producing, controlling and demonstrating the physiological facts and pharmacologic effects which were the themes of the lectures. Chloroform too was sometimes used, if the anesthesia was to be brief, or if for some reason ether was thought to be contra-indicated. This gave an opportunity to demonstrate the great difference in potency, the differences in relative length of certain stages of anesthesia and in pharmacologic effects such as the bradycardia produced by chloroform contrasted with the tachycardia caused by ether.

Students were taught to observe with care the physical signs of the changing planes; the respiratory signs, the color signs, the muscular signs, the eye signs and the pulse signs. The rate, rhythm, quality and volume of the pulse were monitored meticulously and continuously. The monitoring finger practically never left the temporal, mandibular or, sometimes, the carotid artery. By 1923, at Minnesota the blood pressure was being read and recorded at frequent intervals during each anesthesia.

An unobstructed airway was always emphasized. While the middle finger measured the mandibular pulse, the 3rd and 4th fingers were behind the angle of the jaw lifting it forward.

Nitrous oxide, used only occasionally, served to demonstrate again differences in pharmacological actions in that, although it produced the same planes as ether during induction, it could not provide levels beyond the first plane of the third stage if adequate oxygen was administered. It did however, serve to lessen the amount of ether required for the deeper planes of surgical anesthesia. By the local standards prior to 1924, nitrous oxide was too expensive to be used at all routinely in a tax support hospital. By 1925, absorbers of the circle rebreathing type were installed and the use of nitrous oxide with or without the addition of ether, became practically routine.

In 1926, ethylene was added to the University equipment. With the increased surgical schedules, more off-schedule cases, and greater use of the gases it became necessary to have more help in addition to the senior students and the interns. It was decided to employ nurse anesthetists but it was very difficult to find them. However, Miss *Nellie Hegstad* had received six months of practical instruction in anesthesia at Minneapolis General Hospital, and in May, 1927, she was engaged as nurse anesthetist at University Hospital.

By August 1927, regular surgical schedules occupied each morning

of the week and it was necessary to use the cases every morning for teaching anesthesia in order to give each of the growing number of medical students his opportunity. Dr. *Anna Whelan Arnold,* a practicing obstetrician and gynecologist in Minneapolis, was appointed instructor in anesthesia. She remained in this capacity until March, 1929.

When Dr. *Owen Wangensteen* was named head of the Department of Surgery, it became obvious that in order to have enough anesthesia personnel a systematic training program would have to be developed. Miss *Hegstad,* by then Mrs. *Harvey M. Nosby,* was appointed instructor in anesthesia. In February 1929, two graduate nurses, Miss *Alice Youngberg* later Mrs. *C. D. Creevy,* and Miss *Zelda Krueger,* became the first two of a long succession of student nurse anesthetists. Mrs. Nosby took over the supervision of the medical students three mornings a week to continue Dr. Arnold's work and also taught the student nurse anesthetists.

As the open mask method with liquid anesthetics slowly gave way to the use of machines, it became impractical to have the medical students actually give anesthetics because each could have only a couple of opportunities and could learn very little of the detail in so short a time.

A steady stream of nurse anesthetist students passed through the training program. All of the succeeding chief nurse anesthetists were graduates of this training program. Mrs. Harvey Nosby continued as chief nurse anesthetist and instructor until February 28, 1930. Thereafter, Miss *Alice Youngberg,* Miss *Alice Berg,* Mrs. *Lillian Clayton,* Miss *Julo Slattendale* and Miss *Pearl Lemke* in this order served as chief nurse anesthetists.

By 1928, a much closer relationship had been formed between the surgical departments of the Minneapolis General Hospital and the University Hospital. The director was assigned to anesthesia at the Minneapolis General as well as at the University, dividing his University time between the two. In 1930, a program of nurse anesthetist training was started at the Minneapolis General Hospital. After the first one, all of the students were rotated during their training between the University Hospital and the Minneapolis General Hospital.

In 1924, Dr. *John S. Lundy* came from Seattle, Washington to the Mayo Clinic, and started to build the Section on Anesthesia, which became world-renowned under his leadership. He introduced the word "anesthesiology." In the mid-1920's, Dr. *Arthur E. Guedel* came to the Minneapolis General Hospital as chief anesthetist. He planned to de-

vote himself entirely to anesthesia, to conduct a school of anesthesia at the Minneapolis General Hospital for physicians, and to develop a private practice in anesthesia. This was a heroic effort. He announced the school in *Minnesota Medicine* and sent invitations to physicians throughout the state. The course was to be for two and three months and a fee was to be charged. He received almost no response and received almost no calls from surgeons for his services. He was many years ahead of his time in Minnesota. After about a year of trial, he moved to Los Angeles and became one of the best known anesthesiologists in the United States.

Beginning in 1929 and 1930, avertin, tribromethanol, was used to quite an extent. It was administered by rectum. Its primary purpose was to provide a most pleasant induction. It was however, time-consuming and this influenced against routine use of the agent and method.

As ether in oil had also long been administered by rectum to meet certain conditions, the same kind of investigation was carried out with ether. It was found that 20 cc of ether for each eight calories per hour administered in oil by rectum produced an anesthetic effect equivalent to one gram of avertin.

As soon as the safety, advantages and effectiveness of cyclopropane were assured, it practically displaced all other anesthetics except when a cautery had to be used about the head and neck and in that circumstance choloroform seemed still to fill a need. However, even brain operations were done under cyclopropane anesthesia with the operative field well sealed off from the rest of the head and face with high drapes.

In 1935, good use began to be found here for "apnoea" as suggested by Arthur E. Guedel in 1934, or "passive respiration," a term suggested by Philip Woodbridge, or "assisted" or "controlled" respiration as suggested by others. The technique was especially applicable to cyclopropane. Relaxation could be greatly enhanced if, by compression of the breathing bag during inspiration, the inspirations were deepened and blood carbon dioxide concentration reduced below the stimulation threshold. Thus, the anesthetist "took over" respiration and caused the patient's muscles, without any call for action or firmness of even the respiratory muscles, to become much more relaxed than the plane of anesthesia would otherwise induce.

In 1933 and 1934, a limited use was made of sodium amytal and later, pentobarbital intravenously in a few cases. The dose of sodium

amytal required for even relatively minor procedures was so large and the recovery time so long (even up to 24 hours) that it seemed quite impractical. Nembutal was somewhat better in that it required a smaller dose and offered a shorter recovery time. Recovery still was too long however, for practical use in surgical cases. Used intravenously, it was of definite value in certain emergencies when quick, deep, and prolonged sedation was required.

Evipal soon appeared and seemed perhaps to be the long awaited answer to the desire for a good intravenous anesthetic agent. It produced very quick and pleasant sleep and a rapid recovery. Its best use proved to be for induction before other anesthetics.

But cyclopropane continued to be the most commonly used general anesthetic. Nitrous oxide and ether, or ethylene and ether, were used to some extent. Sodium pentothal became the standard for induction before other anesthetics and was continued as the sole anesthetic in cases which were of sufficiently minor severity that it could control reflexes and produce relaxation.

Spinal anesthesia soon came into much greater use. By 1938, it was used for practically all procedures below the diaphragm. For upper abdominal operations, the patients were also given a general anesthetic. It was soon recognized that procaine produced more profound depression of the sympathetic roots than did some other anesthetics and had a shorter duration of anesthesia and motor depression. This made it less valuable than some others for prolonged surgery. Therefore, conservative doses of nupercaine came into quite general use.

In all cases, an intravenous drip of 5% dextrose was started before anesthesia began. Blood was given according to the measured loss. Blood pressure during spinal anesthesia was supported by various pressor drugs, a multitude of which were beginning to be offered. The most effective and reliable was a mixture of ephedrine and neosynephrine. These were mixed in a rubber capped bottle in the proportion of 20 mg of ephedrine to 1 mg of neosynephrine. The single dose of 20 mg of ephedrine to 1 mg of neosynephrine. The single dose, intravenously, was 2 or 3 mg of ephedrine with its accompanying very small dose of neosynephrine repeated as necessary.

Early in 1939, there was a cyclopropane explosion at the University Hospitals. During that spring, there had been a widespread occurrence of bronchial infections, with considerable secretions, and this had caused

an unusual number of post-operative atelectases. Therefore, all major surgery cases were bronchoscoped at the end of anesthesia to clear the bronchial tree. The patient involved in the explosion was a young man from a tuberculosis sanatorium who previously had two stages of thoracoplasty and was having the final stage performed. The operation was completed and the bronchoscopy was to be done. While waiting, the nurse anesthetist allowed the anesthesia to lighten. When the bronchoscopist was ready, she increased the cyclopropane flow and began to increase ventilation by bag pressure to deepen the anesthesia. With the third squeeze of the bag, the explosion occurred. Within thirty seconds the patient became cyanotic. Pure oxygen did no good and the heart soon stopped. Autopsy showed rupture of almost all parts of the previously good lung, while the collapsed lung showed no injury. All rubber parts of the machine were riddled. The clasps on the metal carbon dioxide absorber cover were blown apart and the canister bent. The valves were destroyed and the glass tops on the valve casings were blown out and pulverized. No piece was found. Several very tiny bits of glass were imbedded in the anesthetist's corneas and she had some peppery marks on her face but sustained no permanent injury. As methods for preventing ignition were brought out they were, of course, adopted.

In 1937, inflatable tracheal tube cuffs came into being. At first, they were obtained from Dr. Waters at the University of Wisconsin. However, Dr. *Grimm* began to make inflatable cuffs but they were not satisfactory so he tried rubber contraceptive condoms. A small punched hole in the tip would stretch, air-tight, over the tracheal tube and with a little rubber cement was very durable. The upper end was cut to the desired length and was pleated and folded to enclose a small inflation catheter. Dr. Grimm further perfected this cuff and published the description of it in *Anesthesiology*.

Dr. Knight established a modest residency training program in 1939. His early residents and their dates of service at the University Hospitals were:

Dr. J. Earl Murphy	July 8, 1939 - September 8, 1939
Dr. Jane Musselman	August 1, 1939 - September 28, 1941
Dr. John E. Grimm	May 22, 1940 - September 20, 1942
Dr. Francis X. Swanson	July 1, 1940 - June 30, 1941
Dr. Scott M. Smith	July 1, 1942 - July 1, 1943
Dr. Nels N. Somnesyn	August 10, 1942 - February 15, 1943
Dr. Frank Cole	September 28, 1942 - September 30, 1945
Dr. Isadore Kremen	July 1, 1945 - February 28, 1946

When World War II was declared, it was realized that there would be a great shortage of nurse anesthetists for both military and civilian service. The United States Public Health Service urged the University to greatly expand the program of training them. The Public Health Service would pay the students a stipend plus tuition and an amount for their board and room. The program was adopted and the applications came rolling in. A new nurse anesthetist student started every two weeks, and this was continued throughout the war years. As the University Hospital could not accommodate so many, arrangements were made for them to rotate through the University Hospital, Minneapolis General Hospital, St. Mary's Hospital, and Miller Hospital. Dr. Grimm and his successors, and the chief nurse anesthetist, Miss *Pearl Lemke,* and the nurse anesthetists in the other hospitals did an excellent job in contributing to their training.

It was about this period that Intercostrin, a fairly refined product of curare, was produced. From the spring of 1943, curare was used in nearly all of our cases needing any considerable relaxation and the use of spinal anesthesia diminished greatly. Spinal anesthesia was however still used for many caesarian sections and for transurethral resections, as well as other selected cases.

During World War II, the staff nurse anesthetists entered military service and only Dr. *Cole* and the writer were left to carry on the clinical anesthesia service with only student nurse anesthetists.

The surgical schedule had constantly grown to occupy ten or even eleven hours a day. The pressure from outside work was also increasing heavily. More hospitals were asking for some kind of teaching and supervision and more surgeons were asking for individual anesthesia administrations.

Fortunately Dr. *Joe W. Baird* came to Minneapolis January 1, 1944 to be Assistant Professor of Anesthesiology at the University. With two senior men on the staff, it was possible for one to be at the University Hospital all through the day and both of them much of the time. As of July 1944, Dr. Baird was promoted to associate professor. The promotion of such a good associate drew the attention of more surgeons to the importance and benefits of medical anesthesiology and the requests for service mounted at an increased rate. Within a few months after Dr. Baird came, more help was sorely needed. Fortunately again, Dr. Baird was able to secure Dr. *A. William Friend* as a member of the

team. He arrived in August, 1944, to be Assistant Professor of Anesthesiology at the University. His coming made it possible to further increase the efficiency of service and teaching at the University and the response to calls for service outside.

Through the war years, the Medical School had been on a four-quarter basis without vacations and a class graduated every nine months. At the close of the war, this changed and even greater activity could be foreseen. With demobilization, many more thousands went to college and medical classes were larger. An historic moment for the Anesthesiology Residency Program had arrived.

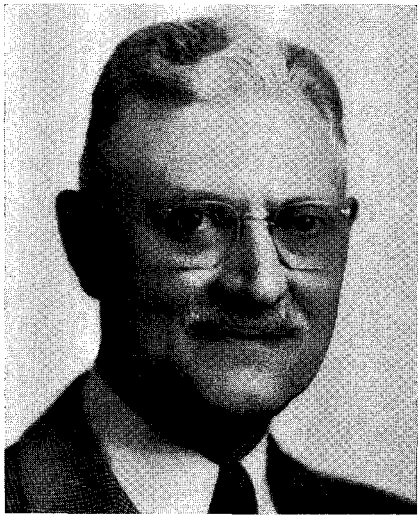
On a day in December, 1945, two men in officers uniforms, one after the other, walked into my office and asked for residency appointments. The first was Dr. *Marvin Adams,* the second Dr. *Frederick H. Van Bergen.* Both were accepted and arranged to report January 1, 1946. Immediately after that, the applicants began to come rolling in.

It was decided that the mission of the Anesthesiology Division had come to be the training of anesthesiologists. The need for anesthetists would thus be better served. The trained people could better instruct others and would be in a position to supervise and train more nurse anesthetists as needed. The acceptance of nurse anesthetist students' applications was therefore discontinued.

A very satisfying thing then happened. I called all the nurse anesthetist students together and told them that a number of residents were arriving and that those of them who had six months or more training would have these doctors under their wings to tell them and show them all they knew and get them off to a good start. I told the new residents the same thing. The transition from nurse anesthetists to residents was an unqualified success.

Ralph Thomas Knight who prepared the above sketch on Anesthesiology, was born in Minneapolis in 1886. He received the degree of doctor of medicine from the University of Minnesota in 1912. From 1913 to 1915, he was Instructor in Anatomy at the University of Nebraska. He then entered surgical practice in Minneapolis. During World War I, he rose from Major to Lieutenant Colonel in the United States Army Medical Corps. He remained in the Army Medical Reserve until 1953 when he retired with the rank of Colonel.

In 1920, after retiring from World War I, Dr. Knight became Instructor and Director of the Division of Anesthesiology in the Depart-



Ralph T. Knight

ment of Surgery of the University of Minnesota. Although Dr. Knight directed the Division of Anesthesiology throughout the 1920's and early 1930's, he had no thought of becoming an anesthetist himself. In fact, on several occasions he asked to be relieved from the teaching of anesthesia because it interfered with his progress in surgery. He did not belong to any anesthesia organization. However, as time passed, he became more interested in the possibility of becoming an anesthetist as surgeons were occasionally asking him to administer anesthesia for difficult or special cases in various hospitals. On invitation of Dr. John Lundy, he was appointed first assistant in Anesthesiology at the Mayo Clinic in April, 1936. After 15 months with Dr. Lundy, he returned to the University of Minnesota where he was promoted to an associate professorship and was Director of the Division of Anesthesiology in the Department of Surgery. He was also Director of Anesthesiology in several hospitals in Minneapolis and St. Paul. Dr. Knight had remained on a part time basis continuing to operate a private office until 1937 when he accepted a full-time University appointment. In 1939, he decided to devote only 80% of his time to the University and resume private practice for the remainder of his time. After returning from the Mayo Clinic, Dr. Knight devoted all of his time to anesthesiology including both the University and his private office.

He joined the American Society of Anesthetists as Number 303 in

1936 and the Anesthetists Travel Club in 1937. In 1939, he became the 57th member of the American Board of Anesthesiology. He is a fellow of the American College of Surgeons and the American College of Anesthesiologists.

When he retired in 1954, Dr. Knight urged Dean Diehl to take advantage of the opportunity to convert the Division of Anesthesiology into a department in the School of Medicine. Since retirement, Dr. Knight continued the practice of anesthesiology with his organization known as Anesthesia Associates.

GROWTH AFTER WORLD WAR II

These years saw the growth and maturation of one of the largest anesthesiology training programs in the nation. By the end of 1946, 18 residents were in training, and for the next seven years the average number of anesthesiology fellows was 22. During this period, Dr. Knight was ordered to provide anesthesia service for many of the charitable institutions in the Twin Cities area. The fellows of the University rotated through Minneapolis Veterans Administration Hospital, St. Paul Ancker, Gillette State Crippled Childrens, Shriners Hospital for Crippled Children and Anoka State Hospital. Staff supervision was lacking or inadequate at all but the University and Veterans Hospitals. In 1946, the Veterans Administration Hospitals became officially associated with the University Medical School; Dr. Knight was named Director and Senior Consultant of the V.A. Section and Drs. Baird and Friend were appointed consultants; each spent a day, in turn, instructing the residents assigned to that institution. Even though only experienced residents were sent to the other affiliate institutions, it was none-the-less difficult for them to assume the heavy responsibilities imposed upon them. As a result, Dr. Knight and his small staff were frequently called upon to rescue both patient and resident when difficulties arose in these hospitals.

The early post-war years were in some respects quite unpleasant for the trainees. Many surgeons were reluctant to accept the change from nurse anesthetist to physician anesthesiologist and continued to insist upon being "captain of the ship" regardless of their scant knowledge of anesthesia. This attitude precipitated the resignation of Dr. Friend in 1947. Further, the tyro residents found it difficult to accept clinical instruction provided by a nurse anesthetist. This difficult situation was

finally relieved when the last student nurse anesthetist completed her training in 1947. Had it not been for Dr. Knight's personality and the encouragement of several surgeons who had served with anesthesiologists in the Armed Forces, the development of the new specialty at Minnesota would have been impossible.

In 1948, several developments occurred which played paramount roles in the future progress of anesthesia and surgery at the University. Perhaps the greatest complement to Anesthesiology was the introduction of the Post Anesthesia Recovery Room. Previously, the semi-conscious patient was returned after surgery to a room which was poorly equipped for the potential emergencies of the postanesthetic period. Young nursing students with hazy concepts of the postanesthetic state were assigned to care for these patients; the anesthesiologist returned to the operating room to anesthetize other patients. Airway or respiratory problems were prone to occur under such conditions; frequently, the anesthesiologist was never informed or was not accessible so that preventable deaths occurred. To remedy this hazardous situation, a four-bed ward which adjoined the operating rooms was converted to a Recovery Room in June of 1948 and two young graduate nurses, Nancy Thiel and Mary Jo Schwartz, were assigned to the unit under the supervision of the staff anesthesiologists. The advantages of the unit became obvious quickly and it was enlarged to accommodate six patients. The physical facilities of this unit and the experience of the skilled nurses assigned to it eventually played a key role in the successful treatment of patients subjected to induced hypotension, hypothermia and extracorporeal circulation. This "make-shift" facility served as the prototype for the Post Anesthetic Recovery Room in the new Mayo Memorial Building.

Although the major contribution of the recovery ward was increased patient safety, it also served to improve the medical prestige of the anesthesiologist. Too often, his surgical colleagues regarded him merely as an operating room technician. His activities in the Post Anesthetic Recovery Room helped to introduce the anesthesiologist as a capable medical consultant.

During this same year Drs. *Ellis N. Cohen* and *Van Bergen* conducted research upon a new bronchodialtor, isoproternol. This was the basis for Dr. Cohen's thesis and in 1949 he was awarded a master's degree in anesthesiology—the first graduate degree earned in this specialty at Minnesota.

The year 1948 also marked the beginning of one of the most controversial anesthesia studies ever carried out—Dr. Henry K. Beecher's study of deaths associated with anesthesia and surgery. The University of Minnesota Hospital was invited as one of nine participating institutions and for the next five-year period naively contributed statistical data which eventually were misused to incriminate curare as a major factor in anesthetic mortality.

The supervision of anesthesia at the University Hospitals was provided by the members of Dr. Knight's group on a rotating basis; although staff coverage was constant, it lacked day-to-day continuity. Both Dr. Knight and Dr. Wangensteen were aware of this so they arranged to have Dr. Van Bergen appointed as the first full time staff physician in Anesthesiology on July 1, 1951. This provided much needed uniformity and constancy in resident instruction and supervision and afforded Dr. Van Bergen the opportunity to complete work for his master's degree in 1952.

Dr. *James H. Matthews* completed his fellowship in the fall of 1950 and joined Dr. Knight's group as a clinical instructor for a few months; he then entered the service and was gone until October of 1952 when he returned.

Dr. *Joseph J. Buckley* began his fellowship in May of 1950 and, after a year of clinical training, decided to devote the next year to clinical research. He and Dr. Van Bergen undertook several research projects which won national recognition: the relationship of postoperative hypotension to hypercapnea and purposefully-induced hypotension for the control of surgical hemorrhage. Upon completion of this research, Dr. Buckley finished his clinical training and joined Dr. Knight's group in 1953. Thus, he became the first Minnesota man to complete three years of fellowship training in anesthesiology.

In 1952, Minnesota experienced a severe poliomyelitis epidemic. Over 50 iron lungs were shipped to University Hospitals and the anesthesiologists were called upon to assist in the management of patients confined to these respirators. It soon became evident that many of the problems and complications were related to an inability to care properly for the patient encased in these bulky tank-type respirators. It was noted that when such patients were removed from the tank respirator and ventilated manually with an anesthetic machine, their general condition and state of oxygenation frequently improved. This prompted

members of the Division of Anesthesiology to seek better methods of ventilating patients with respiratory paralysis. The combined talents of these anesthesiologists and engineers from the Smith Welding Equipment Corporation of Minneapolis were successful in developing a precision volume-preset mechanical ventilator; within the year the first prototype was successfully put to clinical use.

In 1951 and 1952, three Canadians who eventually would become full-time members of the academic staff started their anesthesia training, they were Dr. *Earl A. Schultz,* Dr. *D. S. P. Weatherhead* and Dr. *John R. Gordon.*

In 1953, Dr. Knight was elected President of the American Society of Anesthesiologists. This high office imposed considerable work and responsibility upon him so he appointed Dr. Van Bergen as Associate Director of the Division and assigned Drs. Matthews and Buckley to assist on a part-time basis with the staff coverage of the University Hospitals operating rooms.

In May of 1953, Dr. Wangensteen appointed a committee (Drs. C. W. Lillehei, Van Bergen and Varco) to study the anesthesia situation. He asked that advice be sought from strong Departments and Divisions of Anesthesia at other universities in developing "a strong Division of Anesthesia with accented emphasis on the training of anesthetists at the University level primarily." To this end, Dr. Varco contacted Robert D. Dripps of the University of Pennsylvania, John Adriani of Charity Hospital of Louisiana and Stuart C. Cullen of the State University of Iowa. The recommendations of these three prominent anesthesiologists ultimately played a significant role in the future course and development of the specialty.

Late in 1953, rumors of the results of the Beecher Study trickled across the nation although no formal report had yet been issued; it appeared that curare markedly influenced anesthetic and surgical mortality rates. This caused Dr. Wangensteen to issue an edict which banned the use of curare in patients on the general surgical services. This action shocked not only the anesthesiologists but many other medical personnel of the hospital; how much it affected the future course of the specialty is a matter of conjecture but it doubtless played some part.

THE CONCEPTION OF THE NEW DEPARTMENT

The year 1954 was filled with developments which directly influenced

the growth, personnel and autonamy of the division. In January, 1954, Dean Diehl appointed a committee chaired by Dr. Varco to make recommendations to Dr. Wangensteen and himself regarding the future conduct of anesthesiology in view of Dr. Knight's mandatory retirement on June 30, 1954. Members of the committee were Ray Amberg, Larry Boies, Don Creevy, Bill Maloney, Jack McKelvey, Maurice Visscher and Fred Van Bergen. Having at hand the comments of Drs. Dripps, Adriani and Cullen, Dr. Varco immediately released them to the committee and requested the individual members to offer reactions and suggestions; from these, he prepared a summary of the opinions and formulated a letter of recommendation to Dean Diehl. The recommendations of the committee were dated February 17, 1954 and were as follows:

1. The establishment of a Department of Anesthesiology we believe will have many administrative advantages. Anesthetists are obligated to fulfill requests for service from a wide range of medical interests. For example: Besides providing anesthesia for General Surgery, Obstetrics, Gynecology, Eye, Ear, Nose and Throat, Orthopedics, Urology-Neurosurgery, Pediatrics and Internal Medicine (the latter two in the cardiac catheterization laboratory), they work with the neurologists during encephalograms and on bulbar poliomyelitis cases. Here, too, they are in association with the staff from Physical Medicine. For pediatricians, they have also supplied continuing day-to-day responsibility for maintenance of ventilation in a totally curarized individual as part of the management of tetanus. Of necessity, the prime allegiance the anesthesiologist must have is to his patient, rather than to the specific specialty.

   The extent of these widely separate duties emphasizes the need for administrative leeway. Also, the evident complexities in a budget most effective for the management of these diverse roles could probably be more smoothly handled by departmental autonomy.

2. The anesthetist-in-chief and his staff shall conform to existing practices for full-time clinical appointments. They are to adhere to precisely those regulations guiding private practice among geographically full-time members of the medical school faculty, i.e., the practice of medicine shall be limited to the University of Minnesota Hospitals save for the occasional outside consultative function. These regulations include the privilege of levying charges for professional service on private patients. The money so derived may then be apportioned and allocated as seems wisest in the judgment of the chairman of the Department of Anesthesia.

The committee recognized two issues inherent in the matter of financial return from private patients.

1. The sum accruing from this source may be adequate to supplement the income of only one or two men, under existing salaries.
2. The presence of but two full-time people in the Department of Anesthesiology is certain to curtail, if not stifle, research activities, under the pressures of continuing heavy service and teaching loads. If this area of the medical school is to acquire worthy and representative stature, it must have a measure of protection. This help can best come, we believe, through reasonable provision for staff. It is our proposal that adequate funds be provided through medical school and hospital budgets for one appointment at the professorial rank with a salary of $12,500, an associate professor at $8,500, one assistant professor at $6,000, and an instructor at $4,500.
3. The Department of Anesthesiology shall be conceded a reasonable area in the Mayo Memorial for clinical research and another equitable space in the animal quarters for experimental studies.

