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Medical Bulletin

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UNIVERSITY OF MINNESOTA HOSPITALS
THE MINNESOTA MEDICAL FOUNDATION
AND THE MINNESOTA MEDICAL ALUMNI
ASSOCIATION

IN THIS ISSUE:

Hospital Report

*Porphyryns, X-Rays,
and Tumors*

UNIVERSITY OF MINNESOTA MEDICAL BULLETIN

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Staff Meeting Reports

University of Minnesota Hospitals Annual Report*

Ray M. Amberg†

Introduction

The University of Minnesota Hospitals were established to furnish a means for the University of Minnesota to train students in the multiple fields of medical care. Training is given in the Hospitals under the direct supervision and guidance of a competent staff made up of full-time and part-time faculty. The staff is responsible to the State through the University for both the instruction of the students and the care of the patients. This arrangement has proved satisfactory not only in the training of students but also as an economical means for the State to care for many of its indigent sick.

University of Minnesota Hospital Admission Policy

In applying for admission to the Hospitals, the patient must be referred by his family physician or by a physician in his local community. This rule avoids the criticism that the Hospitals or its clinics are taking patients away from private practitioners. This same policy holds true for patients admitted to the Variety Club Heart Hospital or any other unit of the Hospitals.

Patients are classified according to their ability to pay as County, Per Diem, Teaching and Research, Sixty Fund, Child Psychiatric Fund, Eustis Fund, Rehabilitation Fund, Multiple Sclerosis Diagnostic Fund, Muscular Dystrophy Fund, Private, and, in the case of the Heart Hospital, the Variety Club of the Northwest Fund. No distinction is made between the various classes in the treatment or privileges afforded.

County patients are those who are totally unable to pay and whose expenses are shared equally by their county and the State. When applying for either outpatient or hospital care, these patients must present county papers filled in by both their physician and their county commissioner or his representative.

*This is an abstract of a report given at the Staff Meeting of University of Minnesota Hospitals on September 30, 1955. A copy of the complete report, including tables, may be obtained by writing to the Editor, UNIVERSITY OF MINNESOTA MEDICAL BULLETIN, 1342 Mayo Memorial, Minneapolis 14, Minn.

†Director, University of Minnesota Hospitals.

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Per diem patients are those who cannot afford to pay for the services of both private physician and a private hospital. When applying for either outpatient or hospital care, these patients must present a special form filled in by themselves and their family physicians. They are required to pay their clinic or hospital expenses only. No charge is made for the professional services of the staff. From the standpoint of money received by the Hospitals, there is no difference between a county patient and a per diem patient, and, consequently, the services and privileges are identical.

Teaching and research patients are primarily destitute, unmarried, obstetric patients who are unable to avail themselves of county papers.

The *Sixty Fund* is a special grant from the state legislature which is used to hospitalize indigent psychiatric patients for treatment, teaching, and research purposes.

The *Child Psychiatric Fund* is a special grant from the state legislature which is used to hospitalize indigent children with psychiatric problems for treatment, teaching, and research purposes.

The *Eustis Fund* was set up by William Henry Eustis to care for indigent children under 16 years of age.

The *Rehabilitation Fund* is provided by the legislature for the use of the Hospitals through the Department of Rehabilitation and Physical Medicine to aid in the physical rehabilitation of patients. Referral by a physician is required.

The *Multiple Sclerosis Diagnostic Fund*, in the sum of \$10,000, is provided for each year of the past biennium to assist in financing the multiple sclerosis clinic. Referral by a physician is required.

The *Muscular Dystrophy Fund* is provided by the Muscular Dystrophy Association of Minnesota to assist in the diagnosis and treatment of people afflicted with muscular dystrophy. Referral by a physician is required.

Private patients, limited in number, are admitted as a convenience to the senior staff. They are usually referred by other doctors in the State and are afforded the same treatment and privileges as are private patients in any private hospital.

The *Variety Club of the Northwest Fund* is an annual gift from the Variety Club to assist in the care of patients from any of the communities in the Club area, which includes Minnesota, North Dakota, South Dakota, parts of Wisconsin, and any other area indicated by the Club. Patients may be admitted for care on the usual recommendation of a physician. The Variety Club may at times wish to indicate and

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request service for certain patients in which they have a special interest. No charge is made for the professional services of the staff—only for clinic or hospital expenses.