It is the committee's considered feeling that unless an academically inclined Department of Anesthesia can be realized by encouragement through such provisions for reasonable staffing and for scholarly research activity, this segment of our medical school will revert to an area inhabited by mere technicians. Scientific progress is therein unlikely. We are aware that this latter situation may seemingly be dictated by both expediency and the pragmatics of budgetry but urgently hope that through some respectable variety of fiscal legerdemain a Department of Anesthesia worthy of that designation can be planned.

Two months passed, during which discussions and negotiations took place, before Dean Diehl reacted to the recommendations of the committee. About the middle of April, he called Dr. Van Bergen to his office and informed him that he would be appointed Acting Director of the division and that he could invite Drs. Matthews, Buckley and Weatherhead to serve on a full time basis in the division. Dean Diehl documented his statements by the following letter, dated April 29, 1954:

I am writing to confirm the statements which I made at the time of our conference about ten days ago.

At a recent meeting I presented to the Administrative Committee of the Medical School the report of the special committee under the chairmanship of Dr. Varco, which I appointed to consider and to make recommendations concerning the type of future program which

we should look forward to in the field of Anesthesiology. As a member of this committee, you have a copy of this report.

The Administrative Committee approved the report in principle and urged the administration of the Medical School and Hospital to attempt to work out the budgetary and administrative arrangements involved.

The proposal that there be an independent Department of Anesthesiology was considered favorably by the Administrative Committee, but it was left to the discretion of the dean to decide when a recommendation for an independent department could be justifiably presented to the President and the Board of Regents.

Following the conference which Mr. Amberg, Dr. Wangensteen, Dr. Visscher, Dr. Varco and I had with you at the University Hospital, it was our unanimous decision to offer you the opportunity to serve as Acting Director of a full-time division of Anesthesiology in the Medical School, and in accordance with your recommendation, to invite Dr. Matthews, Dr. Buckley and Dr. Weatherhead (when he finished his fellowship) to serve with you on a full-time basis in this division.

I was very pleased to learn of your interest as well as that of Dr. Matthews and Dr. Buckley in carrying through with the proposal as outlined. Upon this basis, Mr. Amberg and I have drawn up a budget for this division in accordance with our conference and we are recommending this budget to the president for approval. Dr. Wangensteen, Mr. Amberg and I all have assured you that although Anesthesiology will be continued for the present as a Division of the Department of Surgery, you will have our complete support to develop the sort of a program in which we all are interested. Dr. Wangensteen also has assured me that you will have autonomy in the administration of this division.

A suite of offices has been planned for Anesthesiology in the Mayo Memorial and Dr. Varco has assured us that the Department of Surgery will provide you with opportunities for work on dogs as necessary. In addition, Mr. Amberg will attempt to make available to you space, possibly in one of the unfinished operating rooms, to conduct clinical studies in which you are interested.

The vision and the spirit which you, Dr. Matthews and Dr. Buckley have expressed in relation to this division convinces me that it will be a rewarding enterprise for all of you and a very real credit to our Medical School and University Hospitals.

Dr. Knight was delighted that his successors were to be men he had trained. He knew that his philosophy, principles and teachings

of the science and art of anesthesia would be preserved. On June 30, he retired and on July 1, 1954, Drs. Van Bergen, Matthews and Buckley became the first full-time faculty of the autonomous division.

CROSS CIRCULATION

In the early spring of 1954, a surgical feat was accomplished which brought world recognition to the University of Minnesota.

On March 25, Miss Genevieve Scholtes, Operating Room Supervisor, and Dr. Van Bergen were invited by Dr. Richard L. Varco to observe a cross-circulation demonstration in Dr. C. Walton Lillehei's animal laboratory. The circulatory systems of two dogs were connected through an interposed pump so that the heart of one could be opened and operated upon while its body circulation was maintained with oxygenated blood from the other. After witnessing the demonstration, Miss Scholtes and Dr. Van Bergen returned to the hospital to prepare the operating room and choose the anesthetic technique for the first open heart operation using a human donor—to be performed the following morning. There was little time to consider the physiologic implications of suddenly converting the separate circulatory systems of an anesthetized adult donor and infant recipient to a common system. At 7:35 a.m. on March 26th, a 10-month-old infant was anesthetized with cyclopropane; after intubation anesthesia was maintained with 3 ml of pentothal-curare and nitrous oxide-oxygen mixture during the repair of an interventricular septal defect. The adult donor was anesthetized with pentothal-curare and nitrous oxide-oxygen. The total anesthesia time endured by the infant was three hours and 45 minutes. Cross-circulation was in effect for 17 minutes and 38 seconds during repair of the defect. The entire operation proceeded without incident and a casual observer would have believed that this procedure had been done countless times before. The anesthesiologists involved in this first case were Drs. George Mann and Fred Van Bergen.

Two more cardiac patients were operated upon successfully in April and open heart surgery became a reality.

This unique procedure contributed greatly to the stature of the emerging Department of Anesthesiology; scores of prominent anesthesiologists from all parts of the world visited the department during the ensuing years to observe the anesthetic techniques employed for this procedure.

Preparations for the move to the new Mayo Memorial Hospital operating suite were completed during the summer so that on a September weekend in 1954 the move from the old Christian, Eustis and Todd Wings into the spotless and gleaming Mayo facility was accomplished. The new operating suite promised to be a considerable improvement over the old one since all of the operating rooms were concentrated in a single large area. The anesthesiology administrative offices were located on the fifth floor in close proximity to the operating suite and appeared to be quite spacious in comparison with the old offices.

The new Post Anesthetic Recovery Room represented the cooperative efforts and planning of the staff anesthesiologists and recovery room nurses. Mr. Amberg and Dean Diehl had seen to it that funds were available for whatever innovations the planners wanted.

On September 4, 1954, Dr. Knight's former staff and fellows gathered at a testimonial dinner on the occasion of his retirement and elevation to Professor Emeritus in Anesthesiology. At this event, the initial funds for the establishment of the Ralph T. Knight Anesthesia Research Laboratory were presented to him. Over the ensuing years, contributions from his former trainees continued to accumulate until the required goal—$10,000—was achieved. A few years later, the Laboratory was a reality.

Dr. *D. S. P. Weatherhead* completed his three-year fellowship and became the fourth full-time staff member on January 1, 1955. Drs. Schultz and Gordon completed three year fellowships and were given part-time clinical appointments. They rotated between the Veterans and Ancker Hospitals to provide the necessary staff coverage for the residents in these locations.

THE FIRST DECADE

In accordance with Dean Diehl's pledge, the Board of Regents granted departmental status to Anesthesiology on July 1, 1955, thereby establishing the 20th department within the College of Medical Sciences. Activities within the infant department increased markedly during the first year; in addition to providing anesthesia service at the University Hospital and at affiliated hospitals, its enterprises extended beyond the operating room. The anesthesiologist's contributions in resuscitation, in

the management of respiratory disease and drug intoxication, in inhalation therapy, and in the management of pain gained for him increased respect from his surgical, medical, and pediatric colleagues.

The new Van Bergen mechanical ventilator was now in daily use and proved to be a valuable improvement in the management of patients afflicted with bulbo-spinal poliomyelitis, severe sytemic tetanus and other crippling respiratory abnormalities. A report on the development of this ventilator was made at the meeting of the American Society of Anesthesiologists in Boston in the fall of 1955; a scientific exhibit shown simultaneously was awarded the First Place Certificate of Merit. This was the first certificate awarded by the American Society of Anesthesiologists and although it was presented to Dr. Van Bergen, the award was shared by the entire anesthesia staff and the engineers and machinists of the Smith Welding Equipment Manufacturing Company.

Graduate teaching at this time was preceptorial in nature; all forms of inhalational and intravenous anesthesia were used and increased emphasis was placed on regional techniques. In spite of the previous "ban" on the use of muscle relaxants, Dr. Baird's pentothal-nitrous oxide-relaxant combination again became the most frequently used method of anesthesia. Purposefully-induced hypotension, hypothermia and extracorporeal circulation techniques were used whenever they were indicated.

By 1956, the resident staff numbered 24 and three other medical fellows were engaged in a research year which included courses in physiology, biochemistry, pharmacology and biometry.

The staff of the Post Anesthetic Recovery Room was increased to four nurses, two nurses' aides, and two orderlies. Under the able direction of Head Nurse *Nancy Thiel,* the staff not only provided the concentrated nursing care required by post-anesthetic patients but also maintained all anesthetic equipment and supplies. Since the anesthesiology department had not been assigned any patient beds, several of the early respirator patients were managed in the small isolation area of the Post Anesthetic Recovery Room. The Post Anesthetic Recovery Room staff provided most of the skilled nursing care, without which the outcome of these patients would have been less favorable.

In 1957, several minor faculty changes took place. Dean Diehl requested that Dr. Matthews spend a year as Advisor to the Seoul Na-

tional University of Korea. At the same time, Dr. Weatherhead resigned to enter private practice. Initially, this threatened to be a crippling blow to the young department. Dean Diehl sensed the potential set-back and created additional staff positions; Drs. Gordon, Schultz and Oswald joined the full-time staff, thus offsetting the loss of Dr. Weatherhead and the temporary leave of Dr. Matthews.

In the spring of 1957, a temporary residency shortage forced retrenchment in affiliate hospital coverage. Rotation to the Anoka State and Shriners Crippled Children's Hospitals was suspended. During the summer months, six outstanding medical students were employed to assist with the anesthesia service in the University Hospital operating rooms. This proved to be a most successful undertaking since they provided considerable help in the clinical areas and found the experience most instructive in preparing for future practices of general medicine. The utilization of medical students on the clinical service also proved helpful in recruiting, since several students later entered the fellowship program.

THE RESPIRATOR WARD

The successful utilization of the Post Anesthetic Room ultimately promoted the idea of a Respiratory Ward. The department was by now very much involved in the care of patients rendered apneic by disease or drug. As had been the situation in surgical patients before the advent of the Post Anesthetic Recovery Room, these patients too were located throughout the hospital wards. To provide attentive respirator care by the anesthesiologists and to assure the availability of adequate equipment was a major undertaking. From the standpoint of good patient care as well as from an economic viewpoint, it seemed rational to establish a small Respiratory Ward where such patients could be centralized during their acute illness. Obviously, such a ward was best located in close proximity to the operating room so that instant availability of anesthesiologists could be assured. With this premise in mind, in 1957 Ray Amberg temporarily assigned to Anesthesiology four beds on a ward adjoining the operating room for the care of respirator patients; he indicated that eventually funds would be available to build a 10 or 12 bed ward devoted exclusively to this undertaking. To date this appropriation has not been realized and construction of the special unit has not progressed beyond the blueprint stage. It is interesting

(and frustrating) to learn that anesthesiologists from other institutions in Canada and the United States, who visited and observed the functions of our temporary ward and discussed the projected plans for the new unit with us, now have similar units in operation in their own institutions. Despite the relatively inadequate facilities, the department has managed to treat 300 patients, who were respirator-dependent due to a variety of diseases ranging in duration from a few days to 6 years. In addition to the obvious advantages which such a respirator ward offered to the patients it served, it also provided a unique clinical experience for residents.

THE PULMONARY FUNCTION LABORATORY

In response to a need for more sophisticated assessment of the pulmonary status of certain patients the department established the first pulmonary function laboratory in the University Hospital in 1957. The weaning of patients from respirators and the pre-operative evaluations of patients scheduled for pulmonary resection was thereby facilitated through evaluation of their pulmonary function and mechanics. Mr. Amberg provided some of the equipment and Dr. Oswald was assigned the responsibility of this unit. In less than six months, the number of patients undergoing pulmonary function testing and blood gas analysis had increased so rapidly that two days a week were set aside for such testing. This service was beneficial to the hospital patient and his referring physician and its presence within the departmental structure further enhanced the attractiveness of our residency training program, so much so that the Mayo Clinic Anesthesiology Section rotated some of their fellows through this service for a one month period as a supplement to their own program. At this writing, from 20 to 25 patients are evaluated weekly; Dr. *Hugh D. Westgate,* Associate Professor, is currently directing this facility.

The year 1958 began with a shortage of medical fellows—only 18 registered in the clinical program. Another plan to relieve the shortage was instituted in the form of a three-month "refresher course" for general practitioners from rural areas. Happily, this also proved fruitful as a recruiting device since several of the registrants chose to complete the full residency program. Dr. Van Bergen initiated a daily pre-operative conference patterned after one he had attended during a tour of the Division of Anesthesiology at the University of Iowa. Each

resident was required to present an evaluation of patients assigned to him for anesthetization. The resident discussed his choice of premedication and anesthetic management with the responsible staff man while his peers listened and asked questions. This proved to be most beneficial to the patients and fellows and is now a common practice in most training programs throughout the country.

By mid-1959, the complement of fellows had risen to 34. This doubtless reflected better recruitment efforts and the sudden availability of medical officers from the Korean conflict seeking additional training. The respiratory ward and pulmonary function activities had increased to the extent that two residents were assigned to assist the staff men in these activities. In addition, a full-time technologist was appointed to perform the numerous blood gas analyses. Rotation through these services made this program unique among residencies for it offered experience that residents could not gain at other anesthesiology training centers.

Assignment of selected Anesthesiology fellows to the Minneapolis General Hospital was started in March 1960 when Dr. *Van S. Lawrence* joined the medical staff of that hospital. The experience offered in this rotation was chiefly in regional and obstetrical anesthesia. In July, Dr. *Ed Hustad* joined the Veterans Administration Hospital Staff as Chief of Anesthesia. Residents continued to rotate to the Veterans Hospital and to Ancker Hospital in St. Paul under Dr. *Charles Galway.*

Professor Emeritus Ralph T. Knight was further honored in 1960 when he received the American Society of Anesthesiologists' DISTINGUISHED SERVICE AWARD—the highest award granted by this organization.

THE RALPH T. KNIGHT ANESTHESIOLOGY RESEARCH LABORATORY

Another highlight in departmental growth occurred in 1961 when the long-awaited, much-needed Ralph T. Knight Anesthesiology Research Laboratory was formally dedicated. This ceremony was held in conjunction with the annual Anesthesiology Refresher Course and numerous former fellows returned to their Alma Mater for the occasion. University President O. Meredith Wilson and his wife participated in the dedication. This magnificantly equipped laboratory, located in the Diehl Hall Biomedical Library building, is the envy of all who have

seen it. The new laboratory created a need for additional personnel—an animal laboratory attendant and medical technologist were added to the Civil Service Staff. This facility provided opportunities for medical students to do part time research under staff guidance and many more than could be accommodated applied each quarter.

Departmental faculty changes occurred when Dr. Oswald resigned to enter private practice and Dr. *Hugh Donald Westgate* completed his three year fellowship and joined the staff.

In 1962, there were 28 clinical and two research fellows in the department. Dr. Ed Hustad resigned from the Veterans Administration Hospital and the vacancy created had to be filled by one of the senior fellows. The recruitment of suitable staff for the Veterans Administration Hospital became more difficult each year since their stipends were wholly unrealistic when compared with those of competitive institutions and private practice.

The laboratory was quite active; several research fellows and one medical student presented their work at the annual Midwest Residents Meeting in Iowa City; two of the fellows later read papers at the New York Post-Graduate Assembly. In each instance, their expenses were defrayed by a travel fund supported by former residents currently engaged in private practice in Minneapolis.

In addition to other research grants, the department was awarded a federal grant of $100,000 in 1963 for a seven-year study of mechanical ventilators. These research and teaching activities again required an increase in the academic staff so in November of 1963 Dr. *John S. Rydberg* was appointed to the faculty. At the close of the year, the department had 30 clinical and two research fellows. Of this group, 30% were graduates of the University of Minnesota Medical School.

RESEARCH

Research activity by members of the department unfortunately was governed to a great extent by the unpredictable ebb and flow of clinical service demands. In 1964, the Institute of General Medical Sciences of the Public Health Service awarded a training grant in Research Anesthesiology to the department. The first trainee, Dr. *James F. Cummings,* enrolled in June of that year. The program is conducted as a joint effort between the Departments of Pharmacology and Anesthesiology to train qualified personnel for research careers in the field of

Anesthesiology. Upon completion of his training, Dr. Cummings will direct the research activities of the department, thereby providing long-needed continuity in this area.

At the close of its first decade in 1965, the department had 22 clinical and 2 research fellows under the tutorship of 13 staff members; 7 at the University Hospital, 2 at Veterans Hospital, 3 at Hennepin County and 1 at Ramsey County Hospital. In addition, four private practitioners hold clinical appointments within the department and participate in the teaching program. The clerical staff numbers three; the nursing staff includes five nurses, three nurses aides and two orderlies. The laboratory personnel include two technologists, one animal attendant and an electrical engineer.

At the onset of the second decade, the department is continuing to correct its greatest handicap—an enforced emphasis on clinical service accomplished only through sacrifice of teaching and research experiences. To this end, the department is considering the employment of nurse anesthetists and/or physician assistants to provide the residents with more time for the latter activities.

CURRENT UNIVERSITY FACULTY

Joseph John Buckley, professor, is one of the original full-time staff members in the department. Dr. Buckley was born in Methuen, Massachusetts in 1922 and received his bachelor of arts degree from Dartmouth College in 1943 and his doctor of medicine degree from New York Medical College in 1946. He served his internship at the United States Naval Hospital, Chelsea, Massachusetts from 1946-47. The following two years he was Senior Medical Officer assigned to the U.S.S. Nereus, Submarine Squadron 7, Pacific Fleet. From 1950-53, he was a resident in anesthesiology at the University of Minnesota Medical School. In 1956, he was certified by the American Board of Anesthesiology.

Dr. Buckley served as an instructor in Anesthesiology from 1953 to 1958 when he received his master of science degree (anesthesiology). He became assistant professor in 1958, associate professor in 1959, and full professor in 1961.

In addition to the usual medical and scientific organizations, he is a member of the American Society of Anesthesiology and served as a director from 1962-65. He was president of the Minnesota Society of Anesthesiologists in 1959. Currently, he is a member of the Association

of University Anesthetists and the Academy of Anesthesiology. He has served on numerous medical school and hospital committees and presently is chairman of the Operating Room Policy Committee. Predominate research interests are in respiratory physiology and cardiology.

James Hall Matthews, professor, another of the original departmental members, was born in Texarkana, Texas in 1925. He received his bachelor of science degree from Arkansas in 1946 and his doctor of medicine degree from the University of Arkansas School of Medicine in 1947. Following his internship at the University Hospital in Little Rock, Arkansas, he entered the Anesthesiology residency program at Minnesota (1948-50). After serving as a medical officer with the Cold Injury Research Team in the United States Army in Korea, Dr. Matthews returned to Minnesota in 1952 where he was appointed an instructor in Anesthesiology until 1957. The next year he was sent to Korea by the University of Minnesota as Advisor to the Seoul National University in Korea. He was assistant professor in the Department of Anesthesiology from 1948-1962, associate professor 1962, and professor in 1966. He received his master of science degree in 1960.

Dr. Matthews is a member of the usual medical and scientific organizations. In addition, he is a member of the American Society of Anesthesiology and presently is Chairman of the Committee on Anesthesia Residencies. He was president of the Minnesota Society of Anesthesiologists in 1962. Currently, he serves as a director of the American Board of Anesthesiology and is a member of the Association of University Anesthetists and the Academy of Anesthesiology. He, too, serves on various medical school and hospital committees. His current research interests are electroencephalography and the influences of periodicity on responses to anesthetic drugs in animals and man.

John Ralph Gordon, associate professor, was born in Schreiber, Ontario, Canada, in 1923. He was awarded his teacher's certificate in 1941 and received his degree of doctor of medicine and master of surgery from Queen's University, Kingston, Ontario in 1951. After his internship at Kingston General Hospital, Dr. Gordon began his anesthesiology residency at the University of Minnesota (1952-1955). He joined the departmental staff in 1955 serving part-time at the Veterans Hospital as a consultant. In 1957, he became a full-time instructor at the University Hospitals and received his American Board of Anesthesiology certification. He was awarded his master of science

degree from the University of Minnesota in 1962 and was appointed assistant professor. In 1964, he became associate professor.

Dr. Gordon is a member of the usual medical and scientific organizations. Further, he is a member of the American Society of Anesthesiology and was secretary-treasurer of the Minnesota Society of Anesthesiologists from 1959-1962 and president in 1965. He currently is a consultant of Anesthesiology at the Veterans Hospital as well as serving on the operating room committee at the University. His primary research interest is the mechanics of respiration.

Dr. Gordon's armed service record is with the Royal Canadian Air Force as air navigator from which he received the Distinguished Flying Cross. In 1963, he and his wife, Colleen, became American citizens.

Earl Arthur Schultz, assistant professor, was born in 1924 in Winnipeg, Manitoba, Canada. He received his doctor of medicine degree in 1950 from the University of Manitoba. Following an internship at St. Boniface and Deer Lodge Hospitals in Winnipeg, he entered the Anesthesiology Residency program at the University of Minnesota where he was a clinical resident from 1951-1953 and a research fellow from 1953-1955. His association with the department began in 1955 when he served on a part-time basis as a consultant to Ancker Hospital in St. Paul and the Veterans Hospital in Minneapolis. He was certified by the American Board of Anesthesiology in 1957 and appointed as an instructor in the Anesthesiology Department. He obtained his master of science degree from the University of Minnesota in 1958 and was appointed assistant professor in 1960.

In addition to the usual medical and scientific organizations, Dr. Schultz is a member of the American Society of Anesthesiology and was program chairman for the Minneapolis Academy of Medicine and the International Society of Neuroanesthesia. His primary research interests are related to hypothermia and hypercapnea and post-hypercapneic phenomena.

Hugh Donald Westgate, associate professor, was born in 1931 in Edmonton, Alberta, Canada. He received his degree of doctor of medicine in 1955 from the University of British Columbia. Following his internship at the Hamilton General Hospital in Ontario, Dr. Westgate spent the next two years in general practice. In 1958, he entered the residency program in Anesthesiology at the University of Minnesota where he received his master of science degree in 1961. He was

appointed instructor in the department in 1961, assistant professor in 1964, and associate professor in 1966. He became a certified specialist in Anesthesiology in 1964. His primary interests are in regional anesthesia and pulmonary function studies. Currently, he is in charge of the Pulmonary Function Laboratory which is an active component of the department.

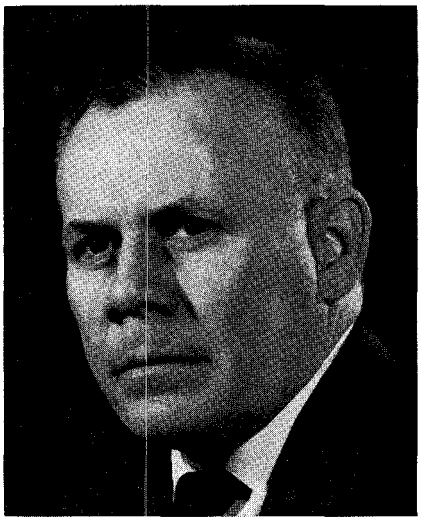
Dr. Westgate is a member of the usual medical societies plus the American and Minnesota Societies of Anesthesiologists, the Canadian Anesthetists Society and the American Thoracic Society.

John Sven Rydberg, instructor, was born in 1931 in Grand Rapids, Minnesota. He received his bachelor of arts degree in 1953 and his doctor of medicine degree in 1957 from the University of Minnesota. After an internship at Detroit Receiving Hospital, Detroit, Michigan, in 1958, Dr. Rydberg joined the Armed Forces where he served as a medical officer from 1958-1960. He entered the residency program at the University of Minnesota in 1960 and received his master of science degree in anesthesiology in 1963. He joined the departmental staff in 1963 and was certified by the American Board of Anesthesiology in 1964.

Dr. Rydberg is a member of the usual medical organizations as well as the Minnesota and American Societies of Anesthesiologists.

James Francis Cumming, instructor, was born in Saskatoon, Saskatchewan, Canada in 1923. He received his bachelor of arts degree from the University of Saskatchewan in 1944 and his doctor of medicine degree from the University of Toronto in 1947. After his internship at the Saskatoon City Hospital in 1948, Dr. Cumming entered general practice which he pursued until 1962. He entered the residency program in the University of Minnesota Department of Anesthesiology in 1963. He became the first research trainee in the field of anesthesiology when the department launched this program in 1964. His research experience has been with the Department of Pharmacology at Minnesota. Upon completion of his thesis, he will begin his staff appointment conjointly with the Departments of Anesthesiology and Pharmacology and will be the first clinical pharmacologist in anesthesiology at this institution. He will devote at least 90% of his time to directing the research activities of the department.

His current research interest is the effect of liver metabolism on the disappearance of anesthetic agents.



Frederick H. Van Bergen

Dr. *Frederick Hall Van Bergen,* who prepared the above sketch of the Department of Anesthesiology from 1946 to the present was born in Minneapolis in 1914. He attended both Shattuck and St. Thomas Military Academy where he received the alternate appointment to West Point in his senior year. He received his premedical education at St. Thomas College in St. Paul from 1933 to 1937 and was awarded the degree of doctor of medicine by the University of Minnesota in 1942. He served his internship at the United States Naval Hospital, Bremerton, Washington in 1941-1942 and was on active duty as a United States Navy Medical Officer until late 1945.

From 1946 to 1948, he was a resident in the Division of Anesthesiology, University of Minnesota School of Medicine, and was awarded the degree of master of science in 1952. He was appointed Clinical Instructor in the Division of Anesthesiology, University of Minnesota in 1948; assistant professor 1953; and associate professor in 1954. The next year he was made head of the newly created Department of Anesthesiology and since July 1957 has been Professor and Chairman of that Department.

Dr. Van Bergen is currently Regional Consultant in Anesthesiology of the Veterans Administration and Consultant to Gillette State Hospital for Crippled Children, St. Paul Ramsey Hospital, and Hennepin County General Hospital. In addition to membership in the usual medical

organizations, he is a member of the American Society of Anesthesiologists and served as a director from 1960-1962. He was chairman of a subcommittee on residency training programs in 1957-1958 and a member of the Committee on Clarification of Ethics in 1960. He has been a member of the Minnesota Society of Anesthesiologists since 1946 and in addition to serving on various committees was president in 1955. He is a member of International Anesthesia Research Society, the Association of University Anesthetists, and President Elect of the Academy of Anesthesiology. He also holds membership in the American Therapeutic Society, New York Academy of Sciences, Minnesota Academy of Medicine and the American Association for the Advancement of Science. He is an honorary member of the New England Society of Anesthesiologists, a Diplomate of the American Board of Anesthesiologists and a Fellow of the American College of Anesthesiologists.