Student Health Service patients are not considered Hospital patients even though a Hospital intern is assigned to that service. The Student Health Service has its hospital quarters in the University Hospitals but is not a part of the University Hospitals. It is maintained by the University with a director, staff, and budget of its own. The new Student Health Service is located on Church Street west of the Hospitals. This provides outpatient care only. The infirmary occupies the fourth floor of the north wing of the Hospitals.

Inpatient Department

The number of patients admitted for the year 1953-54 was 11,836. For the year 1954-55, the number was 12,571. The total number of days of hospital treatment aggregated 156,105 for 1953-54 and 173,393 for 1954-55. The average number of days per patient stay in the Hospitals was 13.2 in 1953-54 and 13.7 in 1954-55. Deaths for the year numbered 528, of which 90 occurred within forty-eight hours after admission: 35 were deaths in the Heart Hospital. This is a net mortality percentage of 3.5. Post mortems for the year 1953-54 numbered 443, an average of 82% of deaths. In 1954-55 the number was 402, an average of 81.8%. The daily average number of patients was 427.7 in 1953-54 and 475.04 in 1954-55. Surgical operations during 1953-54 aggregated 8,205 and 8,076 during 1954-55.

Outpatient Department

The number of new patient visits was 16,924 in 1953-54 and 18,175 in 1954-55. Total patient visits were 101,101 for 1953-54 and 108,944 for 1954-55.

General Remarks

The Inpatient service showed an increase of 17,288 patient days over last year. The Outpatient department showed an increase of 7,843 visits.

The Psychopathic Department of the Hospitals admitted 302 patients in 1953-54 and 392 during 1954-55. Patients days in the Psychopathic Hospital totalled 18,342 in 1954-55, compared to 10,379 in 1952-53.

The waiting list of the Hospitals showed 152 patients on July 1. In the Outpatient Department, the cost per patient visit was

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\$4.84 in 1953-54 and \$5.33 in 1954-55, an increase of 49c per patient visit. The cost of operating the Inpatient Department was \$24.36 in 1953-54 and \$24.47 in 1954-55, an increase of 11c per patient day.

The X-Ray Department reported 73,613 procedures during 1954-55 compared to 67,696 during 1953-54.

The Department of X-Ray Therapy gave 11,892 deep therapy treatments in 1954-55 and 11,639 in 1953-54. There were 5,183 treatments given on the cobalt machine in 1954-55 and 4,960 treatments in 1953-54. The number of superficial therapy treatments given in 1954-55 was 960 and, in 1953-54, 918. There were 198 radium treatments given in 1954-55 and 137 in 1953-54. The total number of radon treatments in 1954-55 was 107; 168 were given the previous year. In the isotope laboratory, 952 tracer studies and treatments were given in 1954-55 and 781 in 1953-54. Radioactive phosphorus treatments numbered 57 during 1954-55 and 44 during the previous year. There were 10 patients treated with radioactive gold; a total of 810 mc. was used. There were 24 radioiodinated serum albumin blood volume studies and 9 radioactive chromium red cell survival studies made in 1954-55.

The number of hospital prescriptions filled was 160,646 in 1954-55 and 150,606 in 1953-54.

The Hospital Laboratory made 570,475 determinations during the year 1954-55 and 578,230 the previous year.

Physical Medicine and Rehabilitation Department

This department has now completed its first year of operation as a special unit. From July 1, 1954 through June 30, 1955, 2,048 patients were treated by the Department of Physical Medicine and Rehabilitation. The total number of patient visits was 39,840. The average number of visits per patient was 19.5. The total number of treatments was 63,665.

In the Rehabilitation Center, 1,097 patients were treated. The total number of patients was 19,905. The average number of visits per patient was 18.1. The total number of treatments given in the Rehabilitation Center was 43,729.

Physical Therapy	31,201
Occupational Therapy	10,152
Speech Therapy	1,062
Vocational Rehabilitation	1,314

Rehabilitation Center Total 43,729

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Occupational Therapy Special Service Units	19,936	19,936
Department of Physical Medicine and Rehabilitation		63,665

In addition to the medical staff, the Rehabilitation Center staff consists of 10 physical therapists, 5 occupational therapists, 2 speech therapists, 1 vocational counselor, 1 social worker, 5 orderlies, 3 aides, and varying numbers of students for short periods of time. The staff has assisted in teaching programs for medical students, nursing students, practical nurses, workshop groups, and aides both in the Center and throughout the hospital.

In the Physical Medicine and Rehabilitation outpatient clinic, 933 patients were seen. In Polio clinic, 173 patients were seen. The medical staff answered in 698 consultations.