Dr. Van Bergen has authored and co-authored over 50 scientific and medical articles which have been published in appropriate journals including chapters in three books. He is an Associate Editor of *Anesthesiology, Modern Medicine* and past Associate Editor of *Survey of Anesthesiology*. His primary research interests have been in the mechanics of respiration. (See Appendix J for staff list.)

Chapter XLI

Department of Laboratory Medicine

THE DEPARTMENT OF LABORATORY MEDICINE had and has roots in many departments of the College of Medical Sciences, including Anatomy, Pathology, Microbiology, Biochemistry, Physiology, Zoology, Genetics, Medicine, Pediatrics, Surgery, Radiology, and Obstetrics. Historical roots are too numerous to trace accurately, but the laboratory facilities and experiments in each department foreshadowed research and standardization of methods. The results of some of these early experimental methods proved useful in evaluation of disease, and diagnostic tests were devised. Medical technologists were trained to perform the clinically pertinent laboratory tests in laboratories housed in both the University Hospitals and the Basic Sciences Departments and to get the results of these tests to the physicians responsible for patient care. Although anatomic pathologists have been primarily responsible for the function of hospital laboratories, the remarkable advances in clinical chemistry, hematology, bacteriology, and physiology have initiated great changes in clinical laboratories and in the medical personnel who help devise, standardize, and interpret the clinical tests. A relatively new specialist, the clinical pathologist, has now joined the anatomic pathologist; the clinical pathologist is now controlling the direction of laboratory medicine.

The Department of Laboratory Medicine which now includes Medical Technology, Clinical Chemistry, Clinical Hematology, Clinical Immunology, Medical Genetics, and Clinical Microbiology was officially included as a department of the College of Medical Sciences in 1959. However, it had been officially and financially recognized by the United States Public Health Service as a training center for clinical pathologists since 1954 and had provided clinical training in medical technology since 1923, and resident training in clinical chemistry since 1939 and in hematology since 1948.

The Department of Laboratory Medicine emerged from the dreams

Gerald Evans

and efforts of Dr. *Gerald T. Evans.* In 1959, twenty years after Dr. Evans came to Minnesota, the first Department of Laboratory Medicine in the United States was recognized. The department is a monument to his foresight and pioneering spirit. Dr. Evans was born in Galt, Ontario, in 1900. He received the degrees of doctor of medicine and master of surgery in 1932, and the master of science degree in 1933 from McGill. By 1937, he had earned the degree of doctor of philosophy at the University of Pennsylvania. He was a clinical assistant in internal medicine and an Osler research fellow (Canadian Medical Association) at the Royal Victoria Hospital of Montreal, 1931-33, associate in medicine and research fellow, University of Pennsylvania Hospital 1933-37, and assistant professor of physiological chemistry at Yale University School of Medicine from 1937 to 1939. That year, he came to the University of Minnesota as Associate Professor of Medicine and Director of Hospital Laboratories. In 1945, he became Professor of Medicine, and in 1959 he was appointed Professor and Head of the new Department of Laboratory Medicine, a position he held until 1966. Dr. Evans was also a consultant for the Veterans Administration Hospital, Minneapolis, from 1947-66. He served as Major, in the Army Medical Research Corps, in 1941. He was a consultant and associate director of Navy Medical Research Unit 3, United States Navy, Cairo, 1953-55. He was certified by the American Board of Pathology in 1961.

Much of the following is cited from an editorial written by Dr. Ellis S. Benson.

Soon after Dr. Evans came to Minnesota, the course in medical technology became generally considered the outstanding one in this country. Next was undertaken the development of strong, versatile clinical laboratories in which careful attentiveness was directed especially toward quality of service. Later, a sound program was established for the training of physicians in clinical pathology.

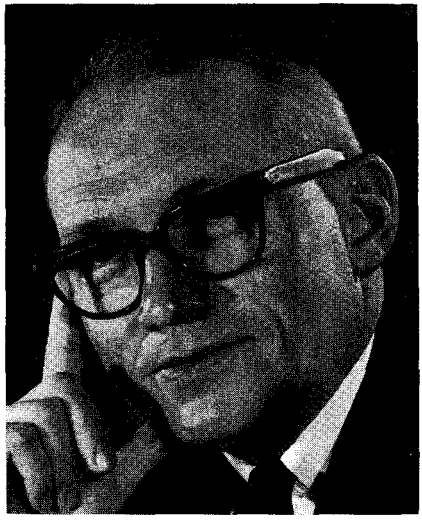
Dr. Evans has always taken a vital interest in the teaching of medical students. The course in Laboratory Medicine in the sophomore year, a course which largely grew from his plans, emphasizes the use of the laboratory in the care of patients. The course, as he evolved it, is one which is closely related to clinical medicine: taking up laboratory topics and relating them to clinical situations in the diagnosis and care of patients. It illustrates well his concept of the supreme relevance of the laboratory to patient care, rather than a self-contained importance of the laboratory.

Gerald Evans conceived Laboratory Medicine as an island between the clinical fields and the basic medical sciences. Laboratory Medicine draws material and ideas from the basic sciences and makes them relevant to clinical medicine toward the goals of more perfect diagnosis and management of patients and, indeed, improvement and prolongation of human life.

He has been a kindly but firm and perceptive teacher and preceptor. Through his influence, many young people have been motivated to seek goals they had not envisioned and to realize individual potentials of which they were not aware. Most of all, those who are proud to have been his students take pride in his imprimatur, an emphasis on quality of effort together with alert and informed sensitivity to the patient and his welfare.

Gerald Evans has been a pioneer, a prophet, a planner, yes, even a dreamer, though many of his dreams will not come true for many years hence. Those who follow him at the University of Minnesota are immensely in his debt. He has set his department on a path which, if energetically and intelligently followed, will bring increasingly rich rewards to the University of Minnesota, to the state of Minnesota and to the professions which make up Laboratory Medicine as a whole.

Ellis S. Benson, Professor and Head, Department of Laboratory



Ellis S. Benson

Medicine since 1966 and Director of Clinical Laboratories since 1959, has been active in the department since 1949 when he, while an instructor in medicine and pathology, became director of the blood bank of the University Hospitals. He was born in 1919 at Hsuchang, Honan, China, of American missionary parents. He received the degree of doctor of medicine from the University of Minnesota in 1945. He interned at the Cincinnati General Hospital, 1944-45, and served as a general medical officer in the Medical Corps, United States Army, 1945-47. He took residencies in pathology and internal medicine at the Veterans Administration Hospital, Minneapolis, from 1947-49. In 1953, he was appointed Assistant Professor of Medicine and Pathology and Associate Director of Clinical Laboratories. At this point, Dr. Benson actually served as an interim director of the department and the laboratories while Dr. Evans was in Egypt (1953-55). In 1957, as a senior resident fellow of the United States Public Health Service and Associate Professor of Medicine and Pathology, he spent one year in the Carlsberg Laboratory in Copenhagen carrying out studies of myoglobin structure using deuterium exchange analysis. In 1959, he became Associate Professor of Laboratory Medicine and Biochemistry and director of clinical laboratories; in 1961, Professor of Laboratory Medicine and Biochemisty, and, in 1966, Professor and Head of the Department of Laboratory Medicine. He is a member of many societies of pathology, chemistry,

cell biology, clinical research, and biophysics. He was president of the Academic Clinical Laboratory Physicians and Scientists in 1966. He is certified by the American Board of Pathology. Despite his heavy administrative burdens, he and his students continue research on cardiac muscle including both chemical and electronmicroscopic studies, and he has contributed 32 papers. He has been the Editor of the Laboratory Section of *Postgraduate Medicine* since 1959, and an Associate Editor of both the *Journal of Clinical and Laboratory Medicine* and the *Journal of Laboratory Investigation* since 1967.

Newell R. Ziegler, associate professor in the Departments of Bacteriology and Immunology and Laboratory Medicine and director of special immunology in laboratory medicine until his death in 1964, developed the clinical bacteriology laboratory and later the blood bank at the University Hospitals from 1947 to 1959. He was born in 1899 in Bippus, Indiana. He received the degree of doctor of medicine in 1928 and the degree of doctor of philosophy in 1930. He was Assistant Professor of Bacteriology at Washington College, Pullman, Washington, and then Associate Professor and Chairman of Bacteriology and Preventive Medicine at the University of Missouri Medical School, Columbia in 1932. From 1942-46, he served in the Army Medical Corps attaining the rank of Lt. Colonel, becoming chief of laboratory service at Kennedy General Hospital, and returning to Columbia as professor. In 1947, he returned to the University of Minnesota as associate professor. Here, he was responsible for setting up and guiding the rigid techniques necessary to blood transfusion and for new methods for storage of blood for cardiac surgery. He had a special interest in erythroblastosis fetalis and other immunohematologic problems.

Robert A. Bridges, Associate Professor of Laboratory Medicine and Pediatrics and Immunochemist, formally joined the department in 1959. He was born in New York City, New York in 1928 and received the degree of doctor of medicine from the University of Texas, Galveston in 1953. He took a rotating internship at Milwaukee County Hospital, from 1953 to 54 and a pediatric residency at the University of Minnesota 1954 to 56. He was a United States Public Health Service heart trainee from 1956 to 57, a fellow of the arthritis rheumatism foundation from 1957 to 60, and a senior investigator of the arthritis rheumatism foundation from 1960 to 65. He was director of the children's rheumatism clinic, Variety Club Heart Hospital, University of Minnesota from

1956 to 59. He became an instructor in pediatrics in 1956, and Assistant Professor in Laboratory Medicine and Pediatrics in 1959. He was director of clinical bacteriology and immunology from 1959 to 62. His research interests are in immunohematology and immunochemistry. He has contributed 42 papers.

Edmond J. Yunis, Associate Professor; Director, Blood Bank; and Director, Division of Immunology, joined the department in 1960. He was born in 1929 in Sinceljo, Colombia. He received the degree of doctor of medicine from Colegio Nal. de San Bartolome, Bogota, Colombia, in 1954. He interned at Hotel Dieu, New Orleans, 1954-55, took a residency in anatomic pathology at Kansas University Medical Center, 1955-57, and a residency in clinical pathology at the University of Minnesota, 1957-59. He became Instructor in Laboratory Medicine and Assistant Director; Blood Bank, 1960; Director, Blood Bank, 1961; assistant professor, 1963, associate professor, 1964, and Director, Division of Immunology, 1966. He was certified by the American Board of Pathology in Pathologic Anatomy, 1963, and Clinical Pathology, 1965. His research interests are in immunology and transplantation immunity. He has contributed 42 papers.

Jorge J. Yunis, associate professor and director of medical genetics joined the department in 1962. He was born in Sincelejo, Colombia in 1933. He received the degree of doctor of medicine at Central University of Madrid in 1956. He served his internship and then a residency in internal medicine at Provincial Hospital, Barranguilla, Colombia, 1957-59, and a residency in clinical pathology at the University of Minnesota from 1959-61. He was Instructor in Laboratory Medicine and Director of the Medical Genetics Laboratory in 1962, assistant professor, 1963, and associate professor, 1965. His research interests are in the cytogenetics and chemical genetics fields which he has brought to life in the department. He has edited two books on medical genetics and contributed 37 papers.

Paul E. Strandjord, Associate Professor, Associate Director, Clinical Laboratories, and Director, Clinical Chemistry Division, joined the department in 1963. He was born in Minneapolis in 1931 and received the degree of doctor of medicine from Stanford University in 1959. In the summers of 1956 and 1957, he held United States Public Health Service fellowships and worked on experimental hormone carcinogenesis

and homologous and heterologous transplantation of neoplastic tissue. In the summer of 1958, on a Josiah Macy Fellowship, he worked on clinical and experimental enzymology. He served as intern in internal medicine at the University of Minnesota from 1959-60, medical fellow from 1960-61. He became Instructor in Laboratory Medicine in 1963, Assistant Professor and Director, Clinical Chemistry Division in 1964, associate professor in 1966, and Associate Director, Clinical Laboratories in 1967. He received both the Borden (1959) and the Watson (1962) Awards for Outstanding Medical Research. His research interests are in diagnostic enzymology and automation of chemical methods. He has contributed 27 papers.

Douglas A. Nelson, formerly Assistant Professor of Laboratory Medicine and Assistant Director, Division of Clinical Hematology, joined the department in 1960. He was born in 1927 in Windom, Minnesota. He received the degree of doctor of medicine from the University of Minnesota in 1954. He interned at Philadelphia General Hospital, 1954-55, and took his residency in anatomic pathology at Mallory Institute of Laboratory Medicine 1955-58. He was a medical fellow specialist in the Department of Laboratory Medicine 1958-60, instructor, 1960-63, and assistant professor, 1963. He was certified by the American Board of Pathology (AP and CP) in 1960. Dr. Nelson became a superb electron microscopist and contributed papers on myocardial ultrastructure and abstracts on the ultrastructure of bone marrow cells before leaving here to become Associate Professor of Pathology and Director of Clinical Hematology at the State University of New York, Syracuse, in 1964.

Lucille J. Hoilund, Research Associate and Assistant Professor of Laboratory Medicine, joined the department in 1964. She was born in 1914 in Biwabik, Minnesota. She was a medical technologist from 1936 to 1948 and received the degree of doctor of medicine from the University of Minnesota in 1949. During the year 1949-50, she was resident in pathology, St. Barnabas Hospital and from 1951-55 she was Medical Director, Minnesota School of Laboratory Technique. For the next three years, she was resident in clinical pathology, Department of Laboratory Medicine. From 1958-1964, she was instructor, anatomy, research associate anatomy, and Assistant Professor of Laboratory Medicine, 1964. She was certified by the American Board of Pathology (CP)

in 1960. She has worked with Dr. Sundberg in research on pyridoxine and essential fatty acid deficiency and their effects on hematopoiesis. She has contributed five papers.

Richard D. Brunning, Assistant Professor and Assistant Director of Clinical Hematology, was born in Grand Forks, North Dakota, and obtained the degrees of doctor of medicine and master of surgery from McGill University in 1959. After completing an internship at Ancker Hospital, St. Paul, and residencies in anatomic pathology in the Department of Pathology, University of Minnesota, and in clinical pathology in the Department of Laboratory Medicine, he became Instructor in Laboratory Medicine, 1965, and Assistant Professor and Assistant Director of Clinical Hematology in 1966. He became director of the training program and postgraduate education in clinical pathology in 1967. His chief research interests have included assay of serum B_{12} and folic acid as well as problems in morphologic hematology. He has contributed five papers and was certified by the American Board of Pathology in Anatomic and Clinical Pathology in 1965.

G. Mary Rutledge Bradley, Assistant Professor, was born in 1926 in Melbourne, Australia and received the bachelor of medicine degree from the University of Melbourne in 1954. In 1955, she was a medical officer in the Department of Public Health, Victoria, Australia. From 1956-59, she was a research assistant in the Department of Medicine, University of Minnesota. From 1962 on, in the Department of Laboratory Medicine, she has held the following positions: Fellow, 1962-65; Instructor, 1965; Instructor and Assistant Director, Clinical Laboratories, 1966; and Assistant Professor, Assistant Director, Clinical Laboratories, and Director, Diagnostic Microbiology, 1966. Her chief research interest has been in microbiology. She has contributed eight papers.

David M. Brown, Assistant Professor of Pediatrics and Laboratory Medicine, joined the department in 1967. He was born in Chicago, Illinois in 1935 and received the degree of doctor of medicine from the University of Illinois in 1957. He took a residency in pediatrics at the University of Minnesota, 1961-62, and as a United States Public Health Service postdoctoral fellow, 1962-65, was a fellow in endocrinology and metabolism at the University of Minnesota. He was a member of the attending staff in pediatric endocrinology at Wilford Hall, U.S.A.F. Hospital, San Antonio, Texas from 1965-67. He has contributed 11 papers.

Andreas Rosenberg, Associate Professor, joined the department in 1964. He was born in Tartu, Estonia. He received the degree of doctor of philosophy (1956) and the degree of doctor of science (1960) from the University of Uppsala, Sweden. From 1958-63, he held a Berzelius fellowship from the Swedish Academy of Sciences and was a research fellow at the University of Uppsala from 1958-60 and in the Division of Physical Chemistry, University of Minnesota from 1960-63. From 1963-64, he was an Assistant Professor of Biochemistry at the University of Uppsala, and in 1964, he became an Assistant Professor of Laboratory Medicine at the University of Minnesota. His research has included fundamental studies on the role of metal ions in the activation of enzymes, enzyme kinetics, and conformation of proteins. He has contributed 35 papers.

Mary E. Dempsey, Assistant Professor of Biochemistry and Laboratory Medicine, joined the department in 1956. She was born in 1928 in St. Paul, Minnesota, and received the degree of doctor of philosophy in biochemistry from the University of Minnesota in 1961. She served as a research biochemist, medical research service, Veterans Administration Hospital, Minneapolis, 1952-56; Instructor, Department of Laboratory Medicine, 1956-58; United States Public Health Service Predoctoral Research Fellow, Departments of Biochemistry and Laboratory Medicine, 1958-61; Instructor, Department of Biochemistry, 1961-65; staff member, cardiovascular clinical research program project, University of Minnesota Medical School, 1963—; and assistant professor, 1965. From 1961-63, she held a postdoctoral fellowship from the American Heart Association. She won the 1967 research award from Iota Sigma Pi, National Honorary Society for Women in Chemistry. She has been an invited speaker in many countries and has produced 37 papers. She is Feature Editor of *Minnesota Chemist.* She is a member of the Research Allocations Committee, American Heart Association. Her principal research interests are steroid chemistry and lipid metabolism.

DIVISION OF MEDICAL TECHNOLOGY

Although the Department of Laboratory Medicine contains scientists from many disciplines, one of its oldest and strongest roots originated in what is now one of its divisions, the Division of Medical Technology.

The following is quoted in and out of context from Miss Ruth Hovde's

Medical Technology Training Program Study (1957) and her subsequent historical notes.

The first "era of growth" of this division occurred with the four-year degree program planned by Doctors *Richard Olding Beard* (Chairman), S. Marx White, and Wilfred Larson.

The first course bulletin was published on March 10, 1922 with the title, *Courses in Medical Technology for Clinical and Laboratory Technicians.* It contained the following announcement: "The demand for clinical and laboratory technicians trained in the principles and techniques of the medical sciences is increasing. The technician so trained is an aide to the physician, the surgeon, the medical specialist, the group clinic, the hospital, or the teaching and research laboratory. The vocation is one that offers satisfactory objectives, a large measure of usefulness and fair compensation." The course requirements of the first two years in the College of Science, Literature, and the Arts included credits in mathematics, chemistry, English, foreign language, and animal biology.

Four sequences were offered at that time to the student in the third and fourth years of the course in the Medical School: a) sequence leading to service as a clinical technician; b) sequence leading to technical service in pathology, neuropathology, and gynepathology; c) sequence leading to technical service in bacteriology and serology; and d) sequence leading to technical service in anatomy or neurology.

No specific details about the clinical training were mentioned other than this statement: "Students in clinical technology, as soon as they have adequate preparation, will be assigned to practical work, for one or more quarters, in the technical laboratory of either University Hospital, Minneapolis General, or Charles T. Miller Hospital in all of which a wealth of clinical material is available and where expert supervision and training will be given." Evidently, no formal clinical training was established, but rather the student in any of the sequences could do whatever practical work could be managed between classes, often only a part of two or three mornings each week.

Upon Dr. Beard's retirement in 1925, Dr. *William A. O'Brien* was appointed chairman of a special committee composed of representatives from the Graduate and the Medical Schools to direct the course. Under Dr. O'Brien's leadership, the second "era of growth" emerged. During

this time, the curriculum content and the clinical training program were crystallized.

In 1929, the first program of rotation through the various clinical laboratories with definite assignments in each was established, but classes on the campus still took up a large part of each day. By 1932, the clinical year of 12 months was arranged.

In 1934, a regular system of submitting grades to the Registrar's Office was started. Previous to this time, whatever number of credits the student needed to complete 180 credits for graduation was submitted. Since this time, a minimum of 45 credits in the senior year of clinical training has been required.

In 1936, the first full-time instructor and a budget of $600 a year to be used for teaching purposes were allocated to the course. Mrs. *Gleva Blain Erskine* was appointed the first instructor. Mrs. Erskine had come to the University Hospitals in July, 1924, had served as "technician in charge" of the laboratory, and had gradually assumed the additional responsibility of supervising the student program. With this budget then according to the department report, "sufficient funds were now available for mimeographed examinations, a supply of pipettes and counting chambers with which the students could practice, and textbooks for reference in the laboratory." From 1938 to 1946, the medical technology program was supervised by Dr. *Helen Knudsen,* Mrs. *Betty Smith Hall,* Dr. *Charlotte Gast,* Dr. *Lucille J. Hoilund,* and Miss *Jane Rietz.*

In 1939, the third "era of maturity" started with the appointment of Dr. *Gerald T. Evans* as director of the course in medical technology and director of the laboratory service of the University of Minnesota Hospitals. Under his guidance, further changes in the curriculum and particularly in the senior clinical year have been made throughout the recent years. The current curriculum includes 2 years in the College of Literature and the Arts and 2 years in the College of Medical Sciences, the second of which consists of 12 consecutive months in a rotating service in the clinical laboratories of the University of Minnesota Hospitals.

In 1959, with the establishment of the Department of Laboratory Medicine, the Division of Medical Technology was designated as the administrative unit for the curricula in medical technology. Miss *Ruth*

Ruth Hovde

Hovde, who had been head of the course in medical technology since 1946, was appointed as professor and director of this division.

In 1959, a graduate program with a major in medical technology leading to the master of science degree was approved by the Executive Committee of the Graduate School, and the first students were enrolled in the fall quarter 1959.

In 1964, a new honors program in medical technology was started to encourage students of high ability to pursue independent study and additional course work in one of the major areas in medical technology. Fourteen consecutive weeks following the basic rotations are allotted to this program.

With Dr. Evan's resignation in 1966, Dr. *Ellis S. Benson* was appointed Professor and Head of the Department of Laboratory Medicine. With his appointment, a fourth "era of development" is emerging.

Ruth F. Hovde, Professor, Department of Laboratory Medicine and Director, Division of Medical Technology, joined the department in 1945. She was born in 1917 in Devils Lake, North Dakota, and received the degree of bachelor of science in medical technology at the University of Minnesota in 1938 and the degree of master of science (anatomy-hematology) in 1949.

From 1938 to 1945, Miss Hovde served as a medical technologist in Grand Forks, Minnesota and Seattle, Washington. At the University

of Minnesota, she became an administrative laboratory technologist and an instructor in medical technology in 1945; instructor, 1946-53; assistant professor, 1953-58; associate professor, 1958-64; and Professor and Director, Division of Medical Technology in 1964. Miss Hovde served as member of the Board of Directors, 1950-53, and President of the American Society of Medical Technologists, 1954-55. Her devotion to the education of medical technologists has made the division of medical technology at the University of Minnesota known throughout the nation as an undisputed leader. She has contributed seven papers.

Verna L. Rausch, Associate Professor, Department of Laboratory Medicine and training coordinator, joined the department in 1946. She was born in 1923 in Minneapolis and received the degree of bachelor of science in medical technology in 1945 and master of science (physiological chemistry) in 1952. She became Instructor in Medical Technology, 1946; instructor and student technologist supervisor, 1951; assistant professor, 1954; and associate professor and training coordinator, 1965. She was a coordinator and lecturer in chemistry for trainees in medical technology in the Peace Corps, Pakistan Project in 1962. She was President of the Minnesota Society of Medical Technologists in 1955-56 and President of the American Society of Medical Technologists, 1965-66. She has contributed seven papers.

Esther F. Freier, Associate Professor, Department of Laboratory Medicine and hospital chemist, joined the department in 1946. She was born in 1925 in Hibbing, Minnesota and received the degree of bachelor of science in medical technology at the University in 1946 and the degree of master of science (physiological chemistry) in 1956. She served as a junior scientist in the division of medical technology from 1946-51; instructor, 1951-57; instructor and hospital chemist, 1957; assistant professor, 1958-64; and associate professor in 1964. She served as President of the Minnesota Society of Medical Technologists, 1958-59. She was the senior author (with Miss Rausch) of the 1958 paper on quality control which won four awards. Since then she has continued to win awards for research. She is responsible for much of the methodology in the 26 papers she has contributed. She has been a member of many committees.

Lorraine M. Gonyea, Associate Professor, Department of Laboratory Medicine, joined the department in 1946. She was born in 1923 in Minneapolis, Minnesota, and received the bachelor of science degree in

medical technology at the University of Minnesota in 1944 and the master of science degree (anatomy-hematology) in 1954. She became Instructor in Medical Technology, 1951; assistant professor, 1959; and associate professor, 1965. In 1955-56, she was on a Fulbright Scholarship and spent time in the laboratories of Professor Paul Owren of Oslo. Since then, her primary interests have been in coagulation and the purification of prothrombin. She has contributed 14 papers.

Grace Mary Ederer, Associate Professor, Department of Laboratory Medicine, joined the department in 1952. She was born in 1919 in Morton, Minnesota and received the bachelor of arts degree in biology from the College of St. Catherine, St. Paul in 1941. She served her medical technology internship in Providence Hospital, Detroit, 1941-42, and received the degree of master of public health at the University of Minnesota, 1962. She served as staff technologist (chemistry) at Henry Ford Hospital, Detroit, 1942-44; instructor (biological sciences), College of St. Catherine, 1944-45; and bacteriology supervisor, Northwestern Hospital, 1945-52. She was administrative laboratory technologist and instructor, University of Minnesota Hospitals, 1956-61; assistant to the director, clinical laboratories, and instructor, 1961-63; assistant professor, 1963-67. Miss Ederer has contributed six papers.

Ben E. Hallaway, Assistant Professor, Department of Laboratory Medicine, joined the department in 1953. He was born in 1919 in Claremont, Minnesota; received the degree of bachelor of science (chemical technology) from Iowa State College in 1941; the degree of bachelor of science in medical technology from the University of Minnesota in 1952; and the degree of master of science (physiological chemistry) in 1961. He served as a junior scientist, in 1953-55; assistant scientist, 1961-64; and assistant professor, 1964. He has contributed seven papers. Most of his studies have been on the changing chemical composition of cardiac muscle fibers.

Patricia Hanauer Bordewich, Assistant Professor, Department of Laboratory Medicine, joined the department in 1954. She was born in 1931 in Albany, Minnesota, and obtained the degree of bachelor of science in medical technology from the University of Minnesota in 1952 and the degree of master of science (anatomy-hematology) in 1962. She served as hematology teaching supervisor, St. Cloud Hospital, 1952-54, and, at the University of Minnesota Hospitals, student technologist supervisor, 1954-55; student technologist supervisor and instructor, 1955-

Dorothy R. Sundberg

57; Instructor in Medical Technology, 1957, and as assistant professor, 1962. She has been active in quality control and electronic counting in the hematology laboratories and has produced four papers.