The specific department reports will be presented at the time of their staff meeting assignments.

The Administration of the Hospitals wishes to thank the Variety Club for their support to the Variety Club Heart Hospital; the University Faculty Women's Club, who have continued their generous efforts in behalf of our patients; the Crippled Child Relief, the Minnesota Society for Crippled Children and Disabled Adults, the State Division of Social Welfare, and the County Boards for their assistance; the various nursing homes for their cooperation; the Traffic Club, who year after year continue to provide entertainment, gifts, and cheer to our patients at Christmas; the Sunshine Society for their contributions; the Camp Fire Girls; the Girl Scouts; the Needlework Guild; the Junior League; the Minneapolis Council of Church Women; the Minneapolis and Hennepin County Chapter of the American Red Cross; the Volunteer Service Bureau; and many other organizations and individuals who have contributed to the welfare of our patients. We wish to express our sincere appreciation to our corps of volunteers who work at information desks and in patient areas. We wish to thank the many people throughout the State who have contributed to the Heart Fund and Cancer Fund during the past year. To all members of the professional and service staffs of the Hospitals, the administration wishes to extend the appreciation of the Hospitals for their loyal devotion to duty and considerate care of the patients.

Some Relationships of Porphyrins, X-Rays, and Tumors*

Samuel Schwartz, M.D.,¹ Karel Absolon, M.D.,²
and Halvor Vermund, M.D.^{3†}

Hematoporphyrin tends to localize in some types of human and animal cancer. Intravenous doses appear to reinforce the effects of roentgen or gamma irradiation in some human tumors previously found to be resistant or believed to be resistant because of their nature and size.

About half of 27 growths measured directly by sight or touch regressed at least 50 per cent in the first two or three weeks of therapy. Squamous-cell carcinomas of the tongue, lip, larynx, vulva, and thigh were inhibited in spite of extensive regional metastases. In 4 of the successfully treated patients, other lesions received x-rays alone with scant effect. Combined treatment also reduced fibrosarcoma, carcinoid, gelatinous-cell rectal cancer, rhabdomyosarcoma, and metastatic adenocarcinoma solidum from the ovary.

Like antibiotics with their own realms of utility, different porphyrins each may be suited to specific forms of neoplasm. The major side effects are anorexia, nausea, and vomiting during therapy and also pronounced photosensitivity that lasts many months.

An investigation now shared by 15 departments in the University of Minnesota Hospitals, Veterans Hospital, and Mount Sinai Hospital was undertaken with 4 major goals:

- 1) To estimate the tendency of different porphyrins and their metal complexes to localize in tumors
- 2) To find the sites of localization by fluorescence microscopy and to determine the nature of chemical binding
- 3) To evaluate porphyrin influence on tumor sensitivity to x-rays and other types of ionizing radiation
- 4) To analyze physiologic and biochemical effects of porphyrins in animals and human beings. Will these changes enhance or limit radiation therapy or restrict use of the compounds?

*This is an abstract of a report given at the Staff Meeting of the University of Minnesota Hospitals on October 7, 1955. A copy of the complete report, including tables, graphs, and references, may be obtained by writing to the Editor, UNIVERSITY OF MINNESOTA MEDICAL BULLETIN, 1342 Mayo Memorial, Minneapolis 14, Minn.

1. Associate Professor, Department of Medicine.

2. Medical Fellow, Department of Surgery.

3. Assistant Professor, Division of Radiation Therapy.

†With the collaboration of J. Bearman, J. Bittner, P. Edmondson, L. Folie, R. Goodlin, L. Hay, A. Heims, K. Ikeda, M. Keprios, M. Loken, J. Modell, P. Murtz, J. Sacks, K. W. Stenstrom, R. Suechting, D. Von Korff, R. Walters, and L. Zieve.

This preliminary report deals mainly with clinical and animal studies. Few patients have been observed as long as six months, and even the early results will require much more time and experience for critical review.

Relation of porphyrins and tumors

All previous workers agree that the porphyrin content of necrotic and infected tumors is characteristically increased, and some claim that neoplastic levels are high without infection and necrosis. The chief evidence of porphyrin is intense red fluorescence of certain growths on exposure to ultraviolet light.

After parenteral injection, hematoporphyrin and other porphyrin compounds tend to localize in many varieties of human and animal neoplasms. Yet, thus far, porphyrin labeled with radioactive zinc or iodine has failed in treatment of tumor. In animals, hematoporphyrin has been reported to be carcinogenic when combined with either chemical carcinogens or light.