Kathryn Grave Zieske, Senior Medical Technologist and Assistant Professor, Department of Laboratory Medicine, joined the department in 1955. She was born in 1926 in Minneapolis, and obtained the degree of bachelor of arts (zoology) from Carleton College, 1948, the degree of master of arts (zoology) from Mount Holyoke, 1950, and the bachelor of science degree in medical technology from the University of Minnesota in 1954. She served as medical technologist supervisor from 1955-61; senior medical technologist, 1961; and senior medical technologist and assistant professor in 1966. Since 1955, Mrs. Zieske has worked in the special hematology laboratory where she has participated in prediagnosis of blood and bone marrow. Her senior paper in medical technology won an award.

Dr. *R. Dorothy Sundberg,* Professor of Laboratory Medicine and Anatomy and Director of Clinical Hematology, who prepared the above departmental sketch, was born in Chicago in 1915. She attended the University of Chicago, Wayne State University and the University of Minnesota where she received the master of arts degree in 1939, the degree of doctor of philosophy in 1943, and the doctor of medicine degree in 1953. She worked as a technologist for Dr. Hal Downey,

1937-39, Instructor in Pathology at Wayne State University, 1939 to 1941, and Teaching Assistant in Anatomy, University of Minnesota 1941 to 1942. During these war years, she taught in the laboratories of gross anatomy, histology, and hematology. She also assumed Dr. Hebbel's responsibilities for hematologic diagnoses in the University Hospitals while Dr. Hebbel was in the service. She served as an instructor in anatomy from 1943 to 1946. When Dr Downey, her world-renowned mentor, retired in 1946, she became assistant professor and continued teaching morphologic hematology as well as functioning as a diagnostic hematologist in the hospital laboratories She became Associate Professor of Anatomy in 1953, professor in 1960, and Professor of Laboratory Medicine and Anatomy in 1963. She received the Lucretia Wilder Award for Research in Anatomy in 1943. She was certified by the American Board of Pathology (hematology) in 1960. Her chief areas of research are in diagnostic and experimental hematology.

In addition to extensive teaching of undergraduate students she is especially active in the graduate school. Indeed, 4 students have taken their major and 16 their minor for the degree of doctor of philosophy with Dr. Sundberg. Nine have taken the masters degree in hematology. She has also had many minors in hematology from the Mayo Graduate School of the University of Minnesota. "I have read more theses than books or journals."

She alone, and in collaboration with others, has contributed 40 papers. She helped Dr. Downey edit and compiled the index for his famous four volume *Handbook of Hematology* in 1938. Dr. Sundberg served on the Advisory Editorial Board of *Blood* from 1960 to 1967, and is now an Associate Editor of *Blood*. In 1967, she directed a continuation course in New Concepts in Hematopoiesis in honor of Dr. Hal Downey.

Dr. Sundberg holds membership in a large number of scientific and professional societies including the American Association of Anatomists, American Society of Hematology, Society of Experimental Biology and Medicine, and American Association of Pathology and Bacteriology.

Chapter XLII

Minnesota Governors, Legislators and University Regents

THE MINNESOTA MEDICAL SCHOOL, like the entire University, owes its birth, childhood and adulthood to the Governors, Legislators, Regents, the tax-paying citizens and many individuals who have made generous gifts. Apparently, when Alexander Ramsey was elected first Territorial Governor in 1849, he had in mind the early establishment of a University. In his second message to the Legislators in January 1851, he recommended that they petition Congress for a grant of 100,000 acres of public land to endow a University of Minnesota. This was enthusiastically approved by the Legislators and sent on its way to Washington. However, at that time any message was in transit more than a month.

In the meantime, Henry Hastings Sibley, destined to become the first governor of the State of Minnesota, was a delegate in Washington and had already gotten a congressional bill for a University of Minnesota land grant. This bill was passed by Congress on February 9, 1851. It granted two townships (46,080 acres) for a Minnesota University. Meanwhile, the Minnesota Territorial Legislature had drafted a Charter for the University which was passed and signed by Governor Ramsey on February 25, 1851. Six years later, in the State Constitution, the University Charter was given lasting status and it has remained the basic instrument of the University.

The initial act of the Territorial Legislature made provision for establishment of a Board of Regents and five departments one of which was Medicine (Chapter II). Most of the governors following Ramsey have played an important role in developing and encouraging the University.

Minnesota legislators have long shown their confidence in those properly trained for the promotion of good health by enacting laws and appropriating funds. On February 7, 1872, a bill was presented by

members of the Minnesota State Medical Association for the establishment of a State Board of Health. The Legislature passed this bill within the following month, thus establishing the fourth State Board of Health in the United States. Later, the Legislature enacted laws creating local boards of health.

In 1883, provision was made for organization of a University Department of Medicine with a nonteaching faculty. Up to that time, a sizeable number of unqualified persons were practicing medicine in Minnesota and considerable quackery existed. The State Legislature came to the rescue and passed an act to regulate the practice of medicine, requiring all physicians to be licensed. They also conferred upon the faculty of the Department of Medicine at the University the right to function as an examining board with power to approve and accept diplomas and to recognize certain medical colleges as evidence that their graduates were qualified to practice. The first medical degrees were actually granted by the University of Minnesota in 1884.

By 1888, the Legislature had provided for a conventional College of Medicine and Surgery. An appropriation was made whereby a small building known as Medical Hall was constructed on the campus in 1893, and two years later the laboratory of the Medical Sciences Building was added.

Ever since these early days, legislators have generously supported building programs. Their loyal support, together with donations from individuals and organizations, has resulted in one of the finest medical school plants in this country. A good example of their faith was the legislative appropriation of $6,500,000 for the construction of the Mayo Memorial Building.

Minnesota State Legislators early recognized the large economic losses and the public health aspects of diseases in animals. Since 1885, when the Legislature passed an act conferring upon the Board of Health power to quarantine domestic animals suffering from epidemic diseases. Minnesota legislators have approved practically every well-recommended procedure to protect animals against destructive diseases. Particular emphasis has been placed on the control and eradication of those animal diseases transmissible to people. In 1903, the Legislature passed an act to establish a State Livestock Sanitary Board. All authority which had previously been conferred upon the State Board of Health concern-

ing infectious diseases among animals was transferred to this newly-created board.

On March 6, 1888, Veterinary Medicine became a part of the curriculum in the School of Agriculture. Although the Legislature provided for a College of Veterinary Medicine in 1891, the proposal did not succeed because there was no public demand. In 1893, a Division of Veterinary Medicine was created. This was continued until 1947 when a complete and excellent School of Veterinary Medicine authorized by the Legislature, was established on the School of Agriculture campus.

Our legislators won great victories by enacting laws and appropriating funds to protect animals. For example, rabies and glanders, said to be the most horrible of all diseases which attack both animals and people, have been brought well under control. Glanders, in fact has been eradicated from Minnesota. While rabies remains a considerable problem among wild animals, it has been well controlled among domestic animals and occurs very rarely in people.

Anthrax has become exceedingly rare among our animals and people. Tuberculosis, which caused such losses among various species of animals early in this century, and was so frequently transmitted to people, has been so reduced among cattle that now only one in 17,000 animals has been infected with this germ. Those who are directing the present attack on brucellosis are winning the fight. Suffering from disease among animals has been reduced to a minimum.

While our legislators made provisions for the improved health and protection of animals, they also supported the use of animals in obtaining knowledge beneficial to other animals and people. On many occasions, misinformed or uninformed individuals have become emotional or even fanatical about the use of animals for the study of the effects of drugs, surgical procedures, etc., and have presented bills for legislative action prohibiting their use. Such bills have been defeated by our legislators. To have passed any one of them would have nullified or seriously interrupted the program designed to improve the health of both animals and people.

Studies consisting of experimental work on animals have resulted in knowledge which when applied to humans has prevented much illness and many untimely deaths. Several of our present-day drugs were first

administered to animals to determine not only their effectiveness but their toxicity. When found to be safe for animals, these drugs were cautiously administered to people until dosage could be properly standardized. The so-called "miracle drugs," including the sulfonamids and the antibiotics, are good examples. They were first given to animals. Those found to be ineffective or too toxic were either modified or eliminated. Those which proved helpful and harmless to animals were safely given to people, and those found efficacious, such as penicillin and streptomycin, are now in common usage. It is said that the discovery of penicillin and the subsequent antibiotics have added ten years to the span of man's life on earth. Experimental animals contributed greatly to this accomplishment. Numerous other preparations are now being studied in the same manner and doubtless still others will follow, some of which most likely will effectively control disease.

Animals themselves are now benefitting significantly from standard drugs such as antibiotics. Veterinarians use them extensively and save numerous lives of nearly all species of animals, including pets suffering from infections such as pneumonia.

Prior to the advent of insulin over 40 years ago (1922), literally hundreds of millions of people in the world suffered and died from diabetes. Dogs were required in the experimental work of Banting *et al.,* in the production of insulin. The million or more persons now living in this country who have diabetes are not doomed to a lingering death but are able to lead reasonably normal lives because of insulin. Future generations of diabetics will also enjoy this important benefit.

Prior to the work of Murphy *et al,* (1926) pernicious anemia was a universally fatal disease. Vast numbers of persons throughout the world had died from this condition over the centuries. Murphy and his coworkers used dogs to develop a simple, direct and effective treatment consisting of whole liver, liver extract, or ventriculin. Since this treatment has been available, persons with pernicious anemia can live indefinite periods without discomfort.

More than a century ago, the first general anesthetic to be studied was ether. It was first used on dogs, and when a safe method was developed in this manner it was employed among people. A number of general anesthetics have since been developed which first were studied experimentally on dogs. These anesthetics whose safety and effectiveness was determined in dogs are now employed not only in humans, but also

in modern experiments on dogs. Without anesthesia, much modern surgery would be impossible.

The Department of Surgery at the University of Minnesota has made many fine contributions by way of modified and new operations, all of which have first been studied carefully on dogs. An early outstanding contribution was the successful closure of an atrial septal defect in a child under hypothermia by Dr. John Lewis. The experimental work on dogs consisted of gradually lowering normal rectal temperature of 38° C and a pulse rate of 160 to 180, to a temperature of 26 to 28° C and a pulse rate of 50 to 70. All vessels to and from the heart were then obstructed, the right atrium was opened, and any remaining blood was evacuated. A large defect through which the index finger could be introduced was produced by removing a part of the membranous septum. After the operation was completed the animal's body was rewarmed. In due time, the chests of the surviving animals were reopened and the septal defects repaired. Twenty-seven of the 39 animals in the original study survived the production of atrial septal defects. Twenty-six were later subjected to the operation for closure of septal defects. In one which had been operated two and one-half months earlier, the defect was found to have healed; four died during anesthesia or during the cooling process before the heart was opened. In the remaining 21, the septal defects were closed; 17 of these survived the surgery. When these 17 animals were later sacrificed, all of the septal defects were found to be soundly healed.

Most of the deaths that occurred in this experiment were in the early days of the work. These experiments led to improvement of technique so that the operation rarely failed. For example, among the last 10 attempts to produce septal defects there was only one death, and only one occurred among the last 10 operations which closed the defects. Thus, in these experiments, the surgeons learned how to prevent or control such complications as coronary air embolism, and ventricular fibrillations not related to air embolism.

If it had been necessary to develop this safe technique on children, it is probable that approximately 20 out of 39 would have died. However, the technique of the operation was so perfected on dogs that on September 2, 1952, a septal defect was successfully closed in an underdeveloped, sickly five-year-old child weighing only 29½ pounds by essentially the same technique that had been carefully developed on

dogs. This child's body was cooled to 82° F (rectal) and the cardiac inflow was occluded for a total of five and one-half minutes, during which time the septal defect, approximately two centimeters in diameter, was closed during direct vision. At the end of the operation, which lasted only 58 minutes, rectal temperature was only 79° F. She was placed in water at 113° F and within 35 minutes the rectal temperature registered 96.8° F. She promptly recovered from the anesthesia and her convalescence was uneventful.

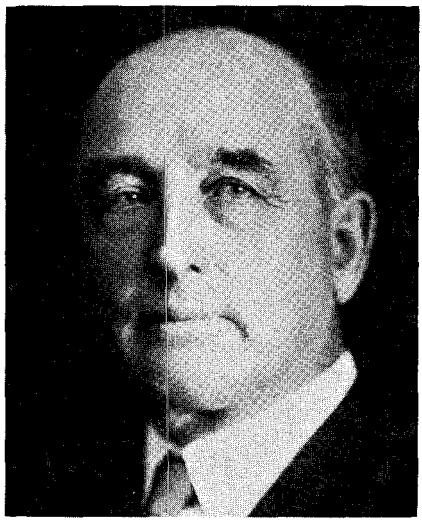
Virtually every important surgical procedure performed today was learned in experimental laboratories using dogs. This is true of approximately two dozen life-saving operations done in different parts of the abdomen alone. The delicate techniques employed in brain surgery were learned for the most part on dogs.

Within the last 20 years, surgeons have learned how to successfully remove diseased lungs, lobes and smaller units, thus completely curing such conditions as cancer, abscess, bronchiectasis, etc., and aiding greatly in the treatment of tuberculosis. Techniques for these operations were for the most part learned on dogs. (Chapter XXVI.)

Throughout the years, Minnesota legislators have familiarized themselves with facts about promoting all phases of good health and have acted accordingly. Now, they have to their everlasting credit a record of health improvement which has given to Minnesotans greater efficiency, happier and longer lives.

Present-day research is working toward the control of the remaining prevalent and highly fatal conditions, such as cancer, the leukemias and various heart diseases. But much more needs to be done. With good administrators, highly-trained scientists and physicians, adequate buildings with well-equipped laboratories and hospital facilities, the solution of some of these problems seems assured. Such a hopeful future can be achieved only by training young men and women to assist and later to assume full responsibility. Today, this is being accomplished by the College of Medical Sciences which our State Legislature has supported so admirably.

The Board of Regents. Practically every item pertaining to the Medical School that reached the Legislature emanated from an individual or a small group of interested persons who presented it to their department heads, who in turn referred it to the dean and his adminis-



Fred B. Synder

trative advisers. The item then went to the Board of Regents who recommended it to the Legislature.

When organization and development of the University of Minnesota was approved in 1851 and the first 12 Regents were appointed, there were slightly more than 5,000 people in the Territory of Minnesota. Tax funds were limited and the Regents were not able to immediately establish a university with necessary buildings and faculty salaries. Then the rumblings and the actual participation in the Civil War made it impossible for the Regents and Legislators to consummate plans for developing the planned University. Prior to 1863, 29 persons had served as Regents. That year, *John Sargent Pillsbury* was appointed a Regent and the next year he was elected to the Presidency of the Board. From the time of his appointment, Regent Pillsbury worked almost incessantly to get the University established.

Under his presidency, a preparatory department was opened in November 1867 and the Board was determined to develop a "real University." In efforts to recruit *William Watts Folwell* of Kenyon College in Ohio and later *Cyrus Northrop* of Yale University he devoted an almost unbelievable amount of time and work (Chapters III and VI).

Mr. Pillsbury served as president of the Board of Regents until 1876. He was succeeded by *Henry H. Sibley* who continued until 1891 through

the period when the non-teaching medical faculty was appointed (1883) and when the College of Medicine and Surgery was established (1888).

In 1891, Mr. Pillsbury was re-elected president and was made Regent for life. He died in 1901, having served on the Board of Regents from 1863 until his death. He was rightfully designated the *Father of the University of Minnesota.* (See Chapter III.)

As president of the Board of Regents, Mr. Pillsbury was succeeded by *Greenleaf Clarke, J. T. Wyman, John Lind* and *B. F. Nelson* over the next thirteen years.

In 1912, Attorney *Fred B. Snyder* became a member of the Board and on December 8, 1914, he was elected president in which capacity he served for the next 36 years. He devoted a tremendous amount of time to the University. As president of the Board, Mr. Snyder had the last word in the selection of presidents. There can be no mistake about his judgment when one reviews the records of Marion Burton, Lotus D. Coffman, Guy Stanton Ford, W. C. Coffey, and James Morrill. He was a strong supporter of the School of Medicine, backing President Vincent in the reorganization of the faculty, establishment of the Mayo Foundation, development of a Student Health Service, the selection of Harold S. Diehl as director of the Student Health Service and Dean of Medical Sciences and the School of Medicine. In fact, he vigorously supported every item of proved value to the School of Medicine.

When Regent Snyder died in 1950, the head of the Board became designated as chairman rather than president. *Raymond J. Quinlivan* was elected to the chairmanship. This was also a wise choice. Under his jurisdiction, *Robert B. Howard* was appointed to the deanship of the College of Medical Sciences in 1958 and *O. Meredith Wilson* was elected to presidency of the University in 1960. The wisdom of these choices is unquestioned. When Regent Quinlivan died in 1961, *Charles W. Mayo* was elected chairman having been a member of the Board since 1951. It was his uncle, Dr. *W. J. Mayo,* who also did such marvelous work for the Medical School and the University as a whole on the Board of Regents from 1907 until his death in 1939. (Chapters XII and XIII.) It is regrettable that space does not permit paying special tribute to every one individually of the 157 persons who have served on the Board of Regents since 1851. Their names and years of service are listed in Appendix I.

The secretaryship of the Board of Regents has been an extremely re-

Charles W. Mayo

sponsible and demanding position. For more than a third of a century, the secretary has also been vice-president of the University in charge of Business Administration. Thus, of necessity, secretaries were especially qualified for their position.

William T. Middlebrook, who served so long in this capacity, was born in Vergennes, Vermont, on April 9, 1891. He received the degree of bachelor of arts from Dartmouth College in 1912, and the master of commercial science degree in 1913. From 1913 until 1917, and again in 1919-1920, he was traveling auditor, traveling freight agent, and special representative, Executive Department of the Great Northern Railway. From 1920 to 1922, he was associated with Griffenhagen and Associates Lt., industrial engineers, Chicago. For the next three years, he was comptroller of Purdue University. In 1925, he was Comptroller and Secretary, Board of Regents, University of Minnesota and in 1943 he was advanced to the vice-presidency, Business Administration and continued as the Regents' Secretary.

He is past-president of the Central Association of the University and College Business Officers; chairman, Business Officers Inter-Association Committee on Relations with Federal Government; vice-chairman, Mid-West Inter-Library Corporation. He is a member of Phi Beta Kappa, American Legion, and served as president of the Minneapolis Kiwanis Club.

Four years before Mr. Middlebrook retired in October 1955, the Board of Regents adopted the following resolution: "Be it resolved, that the Regents of the University of Minnesota do, by this formal action, express to William T. Middlebrook their grateful appreciation for all that his fruitful years of service have meant to the University and to the State of Minnesota; and likewise they extend to him their kindest and friendliest personal regards as he completes three decades of a most useful and productive University life, and enters upon still further years of active service."

Laurence R. Lunden, present secretary of the Board of Regents, was born in Watertown, South Dakota, on April 5, 1907. After graduating from high school in Sioux Falls, he spent 1925-29 earning the degree of bachelor of arts at Grinnell College, Iowa. Then followed a period of graduate work in economics at the University of California. He entered the University of Minnesota Graduate School and from 1929 to 1933 his major was in monetary theory and minor in economic history for which he received the degree of doctor of philosophy.

Luther College of Decorah, Iowa, conferred upon him the degree of doctor of laws (*Honoris Causa*) in 1940. His ability and qualifications were recognized promptly so he was appointed teaching assistant while he was a student in the Graduate School. He was promoted to an instructorship in 1937 in the School of Business Administration. From 1937 to the present time, he has been associate Professor in the School of Business Administration. Since 1934, he has worked actively with the Board of Regents in such positions as investment counsel, assistant secretary, comptroller treasurer, and treasurer. On July 1, 1959, he was appointed to the vice-presidency for Business Administration and became Secretary of the Board of Regents. These positions he continues to conduct admirably. Mr. Lunden has published more than 50 articles on investments, banking and monetary theory in the financial and investment reviews. He has also published an equal number of articles in journals including *The American Economic Review, American Banker (National)* and other banking journals in Louisiana, Arkansas, and Michigan.

He has had more than two dozen special assignments in consulting capacity, membership of committees, etc., in state and national organizations. Among the numerous other important positions, he is a trustee of the Farmers and Mechanics Savings Bank in Minneapolis, trustee of

the Fairview Hospital and a director of the University of Minnesota Foundation. He holds membership and is active in a dozen organizations on and about the campus.

Mr. Lunden is in great demand in Washington, D.C., making appearances on behalf of the Association of Land Grant Colleges and Universities, the National Association of State Universities, and the American Council on Education. He also has appeared before representatives of the Atomic Energy Commission, the United States Public Health Service, National Science Foundation, Veterans Administration, Department of Defense, and the United States Department of Agriculture, Internal Revenue Taxation. He is currently a consultant in the National Science Foundation.

The citizens of Minnesota had confidence in those whom they elected to the Legislature from the beginning. Moreover, they confided in those whom the Legislature elected to the Board of Regents and thus they have willingly provided funds through taxation to assure the building, updating and maintaining of a first class University to provide higher education for their children, grandchildren, and the children of future generations. As years have passed, numerous individuals and organizations including the Federal Government have made significant contributions which have played a large role in the development of one of the nation's best universities and one of its finest colleges of medical sciences.

As this manuscript was going to press, the announcement appeared of Dr. Charles W. Mayo's accidental death at the age of 70 years on July 28, 1968. He had been a member of the Board of Regents since 1951 and Chairman from 1961 to 1967. He served his country and the world in many capacities. He was a member of the clinical staff of the Mayo Clinic from 1931 until retirement in 1963. Dr. Mayo was the last of the Mayo family on the staff of the Mayo Clinic and the Mayo Foundation for Medical Education and Research. During World War II, he served in the medical corps, heading a military hospital in New Guinea. He was appointed an alternate delegate to the United Nations in 1953 and was elected president of the American Association for the United Nations the next year. In reporting his death, July 30, the *Minnesota Daily* said, "He was one of the most honored citizens in the world for his contributions to world peace and brotherhood and received many honorary awards and degrees at local, state, national and international levels."

Chapter XLIII

The College of Medical Sciences: Yesterday, Today and Tomorrow

THE MAGNITUDE of the area's health problem before Medart Chouart des Groseilliers and his brother-in-law Pierre Radisson beached their canoe on Knife Lake in the summer of 1659 is not known. However, the appearance of these two Frenchmen, the first Cacausians to reach the "Minnesota territory" and their followers brought certain communicable diseases, particularly tuberculosis, to the American Indian and created serious additional health problems for the region. As more and more Cacausians arrived from the New England states and from Europe, more disease was introduced. There is little doubt that when the government established a military post in 1819 with a detachment of the infantry consisting of 82 persons with a reinforcement of 120 persons the next month, the disease problem was markedly increased. The soldiers were accompanied by Dr. Edward Purcell. Apparently, the second physician was Thomas S. Williamson, who arrived as a missionary in 1835. Lumber camps employed physicians, one of whom was Christopher Carli who also did some practice outside the camp beginning in 1841, and was the first civilian physician in Minnesota.

By 1849, when the Minnesota Territory was established, the population was approximately 5,000. During the second meeting of the territorial legislature, provision was made for a University which included a medical department.

Although the University did not begin to function until 1869, the population rapidly increased (172,000 in 1860 and 439,706 in 1870). Corresponding heightening of health problems required medical care. Graduates of schools of medicine in Chicago and eastern centers emigrated to this area. The preceptor system was in vogue for some time by which a well qualified physician accepted a young man as his assistant and student, who in due time was able to take over the practice usually

on retirement or death of his teacher, or establish a practice in another area on the recommendation of his teacher.

The idea of establishing a Medical School in Minnesota was conceived by Alexander Stone, who practiced obstetrics in St. Paul. The original school was established as the St. Paul Medical College in 1870. Two years later, the Winona Medical School was founded. Both the St. Paul and the Winona schools were only preparatory institutions intended to prepare students to enter medical schools elsewhere, especially in Chicago. Other private schools were organized in Minnesota including one in Hamline University.

In 1883, a medical faculty consisting of nine physicians was appointed at the University of Minnesota. This was not a teaching faculty, but rather one to examine physicians with reference to their qualifications to practice and also to examine individuals to determine qualifications for a bachelor or doctor of medicine degree. Those who qualified were recommended to the Board of Regents to be granted such degrees.

In 1887, a committee met with the Board of Regents and urged the propriety of establishing a teaching school of medicine by the University of Minnesota. The medical department with its nonteaching faculty was then abolished, and the Medical Department of the University of Minnesota was established to be opened as a school for teaching medicine in October 1888. The other Minnesota schools merged or closed except the one at Hamline University. It continued to operate until 1908 when it merged with the University. Since then, there has been only one Medical School—the University of Minnesota Medical School.

In 1915, an affiliation was established on a trial basis between the Graduate School and the Mayo Foundation for Medical Education and Research. This affiliation became permanent in 1917.

For the first five years, the faculty of the College of Medicine and Surgery was housed in a rented building. Medical Hall the first structure on the campus was occupied in 1893. In the adjacent area, other buildings followed of which the last was the Public Health and Pathology Building occupied in 1907. The total cost of construction of the original medical school complex was $438,732.46. After the last building was constructed on the north complex, it was decided that the College of Medicine and Surgery should move southward on the land extending from Washington Avenue to the Mississippi River. The first building constructed there was the Elliot Memorial Hospital in 1911

followed in a year by the Institute of Anatomy and the new Millard Hall. The three buildings of the new complex south of Washington Avenue constituted a significant advance of the College of Medicine and Surgery. They resulted in almost abandonment of the buildings of the original complex. The new complex was not only adequate but was considered one of the best medical school plants in the nation. With modern facilities for the time, a significant new development occurred. Prior to 1913, the faculty did excellent teaching of students of medicine. Beginning in 1913, a strong research program was added. These two activities advanced so that by 1924 the building program was extended, the number of students was gradually increased and they were taught the best that was known from year to year. Research activities received ever increasing financial support and the volume of research done increased at a phenomenal rate.

The *present situation* is far beyond the fondest dreams of the faculty members of 1888 or even those of 1912. Today, there is a faculty of more than 700 members compared to 28 in 1888 and 70 in 1912. The number of students entering the school each year is over 160. Construction cost of the present buildings was $34,612,434.60 in contrast to one rented building off the campus in 1888 and one $80,000 building on the campus in 1893.

From five fellowships in the Graduate School provided by the University in 1914, the number increased to 232 in 1953 and to 468 in 1958 with a total enrollment of 855 in graduate medicine in 1966. The number of fellowships in the Mayo Foundation increased in a similar manner over the years.

There were 31 Graduate School faculty members at the University in 1915 and 394 in 1966 while at the Mayo Foundation there were 27 in 1915 and 386 in 1966. Up to 1966, the total number who had received graduate degrees at the Mayo Foundation was 2,101 and at the University 1,955—a total of 4,056.

Plans for *the future* of the College of Medical Sciences are complex and imaginative. On May 21, 1964, Dean Howard wrote President Wilson: "The purpose of this letter is to outline the staff and facilities that would be required to increase the entering class size to 200 students, an increase of 50 students or 33.3% over the present entering class size of 150 students." Dr. Howard outlined the requirements for such an increase with reference to buildings, additional staff, etc. Presi-

dent Wilson was receptive and presented the proposal to the Board of Regents. The Board considered the greater need of Minnesota for health manpower required by the State's growing population and the manner in which this need would affect the role of the University in providing physicians, dentists, nurses and other health care personnel.

On September 16, 1964, a request was made of the Hill Family Foundation which contains the following: "In recognition of the apparent need of the State of Minnesota and of the nation for increasing numbers of physicians to meet the needs of a growing population, the College of Medical Sciences has recently advanced a proposal for a substantial increase in the size of the entering class in the Medical School from the present level of 150 students to 200 students. The tentatively outlined cost of the proposed program appears to be in line with costs of similar expansion proposals made by other medical schools, indeed lower than a good many. Nevertheless, its accomplishment would require substantial sums of public funds for both capital expenditures and ongoing maintenance. Further, the proposal is a complex one, involving not only the Medical School, but the School of Dentistry, the School of Nursing, the School of Public Health, and perhaps even other units of the University as well.

"The Regents feel that they neither can nor should respond to this proposal as though it were purely a University matter. The public's stake in the supply of physicians and other health personnel is immediate and clearly evident. The Regents believe therefore, that they should consider the Medical School and related intra-University proposals only in light of a most careful state-wide study of needs for additional physicians, dentists, nurses and other health care personnel and of the potentials for training of such personnel. It is suggested, therefore, that a widely representative committee be formed under other than University auspices and that it be asked to study the needs both state and national to consider means of meeting such needs and to make appropriate recommendations. Such a committee should include representatives of at least the following: the public at large; the State Legislature; the University, including the Medical, Dental, and Nursing Schools, and the Mayo Foundation; the State Medical, Dental and Nursing Associations; the Minnesota Academy of General Practice; and the group that has been studying the possibility of establishing an independent medical school in St. Paul.

"The Hill Family Foundation with its broad and long standing interests in education, public welfare, and medical care would appear to be ideally suited for the sponsorship of such a study."

The Hill Family Foundation accepted the responsibility for such an investigation and established the Health Manpower Study under the direction of Dr. Osler L. Peterson, Professor of Preventive Medicine at Harvard University.

An Advisory Committee consisting of 17 citizens selected from among leaders in the health professions, business, education, farming and law was invited to serve as individuals from Montana, Minnesota, North Dakota and South Dakota. Ivan J. Fahs, doctor of philosophy, Bethel College, was engaged as director of field studies. He and Dr. Peterson selected a staff which began assembling data in June 1965. This task was completed in February 1966 and the commission met to draft its recommendations.

At the same time that the Health Manpower for the Upper Midwest was undertaken with a grant from the Hill Family Foundation, the University also began a Long-Range Planning Study of the Physical Facilities for the Health Sciences to determine the basis for future construction of the Medical Campus. In the Fall of 1966, Dean Howard published the following summation of the two studies under the heading "Recommendations of the Upper Midwest Manpower Study."

1. That the University expand its entering medical class from 150 to 200 students at an early date and lay plans for further expansion to 250 at some time in the future.

2. That, since the Medical School and School of Dentistry are closely related and share staff and curriculum, an increase from 150 to 200 in number of dental students accompany the expansion of the Medical School.

3. That students from two-year medical schools in the North and South Dakota be encouraged to complete their education at the University of Minnesota since studies indicate that a major proportion of the graduates who complete their medical education here remain in the Upper Midwest to practice.

4. That a greatly increased demand for medical care be anticipated. The Commission estimated that by 1975 there will be between 200-300 fewer physicians than will be needed to maintain the present ratio of active physicians to population in Minnesota. For this reason, the

committee favored the ultimate establishment of a second medical school in this region.

5. That, in view of the growing need for personal or family physicians in this area, the teaching of skills and attitudes relevant to the responsibility of the personal or family doctor be strengthened at the University of Minnesota Medical School.

LONG RANGE PLANNING FOR THE HEALTH SCIENCES

Since land for expansion on the Minneapolis campus is severely limited, it is imperative that the use of this land be carefully planned. Therefore, an attempt has been made to read the foreseeable future of health care education and to determine with some accuracy the physical facilities that will be required, within the given land limitations. Some of the notable conclusions of the committee are as follows:

1. Increased emphasis on ambulatory teaching programs.
2. The development of a team approach to comprehensive health care.
3. For Dentistry—more basic sciences, more research, a more preventive orientation.
4. Increased postgraduate and continuing education programs.
5. The probable evolution of a program to train family physicians.
6. Strengthened affiliations with community hospitals.
7. The need for an increase in hospital beds in this complex.
8. The need to coordinate all programs on a health science basis.

Based on these considerations, and the recommendations of the Upper Midwest Health Manpower Study, the Committee recommended the following new construction:

1. A new School of Dentistry building.

2. A new combination Clinic-Hospital facility, to include space for the Schools of Nursing and Public Health, as well. The new facility would contain approximately 270 hospital beds initially, with the ultimate plan that all hospital beds, with the exception of Heart, Masonic and Rehabilitation Center hospital beds, would be located in the new area. All outpatient facilities would also be housed in the new building, as well as additional teaching and conference facilities.

3. A building for research for the clinical departments, including a new, modern facility for large animals.

Estimated total cost of the proposed expansion program is $53,440,-

800. It is anticipated that at least half the costs can be covered by matching funds from federal and other sources, while the remainder will be requested from the Minnesota Legislature.

From a vantage point of 75 years of medical education in Minnesota, and with a view to what surely will be the period of most radical change that medicine has witnessed in this country, we continue to maintain our confidence in the devoted work of individual staff members and in the support of an interested and understanding public.

On September 1, 1967, President Wilson was succeeded by Dr. *Malcolm C. Moos.* With a president of such wide experience, such outstanding accomplishments, such a clear vision for the future of the University, together with a dean of the College of Medical Sciences with such a perfect record and ideal clear vision, the future is assured.

Appendix A

Doctor of Philosophy Degrees Granted by Department of Anatomy, 1888 through June 1966

Date	*Name (Faculty advisor)*	*Title of thesis*	*Most recent position*
1915	WILLIAM FITCH ALLEN (J. B. Johnston)	The Spinal Cord of Bdellostoma	Prof. and head, Dept. of Anatomy, Univ. of Oregon. Deceased 1951
	EDWIN A. BAUMGARTNER (R. E. Scammon)	Development of the Liver, Gall Bladder and Hepatic Ducts in *Amblystoma punctatum*	Pathologist, Newark State School, Newark, New York. Deceased 1942
1916	ELMER RAY HOSKINS (C. M. Jackson)	The Growth of the Body and Organs of the Albino Rat as Affected by Feeding Various Ductless Glands (Thyroid, Thymus, Hypophysis, and Pineal)	Asst. prof. of anatomy, Yale. Deceased 1920
1917	CHESTER ARTHUR STEWART (C. M. Jackson)	Studies of the Effects of Inanition upon Growth in the Albino Rat	Prof. and director of pediatrics, Louisiana State Univ. Deceased 1946
1921	HOMER BARKER LATIMER (C. M. Jackson)	The Postnatal Growth of the Body, Systems, and Organs of the Single-Comb White Leghorn Chicken	Prof. of anatomy, Univ. of Kansas. Emeritus 1952. Deceased 1965
	HJALMER LAURITS OSTERUD (C. M. Jackson)	The Postnatal Growth and Development of the Reproductive Tract in the Female Albino Rat	Prof. of antomy, Med. Coll. of Virginia. Emeritus 1950
1923	HALBERT LOUIS DUNN (R. E. Scammon)	The Growth of the Cerebrum and Its Integral Parts	Chief, National Office of Vital Statistics, U.S.P.H.S.

APPENDIX A—*(Continued)*

Date	*Name (Faculty advisor)*	*Title of thesis*	*Most recent position*
	SHIRLEY PUTNAM MILLER (C. M. Jackson)	The Effects of Inanition upon the Stomach and Intestines of Albino Rats Underfed from Birth for Various Periods	Asst. prof. of anatomy, Univ. of Minnesota. Emeritus 1946
	GUSTAVE JOSEPH NOBACK (R. E. Scammon)	A Study of the Developmental Anatomy of the Respiratory System in Man	Prof. and head of anatomy, New York Univ., and Univ. of Puerto Rico. Deceased 1955
1926	WALTER PAGE COVELL (A. T. Rasmussen)	Quantitative Studies of the Human Hypophysis	Prof. of Anatomy and Otolaryngology, Wash. Univ., St. Louis
	WILLIAM THOMAS PEYTON (R. E. Scammon)	Developmental Topographical Anatomy of the Head and Neck of the Fetus, the Newborn, the Child, and the Adult as Determined by the Orthoscopic Method	Prof. of neurosurgery, Univ. of Minnesota. Emeritus 1960. Deceased 1962
	GORDON HATLER SCOTT (R. E. Scammon)	A Quantitative Study of the Growth Changes of the Parts of the Human Fetal Stomach Wall	Vice Pres. for Med. College Develop., Wayne State Univ.
1927	CHARLES HAMILTON WATKINS (R. E. Scammon)	A Quantitative Study of the Growth of the Arterial System of the Human Fetus with Respect to Body Length, Body Weight, and Age	Prof. and head, section of Internal Medicine, Mayo Clinic
1929	DONALD DUNCAN (A. T. Rasmussen)	Studies of Degeneration in the Peripheral Nerves of Normal Mammals	Prof. and head of anatomy and assoc. dean, Graduate School, Univ. of Texas, Galveston

	CARROLL EDWARDS PALMER (R. E. Scammon)	Studies on the Center of Gravity in the Human Body	Director of research, Tuberc. Div., U.S.P.H.S.
	HAROLD EWART ROE (R. E. Scammon)	The Prenatal Development of the Skin and *Tela-Subcutanea* in the Human Fetus	Pediatrician, Pomona, California
1931	CLAY BRISCOE FREUDENBERGER (C. M. Jackson)	Differences between the Wistar Albino and the Long-Evans Hybrid Strains of the Norway Rat	Prof. and head of anatomy, Univ. of Utah. Deceased 1946
1932	CHARLES MORRIS BLUMENFELD (C. M. Jackson)	Effects of Various Dietary Deficiencies Upon the Morphology of the Suprarenal Gland	Pathologist, Sutter General Hosp., Sacramento, Calif.
	BYRON ELLSWORTH HALL (Hal Downey)	Certain Phases of the Monocyte Problem	Internist, San Francisco and assoc. clin. prof. of medicine, Stanford Univ.
	SAMUEL IRVING STEIN (A. T. Rasmussen)	The Effects of Pregnancy on the Hypophysis of the Albino Rat	Neuropsychiatrist, Chicago, Illinois
1934	RUSSELL LOWELL JONES (A. T. Rasmussen)	The Structure of the Vagus and Glossopharyngeal Nerves	Director, Medical Dept., Motion Picture Relief Fund, Inc., Los Angeles, Calif.
	JOHN JOSEPH LAWLESS (A. T. Rasmussen)	Effects of Castration on Organ Weights in the Rat	Assoc. prof. of medicine and dir. Univ. Health Serv., Univ. of West Virginia
1935	OLIVER PERRY JONES (Hal Downey)	Erythroblasts with Special Reference to the Megaloblast	Prof. and head of anatomy, Univ. of Buffalo
1936	OSCAR ARNOLD BILLETER (C. M. Jackson)	The Effect of Spaying and Thelin Injections on Body Growth and Organ Weights of the Albino Rat	Plastic surgeon, Salt Lake City, Utah
	ARTHUR KIRSCHBAUM (Hal Downey)	Blood Cell Formation in Mammalian Embryos	Prof. and head of anatomy, Baylor Univ. Deceased 1958

APPENDIX A—*(Continued)*

Date	*Name (Faculty advisor)*	*Title of thesis*	*Most recent position*
	RAYMOND A. SCHWEGLER, JR.* (E. A. Boyden and J. C. Litzenberg)	The Development of the Duodenal End of the Common Bile Duct in the Human Embryo and Fetus with Special Reference to the Origin of the Ampulla of Vater and Sphincter of Oddi	Obstetrician and gynecologist, and clin. assoc. prof., Univ. of Kansas, Lawrence-Kansas City
	HERBERT WALD (Edith Boyd)	The Normal Variability of the Weight of the Kidneys, and the Effect of Pathological Processes upon the Distribution of the Weight of the Kidneys	Surgeon, Louisville, Kentucky
1937	DAVID SMITH JONES (E. A. Boyden)	The Origin of the Sympathetic Trunks in the Chick Embryo	Prof. of anatomy, Loyola University, Chicago
1939	JEFF MINCKLER (A. T. Rasmussen)	The Nerve Terminals of the Human Spinal Cord (Normal and Pathological)	Pathologist, General Rose Memorial Hosp., Denver, Colorado
	RUSSELL LEROY MOSELEY (A. T. Rasmussen)	Innervation of the Pancreas	Pathologist, VA Hospital, Pittsburgh, Pennsylvania
	NORMAN D. SCHOFIELD (R. F. Blount)	Transplantation of the Pancreatic Anlage in the Urodele Embryo	Pathologist, Austin State Hospital, Austin, Texas
	RAYMOND CARL TRUEX (A. T. Rasmussen)	The Structure of Sensory Ganglia with Special Reference to the Incidence of Multipolar Neurons	Prof. of anatomy, Temple Univ.
1940	YU-CHI WANG (R. E. Scammon)	A Comparison of the Surface Area and Parts of the Cerebrum in Different Races	Returned to China. No current information

1941	GRANT LITSER RASMUSSEN (A. T. Rasmussen)	I. The Origin, Course and Destination of the Olivary Complex. II. Fiber Projections of the Olivary Complex	Chief, sect. functional neuroanatomy, Nat. Inst. of Neurol. Dis. and Blindness, Nat. Insts. of Health
1942	THOMAS FRANCIS DOUGHERTY (Hal Downey)	Studies on the Cytogenesis of the Microglia; Their Relation to Haematogenous Cells and to the Cells of the Reticuloendothelial System	Prof. and chairman of anatomy, Univ. of Utah
	ERLING STANFORD HEGRE (R. F. Blount)	The Relation of Age to the Influence of the Diencephalic Floor upon Hypophyseal Development	Prof. and chairman of anatomy, Medical College of Virginia
	ROBERT LYNN MERRICK (A. T. Rasmussen)	A Quantitative Study of the Supraoptic Nucleus of the Rats, Dogs and Humans	Neurosurgeon, St. Paul, and asst. clin. prof., Div. of Neurosurgery, Univ. of Minn.
	CHARLES ROBERT NOBACK (R. E. Scammon)	The Development of the Human Osseous Skeleton During Embryonic, Fetal and Circumnatal Periods	Assoc. prof. of anatomy, Columbia Univ.
	MELVIN A. SCHADEWALD (A. T. Rasmussen)	The Structure of the Blood Vessels of Human Stellate Ganglia and Its Changes with Age	Asst. prof. of anatomy, Univ. of Texas, Galveston. Deceased 1954
1943	GLENN A. DRAGER (A. T. Rasmussen)	The Innervation of the Anterior Lobe of the Hypophysis Cerebri	Assoc. Prof. of neurology, John Sealy Hosp. Galveston
	ROBERT GORDON GRENELL (A. T. Rasmussen)	The Effects of Temporary Arrest of the Circulation on the Brain	Prof. of neurobiology and psychiatry, Univ. of Maryland
	RUTH DOROTHY SUNDBERG (Hal Downey)	Lymphocytogenesis in Human Lymph Nodes	Prof. of anat. and inter. med., Univ. of Minnesota

*Ph.D. in Obstetrics and Gynecology, Thesis in Anatomy

APPENDIX A—*(Continued)*

Date	*Name (Faculty advisor)*	*Title of thesis*	*Most recent position*
	CHARLES VAN BUSKIRK (A. T. Rasmussen)	A Quantitative Study of the Seventh Cranial Nerve Complex in Cat, Dog and Man	Prof. of neurology, Univ. of Maryland
1944	ROBERT HARRISON REIFF (Hal Downey)	Splenomegaly of the Banti Type	Pathologist, Seattle, Washington
1947	ROBERT ALAN GOOD (Berry Campbell)	The Morphologic Mechanisms of Hypergic Inflammation in the Brain; with Special Reference to the Significance of Local Plasma Cell Formation	Prof. of pediatrics, Univ. of Minnesota
	JOHN WALTER REBUCK (Hal Downey)	Cytology of Acute Inflammation in Man as Demonstrated by Two Original Technical Procedures with Particular Reference to the Role of Lymphocytes	Chief, div. of lab. hemat. The Henry Ford Hospital
1948	SISTER TERESITA JUDD (Arthur Kirschbaum)	A Comparative Study of the Effects of Certain Chemical and Physical Agents on Mouse Leukemia	Prof. and chairman of biology, St. Catherine's College, St. Paul, Minnesota
1949	MARTHELLA JANE FRANTZ (Arthur Kirschbaum)	Adrenal Cortical Adenomas of Inbred Mice	Pathologist, Univ. of Kentucky, Lexington
	HOWARD ARTHUR MATZKE (A. T. Rasmussen)	The Course of the Fibers Arising from the Nucleus Gracilis and Cuneatus of the Cat	Prof. and chairman of anat., Univ. of Kansas, Lawrence
1951	RALPH LLOYD KITCHELL (L. J. Wells)	Effects of Hormones upon the Adrenals and Reproductive Organs of the Fetus	Dean, College of Vet. Medicine, Kansas State Univ.

	FRANKLIN ROBERT SMITH* (E. A. Boyden and H. K. Gray)	An Analysis of Variations of the Segmental Bronchi of the Right Lower Lobe of Fifty Injected Lungs	Thoracic surgeon, and clin. assoc. prof., Univ. of Washington, Seattle
1952	MORTON ALPERT (W. L. Williams)	Observations on Some Factors in the Deposition of Ceroid Pigment in the Mouse	Assoc. prof. of anat., Indiana Univ.
1953	HAROLD BRODY (Berry Campbell)	Age Changes in the Cerebral Cortex	Prof. of anatomy, Univ. of Buffalo
	NATHANIEL AVROM BUCHWALD (Berry Campbell)	Studies on the Electroarchitectonics of the Cerebral Cortex	Assoc. prof. of anatomy, UCLA Medical School
	SAMUEL OWEN CORNWELL (W. L. Williams)	Studies on Reticuloendothelial Function with Colloidal Gold	Pediatrician, John Umstead Hospital, Butner, North Carolina
	JOHN BASKERVILLE HYDE (Berry Campbell)	The Fifth Nerve of the Shrew	Assoc. prof. of anatomy, Meharry Medical College
	DENNIS JAMES KANE (W. L. Williams)	Histopathology of the Renal Lesion in the Generalized Schwartzman Phenomenon	Internist, Mpls., Minn.
	MARIA RYZEN (Berry Campbell)	Analysis of the Cerebral Cortex in *Sorex pacificus pacificus*	Dept. of psychiatry, VA Hosp., Long Beach, Calif.
	RICHARD HANAWALT SWIGART (W. L. Williams)	Normal and Denervated Skeletal Muscle, and Connective Tissue of Mice Studied by Histochemical and Vital Staining Methods	Assoc. prof. of anatomy, Univ. of Louisville
1954	MARTHA PITEL (E. A. Boyden)	Variations in the Bronchovascular Patterns of the Left Lower Lobe of Fifty Lungs	Chairman dept. of nursing education, Univ. of Kansas

*Ph.D. in Surgery (Mayo Clinic), Thesis in Anatomy

APPENDIX A—*(Continued)*

Date	*Name (Faculty advisor)*	*Title of thesis*	*Most recent position*
1955	RICHARD GUYTHAL HIBBS (J. F. Hartmann)	Development of the Ultra-Structure of Cardiac Muscle	Assoc. prof. of anatomy, Tulane Univ.
	JEROME SUTIN (Berry Campbell)	Electrophysiological Studies of Cerebral Cortical Function: The Regulatory Role of the Supragranular Layers in the Control of Infragranular Pyramidal Cell Excitability	Prof. and chairman of anat., Emory Univ., Atlanta
	ALBINA ANN YAKAITIS (L. J. Wells)	An Experimental Study of Growth of the Adrenals in Fetal Rats	Asst. prof. of anatomy, Univ. of Miami
1956	MONA LUYTEN COETZEE (L. J. Wells)	Hypophysis-Adrenal System in the Fetal Rat: An Experimental Study of the Hypophysis	Research assistant in anatomy, Univ. of Pittsburgh, Pennsylvania
	NANDKUMAR H. KESWANI* (W. H. Hollinshead)	The Phrenic Nucleus in the Cat and Man	Prof. of anatomy, All-India Institute of Medical Sc.
	ROLAND DARRELL MEADER (W. L. Williams)	A Histologic Study of Choline Deficiency in the Mouse	Asst. prof. of anatomy, Univ. of Nebraska
1958	UNG KEE HWANG (L. J. Wells)	Experimental Study of the Thyroid in the Fetal Rat	Asst. prof. of anatomy, St. Louis Univ.
1959	MARY JANE BUCKMAN (R. Dorothy Sundberg)	Studies on Embryonic and Fetal Hematopoiesis with Special Reference to the Goat	
	CARL THEODORE FRIZ (Arnold Lazarow)	Metabolic Studies on the Isolated Islet Tissue of the Pancreas of *Opsanus tau*	Asst. prof. of anatomy, Univ. of British Columbia

	JAE NAM KIM (L. J. Wells and Arnold Lazarow)	The Effects of Experimental Diabetes and Subdiabetes on the Offspring of Rats	Asst. prof. of anatomy, Univ. of Louisville
1960	CARL BLIXSETH HEGGESTAD (L. J. Wells)	The Influence of Growth Hormone upon Fetal Development in the Rat	Assoc. prof. of anatomy, Univ. of Minnesota
1961	CHESTER A. GLOMSKI (R. Dorothy Sundberg)	Macromolecular Splenomegaly in the Rat: A Histologic Study with Special Reference to Tissue Iron Distribution in the Normal and Iron-Loaded Animal	Asst. prof. of anatomy, Buffalo Univ.
1962	ARNOLD WALFRED LINDALL, JR. (Arnold Lazarow)	The Pyridine Nucleotides: A Study of a Method of Measurement—A Study of the Alterations in Rat Liver Under the Conditions of Diabetes and Starvation—A Preliminary Study of Various Marine Fish Tissues with the Emphasis on the Islets of Langerhans	Asst. prof. of anatomy, Univ. of Minnesota
1962	ROBERT JOHN ISAACSON (Arnold Lazarow)	An Investigation of some of the Factors Involved in the Closure of the Secondary Palate	Prof. and chmn., orthodontics, Univ. of Minnesota
1962	RICHARD ELGIN STALLARD (Arnold Lazarow)	The Periodontium: A Histomorphologic Study of the Supporting Structures of the Teeth	Prof. and chmn., pediodontics, Univ. of Minnesota
1963	GUSTAV ERIC BAUER (Arnold Lazarow)	The In Vitro Incorporation of C^{14}- and H^{3}- Labeled Amino Acids into the Proteins of Goosefish Islet Tissue	Asst. prof. of anatomy Univ. of Minnesota

*Ph.D. in Surgery (Mayo Clinic), Thesis in Anatomy

APPENDIX A—*(Continued)*

Date	*Name (Faculty Advisor)*	*Title of thesis*	*Most recent position*
1963	CARL ROBERT MORGAN (Arnold Lazarow)	Studies with Insulin Antiserum: I. Immunoassay of Insulin Using a Two-Antibody System. II. The *In Vitro* Response to Insulin of Adipose Tissue from Rats Injected with Insulin Antiserum. III. The Changes in the Pancreatic Islet B-Cell of Rats Injected with Insulin Antiserum	Asst. prof. of anatomy, Univ. of Indiana
1963	RAYMOND ULRIC SEALE (W. J. L. Felts)	An Evaluation of Chorio-Allontoic Grafting as a Technique in Skeletal Biology	Asst. prof. of anatomy, Univ. of Colorado
1963	HAROLD H. TRARIG (C. F. Morgan)	Autoradiographic Study of the Growth of the Mammary Gland in Castrated and Castrated-Hypophysectomized Mice	Asst. prof. of anatomy, Univ. of Kentucky
1964	LEONARD RICHARD MURRELL (Arnold Lazarow)	Endocrine Pancreas of the Fetal Rat in Organ Culture: Culture Methods, Some Aspects of Histogenesis, Insulin Synthesis and Release, and the Incorporation of Tritiated Leucine into Tissue Protein Fractions	Asst. prof. of anatomy, Univ. of Minnesota
1964	JAMES ROBERT MOREHEAD (C. F. Morgan and Anna-Mary Carpenter)	The Effects of Androgen on the Mammalian Testis Following the Cryptorchid State	Asst. prof. of anatomy, Tufts School of Med.
1964	MICHAEL ROBERT SCHWEISTHAL (L. J. Wells)	Differentiation and Growth of the Fetal Rat Pancreas *in vitro*	Asst. prof. of anatomy, Med. College of Virginia

1964	FRANK MICHAEL SACCOMAN (C. F. Morgan and L. J. Wells)	Radioautographic Study of the Extra Embryonic Membranes in Normal and Experimental Mice	Asst. prof. of anatomy, Bemidji State Teacher's College
1964	DAVID ROBERT KVISTBERG (Cyrus Barnum, Biochem.) (Arnold Lazarow)	Model Studies on the Staining Reaction of Beta Cells of the Islets of Langerhans by Aldehyde Fuchsin	Spec. res. fellow in anatomy, Univ. of Minnesota
1965	MOSTAFA ABOUL-ENEIN (R. Dorothy Sundberg)	Further Studies on Experimental Leukemia in Mice Subjected to Caloric Restriction	Cancer Research Scientist, Univ. of Cairo
1965	BRUCE MARTIN CARLSON (C. F. Morgan and W. J. L. Felts)	Experimental Observations on Implant-Induced Supernumerary Limbs in the Newt, *Triturus Viridescens*	Asst. prof. of anatomy, Univ. of Michigan
1966	JOHN GREWE (W. J. L. Felts)	Histologic and Microradiographic Investigation of the Consequences of Mandibular Incisor Extractions in the Young Mouse	Asst. prof., acting head dept. of pedodontics, Univ. of Minnesota
1966	DONALD WALTER ROBERTSON (Morris Smithberg)	The Uptake of Radioactive Compounds During Development of the Mouse	Instructor, dept. of anatomy, Univ. of Minnesota