Relation of porphyrins and radiation

Very few former investigations directly concern the influence of porphyrins on effects of radiation. A recent report, however, describes sensitization of paramecia to x-rays by hematoporphyrin added to culture media.

At least superficially, many activities of porphyrin and heme substances resemble those of ionizing radiation. Both denature protein, although porphyrin is active only during exposure to light; both cause oxidative reactions; both are associated with release of histamine and similar products; both increase permeability of cell membranes; and both have carcinogenic properties.

Moreover, the heme enzyme metabolism of tumors may modify the effect of radiation, since the oxidative state of tissue is an important factor in determining response to x-rays, and heme enzymes have a major part in tissue oxidation. Other evidence can be cited, and reactions are sufficiently complex to warrant further study.

Materials and methods

Hematoporphyrin was obtained from 2 commercial sources. The first supply, found by solvent extraction to contain a large amount of impurity, was employed on mice and in treatment of 2 persons. Since only a few grams were available, nature of impurities was not established. Material from the second firm was at least 98% pure and was used for the remaining patients and some animals.

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Certain impurities were isolated from hematoporphyrin mother-liquors and other sources. Porphyrins were also extracted from tissues, blood, urine, and feces. Hematoporphyrin is readily distinguished from the natural substance, coproporphyrin.

Before administration, hematoporphyrin was dissolved in 1% sodium hydroxide, diluted with saline or 5% glucose in water, and neutralized with 1% hydrochloric acid to pH 7.4. Final concentrations approximated 5 mg. per cubic centimeter. The solution was sterilized by filtration. As a rule, porphyrin was given intravenously in doses of 500 mg. per day for three to six days a week, with 1 or 2 volumes of 5% glucose in water.

Roentgen rays were employed in superficial, intermediary, and deep therapy under varied conditions. Doses ranged from 11.8 to 334 r per minute in air. Telegamma ray therapy was given with cobalt⁶⁰ in a 1,000-curie source.

Precautions were taken against photosensitivity. For several days after starting porphyrin, human subjects were kept in rooms darkened by black shades. Light was increased by degrees and the patient watched carefully for skin changes or signs of fever. On discharge from the hospital, all were asked to avoid direct sunlight for a number of months and then to increase exposure gradually. This advice was largely ignored.

Mice and rats injected with porphyrin were kept in a dark room, illuminated when necessary by a red light.

In mice, both spontaneous and transplanted breast cancers were observed. Tumors were generally grafted to the thigh, but later the tail was preferred for greater accuracy in tumor measurements. Transplanted Walker carcinoma was observed in rats.

Tissue sections or smears were examined by fluorescence microscopy to determine cellular localization of the red porphyrin fluorescence.

Patients were selected to meet the following criteria:

Group A provided their own internal controls. Either the neoplasm had resisted previous roentgen therapy or the subject had several tumors, some of which could be given x-rays only then compared with other growths which received a similar roentgen dose plus porphyrin administered locally or by vein.

Group B had inoperable tumors which were believed unsuitable for x-ray therapy because of histologic nature, size, or extent of spread. Actually, most of the patients in group A also met the standards for group B.

To date, 38 persons have been observed. Size of neoplasms could be determined in 27 by visual inspection or palpation. In 11 persons changes in the tumors could be followed only by biopsy or roentgen examination.

Efficacy of treatment was determined by rapidity and completeness of response in the rather brief period of observation. Tumor size and over-all therapeutic benefits were judged by several independent observers. Influence of porphyrin was quite apparent in group A, but less clear in group B.

The series was too small for precise statistical inference, even if appropriate figures were available for comparison. Furthermore, though each tumor was selected for probable resistance to x-rays, similar masses have at times proved sensitive.

Because metastases were scattered in most cases and several people were near death when treatment was begun, only irradiated parts were evaluated, and longer life from treatment was scarcely expected.

Therapeutic results

Important factors to be considered were the kind of tumor and the conditions of investigation.

1) In 9 patients, squamous-cell carcinomas were visible and sizes were measured accurately. Porphyrin probably increased the radiation effect in 5 and may have done so in 2 others. The 2 failures were not observed long enough, in 1 instance for only nine days, in the other for one month, after the last day of therapy.

Primary sites were the tongue in 4 patients and the lip, larynx, thigh, vulva, and cervix in 1 each. Extensive regional or distant metastasis or both had occurred in all instances.