Appendix B

Otolaryngologists Who Have Completed Residency Training at Minnesota July 1, 1932–June 30, 1966 in the Approximate Sequence of Their Training, and Their Locations:

1.	NELSON YOUNGS	Grand Forks, North Dakota
2.	HOWARD CLARK	Monterey, California
3.	FRITZ HURD	Great Falls, Montana
4.	ARTHUR JUERS	Louisville, Kentucky
5.	JEROME A. HILGER	St. Paul, Minnesota
6.	ROBERT E. PRIEST	Minneapolis, Minnesota
7.	EMMETT MILHAUPT	St. Cloud, Minnesota
8.	GEORGE M. TANGEN	(Deceased)
9.	WILLIAM R. MOVIUS	La Jolla, California
10.	J. DONALD SJODING	Mankato, Minnesota
11.	EUGENE F. MCELMEEL	Seattle, Washington
12.	NEIL GOLTZ	Fargo, North Dakota
13.	GUDMUNDER EYJOLFSSON	Reykjevik, Iceland
14.	JAMES CARRIS	Colorado Springs, Colorado
15.	HAROLD ULVESTAD	Minneapolis, Minnesota
16.	GRAHAM SMITH	Minneapolis, Minnesota
17.	BENJAMIN BOFENKAMP	Minneapolis, Minnesota
18.	DOUGLAS KUSSKE	St. Paul, Minnesota
19.	ROBERT WHEELER	Minneapolis, Minnesota
20.	SHERMAN STRAND	Santa Monica, California
21.	HARRY B. FREY	Riverside, California
22.	APOSTLE KARANDJEFF	St. Louis, Missouri
23.	ROBERT KOLLER	Minneapolis, Minnesota
24.	SAMUEL SHEA	Minot, North Dakota
25.	ELLIS ELLISON	San Mateo, California
26.	JOHN GLAESER	Minneapolis, Minnesota
27.	BRADLEY KUSSKE	St. Paul, Minnesota
28.	EKREM GOZUM	Minot, North Dakota
29.	CHENG-EN LU	Fergus Falls, Minnesota
30.	KURT POLLAK	Minneapolis, Minnesota
31.	DONALD BOUCHER	Paducah, Kentucky
32.	VICTOR HILDYARD	Denver, Colorado
33.	YUICHI NITO	Toronto, Canada
34.	ALBERT HOHMANN	St. Paul, Minnesota
35.	DONALD KILGORE	Albuquerque, New Mexico
36.	GEORGE LANGSJOEN	Sacramento, California

37.	DUANE NAGLE	Fargo, North Dakota
38.	JOAN DAVISON	Danville, Pa. (Deceased)
39.	JAMES DONALDSON	Seattle, Washington
40.	LOTHAR KAUL	Sioux Falls, South Dakota
41.	ROBERT RICHARDSON	Minneapolis, Minnesota
42.	GEORGE V. TANGEN	Minneapolis, Minnesota
43.	ARNDT DUVALL	Minneapolis, Minnesota
44.	JOHN R. HILGER	St. Paul, Minnesota
45.	RICHARD LUND	Minneapolis, Minnesota
46.	WILLIAM G. MERRICK	Duluth, Minnesota
47.	MELVIN E. SIGEL	Minneapolis, Minnesota
48.	HYMAN PAISNER	Minneapolis, Minnesota
49.	JOHN S. HUFF	Minneapolis, Minnesota
50.	JOHN BANOVETZ	Minneapolis, Minnesota
51.	PATRICK GRIFFIN	St. Paul, Minnesota
52.	DAVID MURPHY	Denver, Colorado
53.	BEN THAL	Seattle, Washington
54.	THOMAS STENGL	St. Paul, Minnesota
55.	JOHN FLANNERY	Wausau, Wisconsin
56.	BARCLAY CRAM	St. Paul, Minnesota
57.	NATHANIEL SPARROW	Raleigh, North Carolina
58.	DAVID BURAN	Minneapolis, Minnesota
59.	RICHARD CARLEY	St. Paul, Minnesota
60.	JOHN DICKSON	Ogden, Utah
61.	SEVERIN KOOP	St. Cloud, Minnesota
62.	MORTON KANE	Minneapolis, Minnesota

Appendix C

Department of Physiology

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
BACANER, MARVIN M.D.	Assoc. prof., 1961—	Assoc. prof.	Cardiovascular physiology
BALL, ZELDA B. PH.D.	Res. asst., 1939-43 Teaching asst., 1942 Assoc. scientist, 1943-45	Not active in scientific work	Cancer biology
BECK, JAMES S. M.D., PH.D.	Asst. prof., 1963—	Asst. prof.	Mathematical and physical biology
BOYLE, ROBERT W. M.D., PH.D.	Grad. student, received Ph.D. in 1936	Prof. physical med., Marquette, chief, physical med., V.A. Hosp., Milwaukee	
BROWN, ERNEST B. JR. PH.D.	Teaching asst., 1946-47 Res. asst., 1947-48 Instructor, 1948-49 Ph.D., 1949 Asst. prof., 1949-52 Asso. prof., 1952-55 Prof., 1955-61	Prof. and head Dept. of Physiol., Univ. of Kansas, Med. Ctr.	Respiration physiology
BROZEK, JOSEPH M. PH.D.	Jr. psychologist, 1942-43 Assoc. scientist, 1943-44 Asst. prof., 1944-53	Prof., Dept. of Psychol. Lehigh Univ., Bethlehem, Pennsylvania	Biostatistics and physiological psychology
CAMPBELL, BERRY PH.D.	Asst. prof., 1944-45 Assoc. prof., 1945-50 (Joint appointment with anat.)	Prof. neurol., Col. Med. Evangelists, 1958	Neurology

CASAS, CARMEN B. PH.D.	Grad. student, received Ph.D. in 1947	Prof. physiology, Univ. of Puerto Rico	Endocrinology
CAVERT, H. MEAD M.D., PH.D.	Res. asst., 1946-47 Res. and teaching asst., 1948-51 Ph.D., 1952 Asst. prof., 1952-59 Assoc. prof., 1959	Prof., physiol., Assoc. dean med. Sch. 1964—	Heart metabolism
CLAUSEN, DONALD F. PH.D.	Jr. scientist, 1942-45 Asst. scientist, 1947-50 Ph.D., 1950 Res. assoc., 1950-60	Stout State Univ., Menomonie, Wisc.	
CODE, CHARLES F. M.D., PH.D.	Instructor, 1938 Asst. prof., 1939	Dir. med. educ. and res., Prof., Mayo	Gastro-intestinal physiology
CORSON, SAMUEL A. PH.D.	Instructor, 1944-46 Res. assoc., 1946-47 Asst. prof., 1946-47	Prof. Behavioral Sci., Ohio State Univ.	Psychotropic drug action
DELANEY, JOHN P. M.D., PH.D.	Ph.D. in 1963	Med. fellow, Surgery Dept.	
EDWARDS, CHARLES PH.D.	Assoc. prof., 1960-65 Prof., 1965—	Prof., Dept. of Physiology, 1965—	Biophysics of muscle and nerve
EVANS, ROBERT L. PH.D.	Res. assoc., 1954-57 Asst. prof., 1957-63	Assoc. Prof., Sch. of Pub. Health, Univ. of Minnesota	Mathematical biology and circulation
FENSTERMACHER, JOSEPH PH.D.	Teaching asst., 1961-64 Ph.D. 1964 Post doctoral fellow, 1965	Post doctoral fellow, Pharmacological Inst. Bern, Switzerland	Transport mechanisms
FERGUSON, DONALD J. M.D., PH.D.	Asst. prof. to prof. surg., 1952-60 Ph.D., Physiol., 1952	Prof. surg., Univ. of Chicago	Endocrinology and surgical research

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
FOX, IRWIN J. M.D., PH.D.	Asst. prof., 1960-64 Assoc. prof., 1964—	Assoc. prof. of physiol., Univ. of Minnesota 1965—	Cardiovascular physiology
FRANTZ, MARTHELLA J. PH.D.	Asst. prof. cancer biol. div. 1951-56	Maumee Valley Memorial Hosp., Ohio 1960—	Endocrinology
FREUNDLICH, HERBERT M. PH.D.	Prof., 1938-39	Deceased	Colloid chemistry
GELLHORN, ERNST M.D., PH.D.	Prof., 1943-60 Prof., emer., 1960—	Retired	Neurophysiology
GIBSON, ROBERT B. M.D.	Asst. prof., biochem., 1912-13		
GOLLAN, FRANK M.D.	Res. assoc., 1946-47 Asst. prof., 1947-48	Chief, radioisotope svce., V.A. Admin. Hosp., Coral Gables, Florida 1960—	Cardiovascular physiology
GREISHEIMER, ESTHER M. M.D., PH.D.	Instructor, 1918-19 Asst. prof., 1922-31 Assoc. prof., 1933-35	Retired Prof. physiol. emer., Women's Med. Coll.	Regulatory physiology
GRIM, EUGENE PH.D.	Post-doctoral fellow, 1951-52 Instructor, 1952-54 Asst. prof., 1954-58 Assoc. prof., 58-62 Prof., 1962	Prof. of physiol., Univ. of Minnesota, 1962—	Transport mechanisms
HADDY, FRANCIS, J. M.D., PH.D.	Mayo Foundation fellow, 1949-51 Amer. Ht. Assoc. fellow, 1951-53 Ph.D., 1953	Prof. and head, Dept. of Physiology, Michigan State Univ.	Cardiovascular physiology

HALBERG, FRANZ M.D.	Res. fellow, 1949-50 Res. assoc., 1950-55 Assoc. prof., 1955-57	Prof. of pathology, Univ. of Minnesota	Biological rhythms
HAMILTON, ROBERT W. JR. PH.D.	Ph.D. in 1964	Linde Air Products, Research	Respiration physiol.
HARVEY, RODNEY B. M.D., PH.D.	Res. asst. 1948-49 Instructor, 1949-50 Ph.D., 1953 Assoc. prof., 1960—	Assoc. prof. of Physiology, Univ. of Minnesota, 1960—	Renal physiology
HEATH, CHARLES PH.D.	Teaching asst., 1952-53 Instructor, 1953-56 Ph.D. in 1956	Assoc. prof. of physiol. Univ. of Alberta, Canada	Respiratory physiology
HEMINGWAY, ALLAN PH.D.	Asst. in physics, Univ. of Minnesota, 1925-29 Instructor, 1929-30 Asst. prof., 1930-42 Assoc. prof., 1945-48 Prof., 1948-51	Prof. of physiol. Univ. of California, Los Angeles, Calif.	Respiration and temperature regulation
HENSCHEL, AUSTIN F. PH.D.	Teaching asst., 1934-38 Ph.D., 1938 Instructor, 1938-41 Asst. prof., 1941-47	Chief, Physiol. Sect., USPHS, Cincinnati, Ohio	Nutrition
HEWITT, EARL A. DVM, PH.D.	Ph.D. in 1931	Prof., Iowa State University, Retired	
HIGHTOWER, NICHOLS C. JR. M.D., PH.D.	Ph.D. in 1952	Dir., Dept. of Clinic Research, Scott and White Clinic	Gastrointestinal physiology

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
HINSHAW, LERNER B. PH.D.	Instructor, May 1956-June 1956 Res. fellow, Sept. 1956-57 Res. assoc., 1957-58 Instructor, 1958-59 Asst. prof., 1959-61	Chief, Cardiovas. Res. Lab., Oklahoma City V.A. Hospital	Cardiovascular
HIRSCH, HERBERT M. PH.D.	Asst. prof., 1953-59 Assoc. prof., 1959-65	Deceased	Cancer biology
HOSHIKO, TOM PH.D.	Teaching asst., 1949-52 nstructor, 1952-53 Ph.D., 1953	Asst. prof. of physiol., Western Reserve University	General physiology
HUMPHREY, EDWARD W. M.D., PH.D.	Grad. student, Ph.D. in 1959	Chief, surg. service, V.A. Hospital, Mpls.	Electrolyte physiology
HUSEBY, ROBERT A. M.D., PH.D.	Teaching asst., 1941-44 Int. Cancer Res. Found. Fellow, 1944-46 Ph.D., 1945 O'Brien asst. prof. cancer res., 1946-51	Res. Dir., Am. Med. Center, 1960—	Cancer Biology
HYDE, JANE E. PH.D.	Res. asst., 1946-49 Teaching asst., 1949-50 Ph.D., 1950	Assoc., Res. Dept. of Anat., U.C.L.A.	Neurophysiology
JARDETZKY, OLEG M.D., PH.D.	Res. asst., 1950-54 Res. fellow, 1954-56 Ph.D., 1956	Res. Dept., Dir. Molec., Pharmacol. Merck, Sharp, and Dohme	Physico-chemical physiology

JOHNSON, JOHN A. M.D., PH.D.	Ph.D., 1950 Instructor, 1951-52 Asst. prof., 1954-55 Assoc. prof., 1955 Prof., 1961	Prof. of physiol., Univ. of Minnesota	General physiology
KABAT, HERMAN M.D., PH.D.	Instructor, 1936-42 Asst. prof., 1942-43		Neurophysiology and rehabilitation
KANDA, SAKYO	Received Ph.D. in 1915	Unknown	
KEYS, ANCEL B.	Asst. prof., 1936-37 Assoc. prof., 1937-39 Prof., 1939-47 Prof. physiol. hygiene, 1947— Dir. lab. physiol. hygiene, 1939—	Prof. & Dir., physiol. hygiene, Univ. of Minnesota	
KING, JOSEPH T.	Teaching fellow, 1923-24 Instructor, 1926-29 Ph.D., 1929 Asst. prof., 1929-41 Assoc. prof., 1942-55 Prof., 1955-64	Retired	
KINGSBURY, FRANCIS B.	Instructor in physiol. & physiolog. chem., 1913-1917 Asst. prof., 1917-20 Assoc. prof., 1920-22	Retired	
KOELLA, WERNER P. M.D.	Res. assoc., 1951-52 Assoc. prof., 1952-55	Sr. scientist, Worchester Foundation, Massachusetts	Neurophysiology

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
KOTTKE, FREDERIC J. M.D., PH.D.	Teaching asst., 1939-40 Instructor, 1941 Instructor and assoc. scientist, 1942-44 Ph.D., 1944 Res. fellow (phys. med.), 1944-47	Prof. and head of physical med. and rehab., Univ. of Minnesota	Rehabilitation
KROVETZ, L. JEROME M.D., PH.D.	Ph.D. in 1963	Assoc. prof., Dept. of Pediatrics, Univ. of Florida	Heart, Respiration
KUBICEK, WILLIAM G. PH.D.	Technician, 1939-42 Teaching asst., 1942-43 Instructor, 1943-46 Ph.D., 1946 Res. fellow, 1946 Asst. prof., 1947-48	Prof. of physical med., Univ. of Minnesota	Cardiovascular physiology
LEE, JUI S. PH.D.	Res. asst., 1949-53 Ph.D., 1953 Res. fellow, 1953-56 Res. assoc., 1958-60 Asst. prof., 1960—	Asst. prof. of physiology, Univ. of Minnesota	Physiology of lymphatus
LEE, Y. CHIUNG P. PH.D.	Res. fellow, 1953-56 Ph.D., 1953 Res. assoc., 1957—	Res. assoc., Dept. of Physiology, Univ. of Minnesota	Cardiac physiology

LIFSON, LATHAN M.D., PH.D.	Teaching asst., 1939-41 Instructor, 1941-44 Ph.D., 1943 Asst. prof., 1944-46 Assoc. prof., 1946-49 Prof., 1949—	Prof. of physiology, Univ. of Minnesota	Transport mechanisms
LLINAS, RODOLFO M.D., PH.D.	Res. fellow, 1961-63 Assoc. prof., 1965—	Assoc. prof. of physiology, Dept., Univ. of Minnesota	Neurophysiology
LONG, DAVID M. JR.	Fellow, 1959-61 Instructor, 1960-61 Ph.D., 1965	Surgery dept., Chicago Med. Sch.	Respiration physiology
LOOFBOURROW, GUY N. PH.D.	Res. assoc. (neurophysiol.), 1946-48	Assoc. prof., Univ. of Kansas Medical School	Neurophysiology
LORBER, VICTOR M.D., PH.D.	Teaching asst., 1938-41 Med. fellow, 1939-40 Instructor, 1941-44 Ph.D., 1943 Asst. prof., 1944-46 Prof., 1952—	Prof. of physiol., Univ. of Minnesota, American Heart Association career investigator	Cardiac physiology
LOUCKS, MILO M. PH.D., M.D.	Instructor, 1930	Deceased	
LOVE, JOHN K. PH.D.	Res. asst., 1950-51 Teaching asst., 1951-55 Instructor, 1955-57 Ph.D., 1956 Res. fellow, 1957-58 Instructor, 1958-59 Lecturer, 1965—	Lecturer, Dept. of Physiology, Univ. of Minnesota	General physiology

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
LYON, ELIAS P. PH.D., M.D. (HON.)	Prof. of physiol. and dir. of dept. and Dean of Med. Sch., 1913-36	Deceased	
MARTINEZ, CARLOS M.D., PH.D.	Rockefeller found. fellow, 1943-44 Asst. prof., 1951-55 Assoc. prof., 1955-58 Prof., 1958—	Deceased	Endocrinology immunology and cancer research
MCCLENDON, JESSE F. PH.D.	Instructor, 1914-16 Asst. prof., 1916-17 Assoc. prof., 1917-20 Prof. (biochem.), 1920-39	Retired	
MCCLINTOCK, RUTH PH.D.	Teaching asst., 1946-51 Instructor, 1951-55 Res. fellow, 1955-57 Ph.D., 1957 Instructor, 1957	Asst. prof., Dept. of Physiol., Univ. of Alberta	General physiology
MEDES, GRACE PH.D.	Instructor (fellow) (physiol. chem.), 1924-25 Asst. prof., 1926-33	Retired	
MEYER, MAURICE W. D.D.S., PH.D.	Predoctoral res. fellow, 1955-56 Postdoctorate res. fellow, 1957-60 Res. fellow, 1958-61 Ph.D., 1960 Lecturer, 1961—	Lecturer in Dept. of Physiology and assoc. prof. of dentistry	Circulation

MICKELSEN, OLAF PH.D.	Assoc. scientist (physiol. hygiene), 1942-44 Asst. prof., 1944-46 Assoc. prof., 1946-48	Prof. of Nutr., Michigan State Univ.	Nutrition
MILLIGAN, JOHN V. PH.D.	Teaching asst., 1961-63 Ph.D., 1964	Asst. prof., Queens Univ., Physiol., Ont., Canada	General physiology
MOE, GORDON K. M.D., PH.D.	Res. asst., 1938-41 Ph.D., 1940	Director, Masonic Res. Found., Utica, New York	Cardiovascular physiology
NAHAS, GABRIEL G. M.D., PH.D.	Res. fellow, 1952-53 Ph.D., 1953 Res. assoc., 1955-56 Asst. prof., 1956-57	Prof. of anesthesiology, Columbia Univ., New York	Circulation respiration buffer systems
NELSON, RALPH A. M.D., PH.D.	Res. fellow, 1955-56 Ph.D., 1961	Dir. med. res., Fairview Park Hosp., Cleveland, Ohio	
NEWBERRY, TRUMAN A.	Instructor, 1952-53 Ph.D., 1953		Private practice
O'BRIEN, JOHN L.	Received Ph.D. at Minnesota in 1936	Practicing surgeon, Fort Dodge, Iowa	
OMACHI, AKIRA PH.D.	Res. asst., 1945-48 Instructor, 1948-49 Ph.D., 1950	Assoc. prof. of Physiol., Univ. of Illinois	Cardiac physiology
PELTIER, LEONARD F. M.D., PH.D.	Instructor, 1951-53 Asst. clin. prof., 1953-56 Assoc. prof., 1956 (All in surgery)	Prof. of orthopedic surgery, Kansas	Physiology of bone and fat embolism

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
POPPELE, RICHARD PH.D.	Res. asst., 1963-64 Ph.D., 1964	Postdoctoral res. fellow, Inst. of Physiol., Univ. of Pisa, Italy	Neurophysiology
PURPLE, RICHARD PH.D.	Instructor, 1964-65 Asst. prof., 1965—	Asst. prof. of physiology, Univ. of Minnesota	Neurophysiology
RACKER, EFRAIM PH.D.	Res. assoc., 1941-42	Chief, div. nutrit. and physiol., New York Pub. Hlth. Res. Inst.	Enzymology and intermediary metabolism
REDGATE, EDWARD S. PH.D.	Res. asst., 1950-55 Res. fellow, 1955-56	Assoc. prof. of physiol., Western Reserve Univ., Cleveland	Neurophysiology
REEVES, JOHNIE L.	Pre-doctoral scholar, 1955	Major, Dept. of Toxicology, School of Aviation Med., USAF Aerospace Med. Cent., Brooks Air Force Base, Texas	Respiration
REINECKE, ROGER M. M.D., PH.D.	Asst. in anat., 1937-38 Asst. in anat. & biochem., 1940 Asst. in physiol., 1940-41 Ph.D., 1941	Prof., Dept. of Physiology, Univ. of Puerto Rico	Circulation
REINER, JOHN M. PH.D.	Instructor (physics), 1943 Res. assoc. biochem., 1943-45 Ph.D., 1946	Assoc. prof. of Microbiology, Emory Univ.	Enzymology and intermediary metabolism
ROBERTS, SIDNEY PH.D.	Teaching asst., 1942-43 Ph.D., 1942 Instructor, 1943-44	Prof. of biol. chem., UCLA Med. Sch.	

ROTH, GRACE M.	Ph.D. in 1936	Retired	
ROWELL, LORING B.	Received Ph.D. in physiolog. Hygiene		
RUFE, REDDING H.	Asst. in physiol., 1924-25 Teaching fellow, 1927-28 Instructor, 1929 Asst. prof. (biochem.), 1930		
RUPP, ALICE	Instructor, 1925-27 Ph.D., 1925	Psychiatrics, Toledo State Hospital	
SAKAMI, WARWICK PH.D.	Res. assoc., 1946	Prof., Dept. of Biochemistry, Western Reserve University	Enzymology and intermediary metabolism
SALISBURY, PETER M.D., PH.D.	Ph.D. in 1941	Deceased	Cardiovascular physiology
SAMUELS, LEO T. PH.D.	Asst. prof. (biochem.), 1937-43 Assoc. prof., 1943-44	Prof. and head, biochem., Salt Lake City, Utah	Endocrinology
SCHAFER, DAVID E. PH.D.	Teaching asst., 1953-57 Instructor, 1957-58 Ph.D., 1959	Sr. res. physiologist, V.A. Hosp., Minneapolis	Transport mechanisms
SCHULTZ, FREDERIC W.	Instructor in physiol. chem. and clin. asst. in pediat., 1911-12 Res. assoc. in physiolog. chem., 1912-13	Deceased	
SCOTT, FREDERICK H.	Asst. prof., 1908-13 Assoc. prof., 1913-18 Prof., 1918-44	Deceased	
SEDGWICK, JULIUS P.	Instructor, 1907-11 Asst. prof., 1911-12 Asst. res. prof., 1912-13	Deceased	

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
SHELLY, WALTER B. M.D., PH.D.	Assistant, 1938-41 Ph.D., 1941	Prof. of dermatology, Univ. of Penn.	Investigative dermatology
SIGG, ERNEST B. M.D.	Res. assoc., 1952-53	Dir. of pharmacol., Geigy Chem. Corp., New York	Neurophysiology
SIMMONS, DAVID H. M.D., PH.D.	Fellow, 1949-51 Trainee, 1951-53 Ph.D., 1953	Assoc. prof., Dept. of Med. and Physiol., UCLA	Respiration electrolyte metabolism
SIMONSON, ERNST M.D.	Assoc. prof., 1944-58 Prof., 1958-66	Retired	Electrocardiography
SMITH, FERN W. PH.D.	Shevlin fellowship, 1942-43 Teaching asst., 1943-45 Ph.D., 1945	Asst. prof. of biol., Huntingdon College, Montgomery, Ala.	
SOLLNER, KARL PH.D.	Assoc. chem., 1938-39 Chemist, 1939-41 Asst. prof., 1941-43 Assoc. prof., 1943-47	NIH	Transport mechanisms membranes
STEGGERDA, FREDERIC R. PH.D.	Asst. physiol., 1925-29 Ph.D., 1929	Prof. of physiol., Univ. of Illinois	
STENSTROM, KARL W.	Asst. prof., 1926-29 Assoc. prof., 1929-35	Retired	
STICKNEY, JOHN C PH.D.	Teaching asst., 1937-40 Ph.D., 1940	Prof., Univ. of W. Virginia	

STISH, RICHARD B.E.E.	Lab. tech., 1953-55 Jr. scientist, 1955-59 Asst. scientist, 1959-61 Res. fellow, 1961—	Res. fellow, Univ. of Minnesota	Instrumentation and experimental design
SWANSON, ROBERT E. PH.D.	Teaching asst., 1950-52 Instructor, 1952-55 Ph.D., 1953 Asst. prof., 1958-61	Assoc. prof., Dept. of Physiol., Univ. of Oregon	Renal physiology
SZEGO, CLARA M. PH.D.	Instructor, 1942-44	Prof., Dept. of Zoology, UCLA	Endocrinology
TAYLOR, HENRY L. PH.D.	Teaching asst., 1940-42 Ph.D., 1942 Res. assoc., 1942-44 Asst. prof., 1944-49 Assoc. prof., 1949-56 Prof., 1956—	Prof. of pub. health, Univ. of Minnesota	Arteriosclerosis
TERZUOLO, CARLO M.D.	Prof., 1959—	Hill Family Found., prof. of physiology, Univ. of Minnesota	Neurophysiology
THOMAS, KATHRYN H. (MRS. JOHN D. GREEN) PH.D.	Res. asst., 1959-62 Ph.D., 1962	Postdoctoral res. fellow, UCLA	Neurophysiology
THOMPSON, ALAN M. PH.D.	Teaching asst., 1952-54 Instructor, 1954-56 Res. fellow, 1954-58 Ph.D., 1956	Assoc. prof. of physiology, Univ. of Kansas	General physiology
TRANK, JOHN W. PH.D.	Teaching asst., 1953-57 Instructor, 1957-60 Ph.D., 1961	Assoc. prof., Univ. of Kansas Med. Sch.	Biophysics

APPENDIX C—*(Continued)*

Name	*Dates and Appointments in the Department*	*Present Position*	*Area of Study*
UTTER, MERTON F. PH.D.	Asst. prof., 1944-46	Prof. of biochem., Western Reserve Univ., Cleveland	Enzymology
VARGAS, FERNONDO F. PH.D.	Grad. stulent, received Ph.D. in 1963	Instituto de Fisiologia, Universidad de Chile	Transport mechanisms
VISSCHER, MAURICE B.	Fellow to asst. prof., 1922-25 Ph.D., 1925 Distinguished service prof., 1960—	Prof. and head, Dept. of Physiology, Univ. of Minnesota	
WAKIM, KHALIL G.	Received Ph.D. in 1941	Prof. of physiology, Mayo Graduate School, Rochester, Minn.	
WALKER, JOHN L. JR. PH.D.	Teaching asst., 1957-63 Instructor, 1963-64 Ph.D., 1963 Asst. prof., 1964-65	Asst. prof., Dept. of Physiology, University of Utah	Transport mechanisms
WANG, JUN CHUAN M.D., PH.D.	Received Ph.D. in 1943 (exchange student)	Dept. of Radiology, Queen's Hospital, Honolulu	Biophysics
WARNER, HOMER R.	Medical fellow, 1951-53	Prof. of biophys., Univ. of Utah	
WEINER, DANIEL M.D.	Res. asst., 1956 Lab. tech. asst., 1957 Teaching asst., 1959 Res. fellow, 1962-64 Instructor, 1964-65	Asst. prof., Dept. of Physiology, Univ. of Virginia	Transport mechanisms

WELLS, HERBERT S. M.D., PH.D.	Prof., 1945-61	Retired	Transport mechanisms
WERMERS, GEORGE W. PH.D.	Teaching asst.. 1956-61 Instructor, 1961-62 Res. fellow, 1962-64 Ph.D., 1963	Asst. prof., Dept. Biology, Merrimack College, No. Andover, Mass.	Cardiac Metabolism
WILCOX, MONTREVILLE	Demonstrator in physiol., 1897-1907 Asst. prof., 1907-1919	96 years old could be retired or deceased	
WOOD, EARL H. M.D., PH.D.	Instructor, 1939-40 Ph.D., 1940	Prof. of physiology, Mayo Grad. Sch. Med., Rochester, Minn.	Cardiovascular physiology
WOOD, HARLAND G. PH.D.	Assoc. prof., 1943-46	Prof. and head, Dept. of Biochemistry, Western Reserve Univ., Cleveland, Ohio	Enzymology intermediary metabolism

Appendix D

Ph.D. Degrees Awarded by the Department of Surgery, University of Minnesota

Year	*Personnel*	*Major Advisor*
1917	MCWHORTER, GOLDER LEWIS	Drs. J.E. Moore and F. Corbett
1921	CAMERON, ANGUS LUVERNE	Dr. A.C. Strachauer
1922	ZIEROLD, ARTHUR ADELBERT	Dr. A.C. Strachauer
1925	WANGENSTEEN, OWEN HARDING	Dr. A.C. Strachauer
1930	PEYTON, WILLIAM THOMAS	Dr. A.C. Strachauer
1930	TASCHE, LESLIE WILLIAM	Drs. O.H. Wangensteen and A.C. Strachauer
1932	CREEVY, CHARLES DONALD	Dr. O.H. Wangensteen
1933	CAMPBELL, ORWOOD JACKSON	Dr. O.H. Wangensteen
1933	LEVEN, NATHANIEL LOGAN	Dr. W.T. Peyton
1934	MANSON, MELVILLE HUSTED	Dr. O.H. Wangensteen
1935	CARLSON, HERBERT AUSTIN	Dr. O.H. Wangensteen
1935	RICE, CARL OLIVER	Dr. O.H. Wangensteen
1936	SPERLING, LOUIS	Dr. O.H. Wangensteen
1937	REA, CHARLES ETHAN	Dr. O.H. Wangensteen
1938	BOWERS, WARNER FREMONT	Dr. O.H. Wangensteen
1938	PAINE, JOHN RANDOLPH	Dr. O.H. Wangensteen
1940	BERGH, GEORGE SVERDRUP	Dr. O.H. Wangensteen
1940	DENNIS, CLARENCE	Dr. O.H. Wangensteen
1941	BELLIS, CARROLL JOSEPH	Dr. O.H. Wangensteen
1942	MERRICK, ROBERT	Dr. W.T. Peyton
1944	LANNIN, BERNARD GEORGE	Dr. O.H. Wangensteen
1944	VARCO, RICHARD LYNN	Dr. O.H. Wangensteen
1946	KOLOUCH, FRED, JR.	Dr. O.H. Wangensteen
1946	MERENDINO, KING ALVIN AURELIUS	Dr. O.H. Wangensteen
1946	STATE, DAVID	Dr. O.H. Wangensteen
1946	TITRUD, LEONARD	Dr. W.T. Peyton
1947	BARONOFSKY, IVAN DONALD	Dr. O.H. Wangensteen
1947	FRENCH, LYLE	Dr. W.T. Peyton
1947	KREMEN, ARNOLD JAMES	Dr. O.H. Wangensteen
1947	SIMMONS, DONALD	Dr. W.T. Peyton
1949	FRIESEN, STANLEY RICHARD	Dr. O.H. Wangensteen
1949	HAY, LYLE JOSEPH	Dr. O.H. Wangensteen
1949	SANCHEZ-PALOMERA, ENRIQUE	Dr. O.H. Wangensteen
1950	ANKNER, FRANK JOSEPH	Dr. Clarence Dennis
1950	LEWIS, FLOYD JOHN	Dr. O.H. Wangensteen

Year	*Month*	*Personnel*	*Major Advisor*
1950		MOORE, GEORGE EUGENE	Dr. O.H. Wangensteen
1951		FERGUSON, DONALD JOHN	Dr. O.H. Wangensteen
1951		LILLEHEI, CLARENCE WALTON	Dr. O.H. Wangensteen
1951		PELTIER, LEONARD FRANCIS	Dr. O.H. Wangensteen
1951		SAKO, YOSHIO	Dr. O.H. Wangensteen
1952		KARLSON, KARL EUGENE	Drs. Clarence Dennis and Richard L. Varco
1952		STUTZMAN, FRANCIS LLOYD	Dr. L.J. Hay
1953		CROSS, FREDERICK SAMUEL	Dr. O.H. Wangensteen
1953		FELDER, DAVITT ALEXANDER	Dr. O.H. Wangensteen
1953		HUBBARD, THOMAS BRANNON, JR.	Dr. O.H. Wangensteen
1953		MASON, EDWARD EATON	Dr. G.E. Moore
1953		ZIMMERMANN, BERNARD	Dr. O.H. Wangensteen
1954		CAMPBELL, GILBERT S., JR.	Dr. O.H. Wangensteen
1954		COHEN, MORLEY	Dr. C.W. Lillehei
1954		HITCHCOCK, CLAUDE RAYMOND	Dr. O.H. Wangensteen
1954		NELSON, RUSSELL MARION	Dr. O.H. Wangensteen
1955		KELLY, WILLIAM DANIEL	Dr. O.H. Wangensteen
1955		MILLER, FLETCHER ALLEN	Dr. R.L. Varco
1955		SPELLMAN, MITCHELL WRIGHT	Dr. C.W. Lillehei
1956		ARHELGER, STUART WALDO	Dr. O.H. Wangensteen
1956		CASEY, JAMES HUGH	Dr. Bernard Zimmermann
1956		GARAMELLA, JOSEPH JOHN	Dr. L.J. Hay
1956		NIAZI, SUAD ASAD	Dr. F.J. Lewis
1956		SHUMWAY, NORMAN E., JR.	Dr. R.L. Varco
1956		SMITH, GRAFTON ADRIAN	Dr. O.H. Wangensteen
1956		THAL, ALAN PHILIP	Dr. O.H. Wangensteen
1957		EGDAHL, RICHARD HARRISON	Dr. R.L. Varco
1957		MACLEAN, LLOYD DOUGLAS	Dr. O.H. Wangensteen
1957		MURPHY, THOMAS OGDEN	Dr. R.L. Varco
1957		READ, RAYMOND CHARLES	Dr. C.W. Lillehei
1958		AUST, J. BRADLEY	Dr. O.H. Wangensteen
1958		BARNARD, CHRISTIAAN NEETHLING	Dr. O.H. Wangensteen
1958		PERRY, JOHN FRANCIS	Dr. O.H. Wangensteen
1958		TOON, ROBERT WALLACE	Dr. O.H. Wangensteen
1959		HAINES, GERALD LEON	Dr. W.T. Peyton
1959		HUMPHREY, E.W. (Physiology)	Dr. Donald Ferguson
1960	June	BASCOM, JOHN (Mpls. Gen. Hosp.)	C.R. Hitchcock
		LILLEHEI, RICHARD CARLTON	O.H. Wangensteen
		YONEHIRO, EARL GRANT	O.H. Wangensteen
1960	July	MOWLEM, ALBERT	R.L. Varco
		JENSON, CONRAD BELNAP	O.H. Wangensteen
1960	August	SHAHON, DONALD BERNARD	O.H. Wangensteen
1960	December	LINDSETH, ESTEN (Mpls. Gen. Hosp.)	C.R. Hitchcock
		BERKAS, ERNEST (Veterans Hosp.)	W.D. Kelly
1961	March	IMAMOGLU, KAMIL	O.H. Wangensteen
1961	July	ROOT, HARLAN DAVID	O.H. Wangensteen
1961	December	SALMON, PETER ALEXANDER	O.H. Wangensteen
1962	December	FELLER, WILLIAM FRANK	R.L. Varco

Year		*Personnel*	*Major Advisor*
1963	March	GRIFFEN, WARD O., JR.	O.H. Wangensteen
1963	June	ABSOLON, KAREL BEDRICH	O.H. Wangensteen
		ROSENBERG, JERRY	J. Bradley Aust
1963	July	GRAGE, THEODOR	O.H. Wangensteen
1963	August	LEONARD, ARNOLD SHEY	O.H. Wangensteen
1963	December	CASTANEDA, ALDO RICARDO	O.H. Wangensteen
1964	June	BERNSTEIN, EUGENE FELIX	O.H. Wangensteen
		CHOU, SHELLEY (Neurosurgery)	Lyle A. French
		GANS, HENRY	R.L. Varco
		GOOTT, BERNARD	R.C. Lillehei
1964	July	ACKERMAN, NORMAN	O.H. Wangensteen
1964	December	HAGLIN, JOHN (Henn. County Gen.)	C.R. Hitchcock
1964	December	MCQUARRIE, DONALD	R.L. Varco
1965	July	DOBERNECK, RAYMOND CLEMENS	O.H. Wangensteen
	August	PETER, EDWARDT T.	O.H. Wangensteen
		NICOLOFF, DEMETRE M.	M.B. Visscher
		SELLERS, ROBERT DOUGLAS	C.W. Lillehei
1966	March	NAKIB, AHAMAD	C.W. Lillehei
	June	SOSIN, HENRY	O.H. Wangensteen
	August	HEUPEL, HERMAN	Edward Humphrey
	October	DELANEY, JOHN P. (Surgery)	O.H. Wangensteen
1967	January	LUNSETH, JOHN BENTLEY	O.H. Wangensteen
	April	MCFEE, ARTHUR STORER	O.H. Wangensteen
	May	NICOLOFF, DEMETRE (Surgery)	O.H. Wangensteen
		WALDER, ARNOLD IRA	O.H. Wangensteen
		STONE, NELSON HOWARD	O.H. Wangensteen
		BLOCH, JACK HERBERT	O.H. Wangensteen
		BLUM, JOHN ALAN	C.D. Creevy

Appendix E

M.S. Degrees Awarded by the Department of Surgery, University of Minnesota

Year	*Personnel*
1921	Tanner, Chester O.
1930	Creevy, Charles Donald
1931	Carlson, Herbert Austin
1931	Leven, Nathaniel Logan
1931	Manson, Melville H.
1931	Rice, Carl Oliver
1933	Dvorak, Harold Joseph
1933	Henrikson, Earl Clifford
1933	Mead, Charles Henry, Jr.
1933	Randall, Osmer Samuel
1934	Hargrave, Robert Lee
1934	Hibbard, James Sutherland
1934	Sperling, Louis
1935	Paine, John Randolph
1935	Ritchie, Wallace Parks
1935	Scott, Horace Golden
1937	Bowers, Warner Fremont
1939	Buirge, Raymond Enright
1939	Titrud, Leonard Albert
1941	Smith, Baxter Allen
1942	Lannine, Bernard George
1944	State, David
1946	French, Lyle A.
1947	Gaviser, David
1947	Mears, Frederick Blackburn
1947	Simmons, Donald
1948	Culmer, Charles Urness
1948	Strickler, Jacob Harold
1948	Tongen, Lyle Aaron
1948	Utendorfer, Robert William
1949	Brown, Schuyler Pillsbury
1949	Cohen, Ellis
1949	Davis, Donald David
1949	Eddy, Frank Dayton
1949	Marshall, Clark MacKenzie
1949	Minge, Raymond Kenneth
1949	Nelson, Carleton Alexander
1949	Peterson, Lowell John
1949	Shanoski, Stanley Joseph
1949	Skinner, Abbott
1949	Stewart, Donald
1950	Boosalis, Nicholas Gus
1950	Brigham, Charles Fay, Jr.
1950	Clatworthy, Harry William, Jr.
1950	Helferty, John Kenneth
1950	Johnson, Frank Edward
1950	Martinson, Elmer James
1950	Shaffer, John Ordie
1950	Webber, Richard John
1951	Arhelger, Stuart Waldo
1951	Ariel, Irving M.
1951	Enquist, I.F.
1951	Ferguson, Donald J.
1951	Haines, Gerald
1951	Ide, Arthur Wheaton, Jr.
1951	Lenz, Gilbert Gordon
1951	Monson, Einer Millard
1951	Raffucci-Arce, Francisco Luis
1951	Rauch, Robert Frederick
1951	Wood, Newell Edwin
1952	Ferrin, Allan Lowell
1952	Koefoot, Robert Reese
1952	Muller, John Joseph
1952	Van Bergen, F.H.
1953	Delancy, Herman
1953	Linner, John Henry
1954	Chou, Shelley
1954	Evers, William
1955	Alden, John Fredolph
1955	Nelson, Loren Elmer
1955	Taufic, Mansur
1956	Hannon, Donald William
1956	Ring, Dean M.
1956	Sullivan, William Albert, Jr.

Year	*Personnel*
1957	GILBERTSEN, VICTOR ADOLPH
1957	HUNTER, SAMUEL WYNNE
1957	REEVES, MELVIN MITCHELL
1957	SIM, BO SUNG
1958	BARNARD, CHRISTIAAN NEETHLING
1958	HOULE, DUDLEY BENNINGFIELD
1958	SAXON, EUGENE IRA
1958	THORNGATE, STEPHEN
1958	WOHLRABE, DONALD EDWIN
1959	HAGLUND, ROGER
1960	BENTZ, HERMAN. . (Veterans Hospital)
1960	BRAINERD, JOHN (Ancker Hospital)
1960	FATTAH, FAROUK
1960	SCHIMERT, GEORGE
1960	PHIBBS, CLIFFORD (Ancker Hospital)
1961	DEWALL, RICHARD
1961	YA, PO
1962	THAN, MAUNG M.
1963	AMELI, MOHAMMAD
1963	CRUZ, ANATOLIO
1963	GUZMAN, TOMAS
1963	LEVY, MORRIS JOSEPH
1963	JOHNSON, ROGER STANLEY (Ancker Hospital)
1963	BAHANGANADA, KASIAN
1963	ALLCOCK, EDWARD
1963	MORALES, FLAVIO
1964	SCOTT, WILLIAM
1965	BLANCHARD, ROBERT (Ancker Hospital)
1965	LARGIADER, FELIX
1965	MEEKER, WILLIAM

Appendix F

Professor and Chairman—Departments of Surgery

1938 Ph.D.	John Randolph Paine, University of Buffalo, Buffalo, New York
1940 Ph.D.	Clarence Dennis, State University Medical Center, Kings County Hospital, Brooklyn, New York
1946 Ph.D.	K. Alvin Merendino, University of Washington, Seattle, Washington
1946 Ph.D.	David State, Albert Einstein Medical College, New York City, New York
1947 Ph.D.	Ivan D. Baronofsky, Hahnemann Medical College, Philadelphia, Pennsylvania
1951 Ph.D.	C. W. Lillehei, Cornell University, New York City
1951 M.S.	Francisco Luis Raffucci-Arce, University of Puerto Rico, San Juan, Puerto Rico
1953 Ph.D.	Bernard Zimmerman, West Virginia School of Medicine, Morgantown, West Virginia
1954 Ph.D.	Gilbert S. Campbell, Jr., University of Arkansas, Little Rock, Arkansas
1955 Ph.D.	Fletcher Allen Miller, Creighton University, Omaha, Nebraska
1956 Ph.D.	Alan Philip Thal, Wayne State University, Detroit, Michigan (currently Professor of Surgery, University of Kansas)
1957 Ph.D.	Richard Harrison Egdahl, Boston University, Boston, Massachusetts
1957 Ph.D.	Lloyd Douglas MacLean, Co-Chairman, McGill University, Montreal, Canada
1958 Ph.D.	Joseph Bradley Aust, South Texas Medical School, San Antonio, Texas
1961 M.S.	Richard DeWall, Chicago Medical School, Chicago, Illinois (currently private practice, Dayton, Ohio, and associated with Cox Coronary Heart Research Institute, Kettering, Ohio)
1963 Ph.D.	Ward O. Griffen, Jr., University of Kentucky, Lexington, Kentucky
no graduate degree	J. Van Geertruyden, Clinique Chirurgicale, Hospital Universitaire Brugman, Bruxelles, Belgium
no graduate degree	Snorri Hallgrimsson, University of Reykjavik, Reykjavik, Iceland
no graduate degree	Jan Moll, Kierownik II, Kliniki Chirurgicznej, Akademii Medycznej, W. Lodzi, Poznan, Szkolna 8/12 Poland

no graduate degree	Pong Tansathitaya, Chulalongkorn Hospital, Bangkok, Thailand
no graduate degree	Juro J. Wada, Sapporo Medical College, Sapporo City, Japan

PROFESSOR AND/OR DIRECTOR OF SURGICAL DIVISIONS

1930 Ph.D.	William T. Peyton, Director Division Neurosurgery
1930 Ph.D.	C. W. Creevy, Director Division Urology
1938 Ph.D.	Warner Fremont Bowers, Director Graduate School of Medical Sciences, New York Medical College, New York City, New York
1947 Ph.D.	Lyle French, Director Division Neurosurgery
1949 Ph.D.	Stanley R. Friesen, University of Kansas, Kansas City, Kansas
1950 Ph.D.	F. John Lewis, Northwestern University, Chicago, Illinois
1950 Ph.D.	George E. Moore, Director Roswell Park Memorial Institute, Buffalo, New York
1950 M.S.	H. William Clatworthy, Director Division, Pediatric Surgery, Ohio State University, Columbus, Ohio
1951 M.S.	I. F. Enquist, State University of New York, Brooklyn, New York
1951 Ph.D.	Donald John Ferguson, University of Chicago, Chicago, Illinois
1951 Ph.D.	Leonard Francis Peltier, Director Division Orthopedic Surgery, Kansas Medical Center, Kansas City, Kansas
1952 Ph.D.	Karl E. Karlson, State University of New York, Brooklyn, New York
1953 Ph.D.	Edward E. Mason, University of Iowa, Iowa City, Iowa
1955 Ph.D.	Mitchell W. Spellman, Howard University School of Medicine, Washington, D.C.
1956 Ph.D.	Edwin L. Brackney, Medical College of Georgia, Augusta, Georgia
1956 Ph.D.	Norman E. Shumway, Jr., Director Division of Cardiac Surgery, Stanford University, Palo Alto, California
1958 Ph.D.	Christiaan N. Barnard, Director Division, Cardiopulmonary Surgery, University of Capetown, Capetown, South Africa
1963 M.S.	Morris Levy, Director Department of Chest and Cardiac Surgery, Beilinson Hospital, Tel Aviv, Israel
no graduate degree	Tatsuo Tannija, Director Cardiovascular Surgery, Chiba City University, Chiba City, Japan
no graduate degree	Kazumi Taguchi, Director Cardiovascular Surgery, Hiroshima University, Hiroshima, Japan
1965 Ph.D.	Robert D. Sellers, Director of Cardiovascular Surgery, University Hospital, Omaha, Nebraska
	Peter Allen, Director Division of Cardiac Surgery, 814 Fairmont Memorial Building, Vancouver B. C., Canada

Julian Ansell, Chairman Division of Urology, University of Washington, School of Medicine, Seattle, Washington

Christian Bruusgaard, University of Oslo, Ullevaal Hospital, Oslo, Norway

Prem Buri, Siriaj Hospital, Bangkok, Thailand

Juan Gonzalez, Chief of Cardiovascular and Thoracic Surgery, Childrens Hospital, Mexico City, Mexico

N. Gopinath, Chief Cardiovascular Surgery, All India Institute, New Delhi, India

Vincent L. Gott, Director Division of Cardiovascular Surgery, Johns Hopkins University, Columbus, Ohio

Herbert Warden, Director of Cardiovascular Surgery, University of West Virginia

Tsung-Po Kuo, Chief of Surgery, Kaohsiung Medical College, Kaohsiung, Taiwan

Nicolaas Meyne, Director Division of Cardiac Surgery, University of Amsterdam, Amsterdam, Holland

Jan Nowicke, Director Division of Cardiac Surgery, Instytut Grevzlicy, Wolski Hospital, Warsaw, Poland

Guillermo Schrader, Chief Thoracic and Cardiovascular Surgery, Hospital Militar, Bogota, Colombia

Leo Cuello, Director of Cardiovascular Surgery, University of Texas, San Antonio, Texas

Appendix G

Full Professors, on Surgical Staff, University of Minnesota

Dr. Richard L. Varco
Dr. Richard C. Lillehei
Dr. C. R. Hitchcock
Dr. E. W. Humphrey
Dr. W. W. Kelly
Dr. J. F. Perry

Appendix H

Veterans Administration Hospital Division of Surgery

General Surgery

DR. ROBERT UTENDORFER	December 1948 to March 1955
DR. FREDERICK OWENS	October 1949 to April 1951
DR. ROBERT HAMMERSTROM	July 1955 to September 1957
DR. ERNEST BERKAS	July 1956 to November 1960
DR. RAYMOND READ	August 1959 to July 1961
DR. STEPHEN RICHARDS	July 1961 to August 1964
DR. NEIL TROTMAN	January 1961 to January 1965
DR. ESTEN LINDSETH	May 1961 to August 1963
DR. JOHN CONDIE	July 1962 to July 1964
DR. BERNARD GOOTT	November 1962 to April 1965
DR. DAVID RAAB	July 1963 to October 1964
DR. CECIL PROVENCE	January 1965 to June 1966
DR. YOSHIO SAKO	January 1955 to present
DR. DONALD MCQUARRIE	October 1964 to present
DR. HERMANN HEUPEL	July 1965 to present
DR. DEMETRE NICOLOFF	July 1965 to present
DR. JOHN LUNSETH	June 1965 to present

Orthopedics

DR. RICHARD JONES	December 1948 to July 1949
DR. ROBERT PREMER (CHIEF)	January 1958 to present
DR. FREDERICK DRILL	July 1961 to present

Otolaryngology

DR. HENRY HANSON (CHIEF)	January 1923 to July 1957
DR. DUANE NAGLE	January 1959 to December 1959
DR. HENRY WILLIAMS (CHIEF)	October 1963 to present

Urology

DR. JULIAN ANSELL (CHIEF)	July 1956 to June 1959
DR. ROGER HAGLUND	July 1959 to January 1960
DR. GEORGE MELLINGER (CHIEF)	July 1960 to present
DR. CLYDE BLACKARD	July 1962 to June 1963
DR. JOHN PYRRIS	July 1963 to March 1965
DR. EMIL MALTRY	June 1965 to August 1966

Appendix I

A Chronological Listing of Regents 1851-1965

Isaac Atwater	1851-1960
J. W. Fruber	1851-1855
William R. Marshall	1851-1853
(Ex officio—Governor)	1866-1870
	1875-1880
B. B. Meeker	1851-1857
Socrates Nelson	1851-1859
Alexander Ramsey	1851-1857
(Ex officio—Governor)	1860-1863
Henry M. Rice	1851-1859
Henry H. Sibley	1851-1860
(Ex officio—Governor)	
C. K. Smith	1851-1853
Franklin Steele	1851-1860
N. C. D. Taylor	1851-1855
Abram van Voorhees	1851-1860
J. G. Riheldaffer	1853-1859
John H. Stevens	1853-1859
Mahlon Black	1855-1860
A. W. Fridley	1855-1860
St. A. D. Balcom	1857-1860
J. M. Winslow	1857-1860
John M. Berry	1860-1861
(Declined)	
Ignatius Donnelly	1860-1863
(Ex officio Lt. Governor)	
Edward O. Hamlin	1860-1864
William M. Kimball	1860-1864
Orlando C. Merriman	1860-1871
(Special Board)	1864-1868
Edward D. Neil	1860-1861
(Ex officio—Chancellor)	
Simson Smith	1860-1861
Uriah Thomas	1860-1863
George F. Batchelder	1861-1863
Jared Benson	1861-1864
B. F. Crary	1861-1862
(Ex officio-Supt. Public Inst.)	
Richard Chute	1863-1864
	1876-1881
John S. Pillsbury	1863-1895
(Special Board 1864-1868)	1895-1901
(Ex officio Governor 1876-1882)	
Henry A. Swift	1863-1864
(Ex officio-Lt. Governor, March to July 1863—Governor, July 1863 to July 1864)	
Stephen Miller	1864-1868
(Ex officio—Governor)	
John Nicols	1864-1873
(Special Board)	1864-1868
Charles D. Sherwood	1864 Jan.
(Ex officio—Lt. Governor)	to March
Mark H. Dunnell	1867-1870
(Ex officio—Supt. Public Inst.)	
Edwin J. Thompson	1867-1870
Ronald S. Donaldson	1868-1872
Benjamin Franklin	1868 to
	Aug. 1868
A. A. Harwood	1868-1878
Horace Austin	1870-1874
(Ex officio—Governor)	
Charles S. Bryant	1870-1876

Horace B. Wilson 1870-1875
(Ex officio-Supt. Public Inst.)

Paris Gibson 1871-1880

Oliver Dalrymple 1872-1875
William W. Folwell 1872-1884
(Ex officio—President)

Cushman K. Davis 1874-1876
(Ex officio-Gov. 1875-1876) 1883-1898
Morris Lamprey 1874-1879

David Burt 1875-1881
(Ex officio-Supt. Public Inst.)

Thomas S. Buckham 1876-1887

A. J. Edgerton 1878-1881

Greenleaf Clark 1879-1904

Orson V. Tousley 1880-1883

John B. Gilfillan 1881-1887

Lucius F. Hubbard 1882-1887
(Ex officio—Governor)

David L. Kiehle 1882-1893
(Ex officio-Supt. Public Inst.)
Knute Nelson 1882-1895
(Ex officio-Governor 1893-95)

Cyrus Northrop 1884-1911
(Ex officio—President)
A. R. McGill 1887-1889
(Ex officio—Governor)

William M. Liggett 1888-1905
Gordon E. Cole 1888-1908

Sloan M. Emery 1889-1893
Stephen Mahoney 1889-1907
William R. Merriam 1889-1893
(Ex officio—Governor)

Ozora P. Stearns 1890-1895

Joel P. Heatwole 1891-1897

John Lind 1893-1894
(Ex officio—Governor 1899-1901
1899-1901) 1908-1914
Sidney M. Owen 1893-1901
1907-1910
W. W. Pendergast 1893-1899
(Ex officio-Supt. Public Inst.)

William H. Yale 1894-1895

Alphonso Barto 1895-1899
David M. Clough 1895-1899
L. S. Swenson 1895-1897

Elmer E. Adams 1897-1905
A. E. Rice 1897-1920
M. R. Todd 1897-1898

Samuel G. Smith 1898-1901
Thomas Wilson 1898-1910
John H. Lewis 1899-1901
(Ex officio-Supt. Public Inst.)

Charles E. Tuller 1900-1901

John W. Olson 1901-1909
(Ex officio-Supt. Public Inst.)
C. C. Strickler 1901-1907
Samuel R. Van Sant 1901-1905
James T. Wyman 1901-1908

T. L. Schurmeier 1902-1904

Benjamin F. Nelson 1904-1916
Daniel R. Noyes 1904-1908
Eugene W. Randall 1904-1907

Samuel G. Comstock 1905-1908
John A. Johnson 1905-1909
(Ex officio—Governor)

Dr. William J. Mayo 1907-1939
Pierce Butler 1907-1924

Charles A. Smith 1908-1912

Henry B. Hovland	1908-1912
Adolph O. Eberhart	1909-1915
C. G. Schultz	1909-1919
(Ex officio-Supt. Public Inst.)	
Charles L. Sommers	1910-1922
Milton M. Williams	1910-1925
George E. Vincent	1911-1917
(Ex officio—President)	
Fred B. Snyder	1912-1951
John G. Williams	1912-1937
George H. Partridge	1914-1931
Winfield Hammond	1915-1916
(Ex officio—Governor)	
J. A. A. Burnquist	1916-1921
(Ex officio—Governor)	
Charles W. Glotfelter	1916-1922
Marion L. Burton	1917-1920
(Ex officio—President)	
James M. McConnell	1919-1929
(Ex officio-Supt. Public Inst.)	
Lotus D. Coffman	1920-1929
(Ex officio—President)	
L. E. Potter	1920-1922
J. A. O. Preus	1921-1925
(Ex officio—Governor)	
Alice Rockwell Warren (Mrs. Frank M.)	1922-1927
Archie D. Wilson	1922-1929
Dr. Egil Boeckmann	1922-1933
J. E. G. Sundberg	1923-1931
Julius A. Coller	1924-1937
Theodore Christianson	1925-1929
(Ex officio—Governor)	
Mrs. Bess Wilson	1925-1933
Samuel Lewison	1927-1931
A. J. Olson	1929-1937
	1939-1964
Lars O. Teigen	1929-1930
William H. Gemmell	1929-1933
Charles B. Butler	1931-1935
Dr. O. J. Hagen	1931-1937
Rufus R. Rand	1931-1937
James V. Williams	1931-1933
Mrs. Anna O. Determan	1933-1935
George W. Lawson	1933-1959
Frank W. Murphy	1933-1939
Dr. A. E. Olson	1933-1939
Albert Pfaender	1935-1946
Raymond J. Quinlivan	1935-1961
George B. Leonard	1937-1939
Lewis E. Lohmann	1937-1939
Martin M. Olson	1937-1939
O. M. Peterson	1937-1939
Benjamin Du Bois	1937-1939
James F. Bell	1939-1961
Daniel C. Gainey	1939-1967 (Expiring)
Richard L. Griggs	1939-1963
Albert J. Lobb	1939-1951
Dr. E. E. Novak	1939-1955
Dr. Frederick J. Rogstad	1939-1949
Sheldon V. Wood	1939-1953
J. Seneca Jones	1946-1953
Herman F. Skyberg	1949-1967 (Expiring)
Dr. Charles W. Mayo	1951-1971
Lester E. Malkerson	1951-1971
Karl G. Neumeier	1953-1959
Marjorie J. Howard (Mrs. C. E.)	1953-1971 (Expiring)

Edward B. Cosgrove	1955-1961
Robert E. Hess	1959-1967 (Expiring)
Alfred I. Johnson	1959-1965
Bjarne E. Grottum	1961-1967 (Expiring)
Fred J. Hughes	1961-1969 (Expiring)
Otto A. Silha	1961-1969 (Expiring)
William K. Montague	1963-1969 (Expired)
Gerald W. Heaney	1964-1965
Albert V. Hartl	1965-1969
George Rauenhorst	1965-1971

Appendix J

Members of the faculty with the rank of Assistant Professor or higher are listed below for each department of the School of Medicine of the University of Minnesota.

ANATOMY

Bauer, G. Eric
Bell, E. T.
Blount, Raymond
Boyd, Edith
Boyden, E. A.
Brekhus, Elmo
Calkins, Leroy A.
Campbell, Berry
Carpenter, Anna-Mary
Davidson, Joseph
Dixit, Padmakar
Downey, Hal
Erdman, Charles A.
Felts, Wm. J. L.
Greene, Charles L.
Hally, A. Douglas
Hare, Earle H.
Hartmann, J. Francis
Heggestad, Carl B.
Hendriks, George A.
Hoiland, Lucille J.
Hudson, George
Jackson, Clarence M.
Johnston, John B.
Kirchbaum, Arthur
Larsell, Olaf
Lazarow, Arnold
Lee, Thomas G.
Lindall, Arnold W.
Lippman, Hyman S.
Meyer, Arthur W.
Miller, Shirley P.
Morgan, Charles F.
Myers, Jay A.
Nickerson, Winfield S.
Osterud, Hjalmer L.
Rasmussen, Andrew
Read, Harry K.
Retzer, Robert
Ritchie, Arthur
Scammon, Richard E.
Smithberg, Morris
Speidel, Edna
Spencer, E. C.
Stanley, Hugh P.
Stewart, Chester A.
Stewart, J. Clark
Sundberg, R. Dorothy
Vernier, Robert L.
Walker, Frederick
Wells, Lemen J.
Williams, W. Lane
Wood, Richard L.

ANESTHESIOLOGY

Bagley, Russell W.
Baird, Joe W.
Buckley, Joseph J.
Cohen, Ellis N.
Friend, A. William
Gordon, John R.
Jackson, J. Albert
Knight, Ralph T.
Matthews, James H.
Van Bergen, Frederick H.
Westgate, Hugh D.

BIOCHEMISTRY

Armstrong, Wallace D.
Arnow, L. Earle
Barnes, Richard H.
Barnum, Cyrus P., Jr.
Bell, Charles John
Benson, Ellis S.
Bernlohr, Robert W.
Bishop, J. S.
Bodley, J. W.
Boyer, Paul D.
Burnham, B. F.
Burr, George O.
Cavett, J. W.
Carel, Herbert C.
Carlson, Curtis H.
Carr, Charles W.
Caster, William O.
Cohen, Saul L.
Dempsey, Mary E.
Edstrom, Ronald
Frane, Elizabeth G.
Frantz, Ivan D.
Gibson, Robert B.
Glick, David
Gray, Ernest D.
Greenberg, Leonard
Gutman, Helmut
Hamilton, R. H.
Hemingway, Allen
Holman, Ralph T.
Kingsbury, F. B.
Koerner, James F.
Larner, Joseph
Lundberg, Walter
McClendon, Jesse F.
Medes, Grace
Pascoe, T. A.
Pettibone, J. V.
Pollara, Bernard
Ronwin, Edward
Samuels, Leo T.
Schroefer, George S., Jr.
Singer, Leon
Smith, Quentin T.
Sollner, Karl
Ungar, Frank
Van Pilsum, John F.
Villar-Palasi, C.
Von Korff, Richard W.
Wetlaufer, Donald B.
Wold, F.
Woods, Harland
Yarbro, J. W.
Zabarsky, S. H.

INTERNAL MEDICINE

Aagard, George N.
Abbott, Everton J.
Adicoff, Arnold
Aldrich, C. Knight
Alexander, Carl S.
Amatuzio, Donald S.
Anderson, Karl W.
Andreassen, Rolf L.
Barron, Moses
Beard, Archibald
Bell, John Wesley
Benson, Ellis S.
Berglund, Hilding
Berman, Reuben
Bilka, Paul J.
Blake, Francis G.
Blomberg, Robert D.
Blumberg, Henry
Blumenthal, J. S.
Boehrer, John J.
Bohn, Donald G.
Boothby, Walter M.
Borden, Craig
Borg, Joseph F.
Bowlin, Paul F.
Briggs, John F.
Butler, John
Cardle, Archibald E.
Carey, James B., Sr.
Carey, James B., Jr.
Chapman, Carleton B.
Cohen, Sumner S.
Craig, David M.
Crosbie, Stanley
Cross, John Grosvenor
Dahl, James
Davis, Jay C.
Davis, Richard B.

De Foe, Edward
Doan, Robert E.
Doscherholmen, Alfred
Drake, Carl B.
Ebert, Richard V.
Eichhorn, Edmund
Eichenholz, Alfred
Eliot, Robert S.
Ellis, Ralph V.
Eusterman, George B.
Evans, Gerald T.
Fahr, George E.
Falk, Abraham
Fee, John G.
Fenger, E. P. K.
Fifer, William P.
Flink, Edmund B.
Frantz, Ivan D.
Freeman, Charles D.
Frey, Richard J.
Fuller, Benjamin F.
Gardner, Edwin L.
Gault, N. L.
Geer, Everett K.
Gilfillan, James S.
Gillespie, Delmar R.
Goetz, Frederick C.
Graham, Christopher
Green, Robert A.
Greenberg, Albert J.
Greene, Charles Lyman
Giffin, Herbert
Hagen, Paul S.
Hall, Alexander
Hall, Wendell H.
Hallock, Phillip
Hamilton, Arthur S.
Hammarsten, James F.
Hammes, Ernest M.
Hanson, Mark
Hartzell, Thomas B.
Head, Douglas P.
Head, George Douglas
Heller, Ben I.
Henderson, Andrew
Herrman, Edgar J.
Hill, Earl
Hinckley, Robert G.
Hoff, Alfred
Hoffbauer, Frederich W.
Hoffman, Max H.
Hollinshead, William H.
Holt, John E.
Horns, Howard L.
Hoseth, Wayne
Howard, Robert B.
Hunter, Charles H.
Hurwitz, Milton M.
Irvine, Harry G.
Jacobson, Wyman E.
Janssen, Martin E.
Jenne, John
Johnson, Herbert W.
Johnson, John W.
Johnson, Reuben A.
Jones, David G.
Kane, Dennis
Kennedy, Byrl J.
Kerkhof, Arthur C.
Larrabee, Walter
Larson, Evrel A.
La Bree, John W.
Lapak, John A.
Levitt, George X.
Lillehei, James P.
Lindell, Robert E.
Lindeman, Charles E.
Lindgren, Russell C.
Logan, Archibald
Lowry, Jeanette
Lowry, Paul T.
Lowry, Thomas
MacDonald, Frank M.
Magraw, Richard M.
Maloney, William F.
Mankey, James C.
Mariette, Ernest S.
Martin, Dwight L.
Martin, Frank
Mazzitello, William F.
Mc Carthy, Donald
McCloud, Charles N.
Mc Collister, Robert J.
Mc Kinlay, Chauncey A.
Mc Kinley, J. Charnley
Mears, Burtis
Medes, Grace
Michelson, Henry E.
Miller, Harold
Miller, J. C.

Moen, Johannes K.
Morrison, Angus W.
Muchmore, Harold G.
Mulhausen, Robert O.
Murray, M. John
Mussey, Robert D.
Myers, Jay A.
Myhre, James G.
Nathanson, Morris
Nelson, O. L. Norman
Nesbitt, Samuel
Nippert, Louis A.
Nothnagel, Charles
Oerting, Harry
Olson, George M.
O'Malley, Valentine
Peppard, Thomas A.
Peterson, William E.
Plass, Herbert F.
Plummer, Henry S.
Rees, Soren P.
Redleaf, Paul D.
Reimann, Hobart A.
Rice, Fred A.
Richards, A. McDonald
Richards, Ernest T. F.
Rizer, Dean K.
Rizer, Robert I.
Roberts, Thomas S.
Roth, George G.
Rountree, Leonard G.
Rusterholz, Alan P.
Ryan, Joseph M.
Scallen, Raymond W.
Schaaf, Frederick W.
Scherer, L. Raymond
Schmidt, Herbert W.
Schneider, John P.
Schultz, Alvin L.
Schwartz, Samuel
Schwyzer, Marguerite
Shapiro, Morse J.
Shea, Andrew
Sheldon, Walter
Sinkler, George
Smith, Adam
Smith, Ralph E.
Sommers, Ben
Soucheray, Philip H.
Staples, Henry L.
Stead, William
Stevenson, George S.
Stokes, John H.
Sweetser, Horatio B., Jr.
Sweeney, Arthur A.
Sweitzer, Samuel E.
Swenson, Donald B.
Thomas, Lewis
Tiffany, Francis B.
Tobian, Louis
Tregilgas, Richard B.
Tucker, William
Tuna, Naip
Ubel, Frank A.
Ulrich, Henry
Vennes, Jack A.
Walsh, Alphonse E.
Wang, Yang
Watson, Cecil J.
Weisman, Samuel
Wetherby, MacNider
White, Asher A.
White, S. Marx
Williams, Ralph
Wilson, J. Allan
Winchell, C. Paul
Wright, Charles B.
Wohlrabe, A. Cabot
Wolff, Herman J.
Wittich, Frederick W.
Yarbro, John
Ylvisaker, R. S.
Zieve, Leslie
Ziskin, Thomas

DIVISION OF DERMATOLOGY

Becker, Frederick T.
Butler, John
Cumming, Harry A.
Epstein, Stephan
Fisher, Isadore
Freeman, Charles D., Sr.
Fusaro, Ramon M.
Goltz, Robert W.
Hill, Elmer T.
Irvine, Harry G.

Karon, Irvine M.
Laymon, Carl W.
Lynch, Francis W.
Madden, John F.
Michelson, Henry E.
Olson, George M.
Orkin, Milton
Ravits, Harold G.
Rukavina, John G.
Rusten, Elmer M.
Sweitzer, Samuel E.
Vander Horck, Max P.
Windhorst, Dorothy B.
Winer, Louis H.
Zelickson, Alvin S.

LABORATORY MEDICINE

Abernathy, Robert
Alexander, Paul
Bauer, Henry
Benson, Ellis S.
Blazevic, Donna
Bordewich, Patricia
Bradley, G. Mary
Bridges, Robert A.
Brown, David
Brunning, Richard D.
Cromartie, William
Crowley, Leonard
Dempsey, Mary E.
Ederer, Grace M.
Evans, Gerald T.
Finley, Paul
Frame, Elizabeth
Freier, Esther
Gleason, Donald F.
Gonyea, Lorraine
Hallaway, Ben
Hammer, Kathryn
Hoilund, Lucille
Hovde, Ruth
Jarvis, Bruce
Larson, Evrel A.
Melby, James
Merritt, Barbara
McMaster, Elaine
Michaelson, Olaf
Needham, Gerald
Nelson, Douglas
Otten, Charlotte
Polesky, Herbert F.
Raich, John
Rausch, Verna
Rydell, Robert E.
Rosenberg, Andreas
Segal, Edward
Segal, Martin
St. Geme, Joseph
Strandjord, Paul E.
Sundberg, R. Dorothy
Wallace, Franklin
Wise, Robert
Yasmineh, Walid G.
Yunis, Edmond
Yunis, Jorge
Zaki, George F.
Ziegler, Newell

MICROBIOLOGY

Anderson, Dwight L.
Bradley, S. Gaylen
Brand, Gerhard K.
Bernlohr, Robert W.
Chapman, S. Stephen
Church, Brooks D.
Dworkin, Martin
Evans, Charles A.
Good, Robert A.
Green, Robert G.
Grossberg, Sidney
Hall, Wendell H.
Halvorson, H. Orin
Henrici, Arthur T.
Hinz, Ronald W.
Holland, John J.
Hooper, Alan B.
Jezeski, James J.
Jenkin, Howard M.
Johansson, Karl R.
Johnson, Russell C.
Karlson, A. G.

Kim, Yoon Berm
Klein, Dolph
Krafchuk, John D.
Larson, Winford P.
Lichstein, Herman C.
Lindorfer, Robert K.
Lind, Arnold J.
Macy, Harold
Matson, G. Albin
McLaren, Leroy C.
McLimans, William S.
Muschel, Louis H.
Needham, Gerald
Olson, Joseph C.
Peterson, David
Plagemann, Peter G.
Prince, James T.
Rogers, Palmer
Ross, John D.
Scherer, William F.
Schmidt, Edwin L.
Schultz, Robert B.
Skinner, Charles E.
Spizizen, John
St. Geme, Joseph W.
Syverton, Jerome T.
Tsuchiya, Henry M.
Ulrich, John A.
Verna, John E.
Wannamaker, Lewis
Watson, Dennis W.
Ziegler, Newell R.

SCHOOL OF NURSING

Backlund, Marilyne R.
Baker, Bessie
Bowditch, Helen
Boyle, Rena E.
Brennan, Florence M.
Coe, Myrtle H.
Cook, Nancy L.
Dodds, Thelma
Dougherty, Katherine E.
Dreves, Katherine (Densford)
Dunning, Frances E.
English, Irene R.
Erdmann, Bertha
Freeman, Ruth B.
Fritz, Edna L.
Gordon, Phoebe
Grainger, Margaret F.
Hansen, Helen B.
Harris, M. Isabel
Harrington, Ruth
Hauge, Cecelia
Hodgkins, Myrtle P.
Hubbard, Joann R.
Johnston, Ruth V.
Julian, Florence J.
Kurtzman, Dorothy
Lediger, Cecelia R.
Lewis, Garland K.
Low, Margery
Lucier, Francis M.
May, Katherine E.
McClure, Eugenia
McDonald, Ida M.
Miller, Doris I.
Miller, Julia M.
Moncure, Frances D.
Nobles, Georgia
Norris, Sybil
Ordahl, Olena
Paetzneck, Marguerite
Pennebaker, Ruth F.
Peterson, Helen J.
Petry, Lucile
Pierce, Elizabeth
Powell, Louise M.
Randall, Julia
Reynolds, Eizabeth
Sarosi, Grace M.
Tayor, Eugenia R.
Taylor, Jean W.
Thompson, Barbara
Titt, Dorothy E.
Town, Marion J.
Thomas, Gertrude I.
Walseth, Hannah K.
Weise, Ruth D.
Whitney, Elizabeth A.
Vannier, Marion L.

OBSTETRICS AND GYNECOLOGY

Abbott, Amos
Adair, Fred L.
Barno, Alex
Barry, Lee W.
Benjamin, Arthur E.
Bernstein, Irving
Calkins, LeRoy A.
Cates, A. B.
Cohen, William D.
Condit, William H.
Dippel, A. Lewis
Eastman, Nicholson J.
Ehrenberg, Claude J.
Freeman, Donald W.
Friedman, Lewis L.
Gillam, John S.
Hakanson, Erick G.
Hartley, Everett C.
Holly, Roy G.
Hudson, George E.
Janda, George W.
Kaiser, Irwin H.
Lang, Leonard A.
LaVake, Rae T.
Leavitt, Frederick
Litzenberg, Jennings
Lund, Curtis J.
Makowski, Edgar L.
Maland, Clarence O.
McKelvey, John L.
McLennan, Charles E.
Meyer, Robert
Mitchell, Mancel T.
Prem, Ronald A.
Ritchie, Parks
Rothrock, John L.
Sadler, William P.
Seibel, David I.
Simons, Jalmer
Solhaug, Samuel
Souba, Frederick J.
Stone, Alexander J.
Stromme, William B.
Sturley, Rodney F.
Swanson, Roy E.
Urner, John A.
Wynne, Herbert M.

OPHTHALMOLOGY

Adair, Frank
Allport, Frank
Boies, Lawrence R.
Brown, John C.
Burch, Edward P.
Burch, Frank E.
Camp, Walter E.
Christensen, Llewellyn
Clark, Howard S.
Clausen, Donald F.
Cooper, Robert R.
Fink, Robert J.
Fink, Walter
Fowlks, William L.
Friedman, Harry S.
Fulton, John Farquhar
Garten, Joseph L.
Grant, Hendrie W.
Hansen, Erling W.
Harris, John E.
Haven, Walter K.
Heath, Albert C.
Hoffman, Walter L.
Horns, Richard C.
Hymes, Charles
Jerome, Bourone
Johnson, Douglas L.
Kane, Thomas W. O.
Kantar, Bruce
Knobloch, William H.
Koch, Ferdinand L. P.
Lane, Laura A.
Laton, W. S.
Leavenworth, Richard O.
Lewis, William W.
Lindberg, Vernon L.
Lindberg, Winston
Macnie, John S.
McCannel, Malcolm A.
McNeill, John A.
Monahan, Robert H.
Parker, Elmer H.

Patterson, William E.
Pfunder, Malcolm C.
Plotke, Harry L.
Pratt, Fred J.
Pratt, John A.
Rocknem, Robert E.
Rucker, C. Wilbur
Sandt, Karl E.
Schwartz, Virgil J.
Shapiro, Irving
Shaw, Howard A.
Simons, Leander T.
Simonson, Ernst
Sperling, Harry
Stanford, Charles
Sterner, Donald
Strout, G. Elmer
Tani, George T.
Todd, Frank C.
Tracht, Robert P.
Wendland, John P.
Wipperman, Frederick F.

OTOLARYNGOLOGY

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Burch, Frank
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Connor, Charles E.
Duvall, Arndt J., III
Fisher, Carl
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Fulton, John Farquahr
Glaiser, John
Hanson, Henry B.
Hanson, Henry V.
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Heath, Albert C.
Hilding, Anderson C.
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Kusske, Bradley
Kusske, Douglas
Lane, Laura A.
Lassman, Frank M.
Lewis, William W.
Lillie, Harold I.
Macnie, John S.
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Newhart, Horace
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Strout, G. Elmer
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Halberg, Franz
Hebbel, Robert
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Potter, Edith
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Warwick, Margaret
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Anderson, Edward D.
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Arey, Stuart
Ayoub, Elia
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Berendes, Heinz
Berglund, Eldon
Bevis, William D.
Blaw, Michael E.
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Chapman, S. Stephen
Christeson, James T.
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Cohen, Joseph T.
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Lawton, James J.
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Lippman, Hyman S.
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Straub, Conrad P.
Vesley, Donald
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Jydstrup, Ronald A.
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Rowell, Loring B.
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PERSONAL HEALTH

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de Berry, Ellet M.
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Kernan, Phillip D.
Lees, Harry
Myers, J. Arthur
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Todd, Romana L.
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PREVENTIVE MEDICINE AND PUBLIC HEALTH (INCLUDING EPIDEMIOLOGY AND MATERNAL AND CHILD HEALTH)

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Emerson, Haven
Gullen, Warren H.
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Schuman, Leonard M.
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Stief, Ruth
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Top, Franklin H.
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Williams, George E.

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Fritz, Kathryn
Hanson, Lola
Hauser, Ann
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Leonard, Barbara J.
May, Katherine E.
McIntyre, Marie J.
McIntyre, Mary Ann
Mickey, Janice
Murphy, Marion I.
Murray, Lorena J.
O'Leary, Agnes
Palmer, Mellie F.
Pangburn, Phyllis (Harris)
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Sanburn, Evelyn
Sandve, Wanyce C.
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Boyle, Hilda
Branton, Alloys F.
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Brownell, Otto E.
Buzicky, Albert W.
Carter, Philip R.
Cassidy, Gladys
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Gilman, Gertrude
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Jordan, William A.
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Klicka, Karl S.
Knisely, Merton A.

Knudsen, Helen M.
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Shoos, Kenneth J.
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Smith, Lyle
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Wagner, Edmund G.
Wallace, William N.
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RADIOLOGY

Allison, Robert G.
Aurelius, J. Richard
Bergh, Solveig M.
Bissell, Frank S.
Borman, Chauncey N.
Charyulu, K. K. N.
D'Angio, Giulio
Dillon, John F.
Fink, Daniel L.
Hansen, Cyrus O.
Hanson, Malcolm B.
Jacobson, Baruch S.
Kelby, Gjert M.
Lipschultz, Oscar
Loken, Merle
Lowman, James T.
Marvin, James F.
Maruyama, Josh
Medelman, John P.
Mellins, Harry Z.
Morse, Russell
Mosser, Donn G.
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Peterson, Harold O.
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Stenstrom, K. Wilhelm
Ude, Walter H.
Veinbergs, Arnold
Vermund, Halvor

ROENTGEN DIAGNOSIS

Amplatz, Kurt
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Baggenstoss, Osmond J.
Berger, Phil
Borman, Chauncey N.
Carey, Lewis B.
Carmen, Russell D.
Coleman, John B.
Feinberg, Samuel B.
Fink, Daniel L.
Friedman, Jack
Frye, Charles W.
Gedgaudas, Eugene G.
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Greenspan, Richard
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Hanson, Malcolm B.
Hauser, Donald C.
Hawkinson, Harlan
Hess, Carol N.
Hewell, Charles A.
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Kelb, Gjert M.
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Koada, Birger
Langer, Leonard O.
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Lipschultz, Oscar
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Merner, Thomas B.
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Sandler, Bernard
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Tobin, John A.
Tsai, Shih Hao
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Wolfson, Justin J.

RADIATION THERAPY

Berg, Solveig M.
Charyulu, K. K. N.
D'Angio, Giulio
Jacobson, Baruch S.
Loken, Merle K.
Lowman, James T.
Marvin, James F.
Maruyama, Yosh
Mosser, Donn G.
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Stenstrom, K. Wilhelm
Veinbergs, Arnold
Vermund, Halvor

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Johnson, James A.
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