2) In 6 subjects, measurable miscellaneous neoplasms regressed at least 50% in the first two or three weeks of therapy. Except in 1 person with internal controls, all growths were of types ordinarily highly immune to x-rays. Histologic diagnoses were rhabdomyosarcoma primary in the groin, fibrosarcoma of the cheek, adenocarcinoma solidum of the ovary, gelatinous-cell cancer of the rectum, abdominal carcinoid, and mycosis fungoides. In the last patient, control lesions treated with the same dose of x-rays alone showed no response.

3) Response in 5 instance, though hard to determine, may have been significant. However, x-rays alone probably could have accomplished as much. For example, carcinoma of the stomach shrank quickly at first, but a large tumor persisted. Adenocarcinoma im-

proved greatly from a clinical standpoint, yet the gastric mass remained inoperable. The rapid growth of an osteogenic sarcoma of the pelvis was arrested during the four-month observation period. Multiple myeloma displayed about 50% fewer malignant cells in 2 biopsies from the ilium after x-ray and hematoporphyrin therapy than were found in the opposite ilium treated with x-rays alone.

4) In 13 patients, response could not be evaluated but was probably negligible. Owing to nature of the growth or short observation period, no significant porphyrin activity was seen. Squamous-cell cancers or adenocarcinomas of the tongue, stomach, lung, esophagus, and ovary and malignant melanoma, neuroblastoma, and chronic lymphatic leukemia were represented.

5) Effects in the remaining 5 patients were definitely insignificant. Tumors were uterine adenocarcinoma and leiomyosarcoma, renal adenocarcinoma growing in the lung, and 2 instances of malignant melanoma with primary site unknown.

Comment

Results of therapy suggest that hematoporphyrin modifies x-ray action in some human tumors but not perceptibly in others. Potentiation seemed likely in 13 of the 38 patients, possible in 5, and quite improbable in 5. Effects in the remainder cannot be assessed at present but for practical purposes may be considered negative.

Visible squamous-cell cancers reacted quite dramatically to combined therapy in 7 of 9 instances, and 6 tumors apparently disappeared, though 1 has recurred to date. In 4 of these subjects, other lesions of the same type were little affected by x-rays alone. On the other hand, none of 3 persons with malignant melanoma was benefited by radiation with porphyrin.

Tumor response was often surprisingly prompt, with softening and recession after three to seven days of therapy. In view of expected resistance, this was most interesting, as when rhabdomyosarcoma diminished in seven days under a total dose of only 814 r.

With squamous-cell cancer of the tongue, a second x-ray course would ordinarily achieve less than the first. Yet, in 2 instances, the combined method resulted in biopsies without malignant cells and in gross disappearance of the treated mass at a time interval at which the tumor was previously found to be regrowing with x-ray therapy alone.

Considerable differences were noted in the extent of porphyrin localization in various human neoplasms. Not enough data were

gathered to correlate local deposits with rising susceptibility of tumor to x-rays.

Any agent employed for malignant disease is most efficient against certain types, and porphyrins may follow the same rule. Pure hematoporphyrin, for instance, showed no specific localization in transplanted breast cancer of mice and did not affect x-ray sensitivity. However, it did localize well in transplanted Walker carcinoma of rats and appeared to affect spontaneous cancer in mice.

An impure preparation of hematoporphyrin made spontaneous mouse cancer and transplants more vulnerable to x-rays. Intense red fluorescence persisted in the tumor for a week or more after vanishing from other tissues. The active impurity also migrated to Walker carcinoma. Nature of the compound has not been discovered.

If it is true that porphyrin enhances the radiosensitivity of tumors, the mechanisms should be determined. The task is difficult. Even the behavior of ionizing radiations is not thoroughly understood, after enormous amounts of work by countless investigators.

Certain effects of radiation are basic in explaining combined activity with porphyrin. Genetic, chromosomal, mitotic, and chemical changes induced by oxidizing or reducing radicals in irradiated water or tissues have been studied intensively.

Cysteine, thiourea, and many other substances apparently protect both cells and the whole body from radiation by competing with essential tissue enzymes or substrates for the active radicals. In particular, sulfhydryl enzymes seem to be spared.

Similar protection is offered by low oxygen tension or by cyanide, which inhibits oxidative metabolism, and also by hypothermia until normal temperature returns.

A number of agents, such as cortisone and guanazola, are said to potentiate the biologic activity of ionizing radiation.

For interpreting the response of tumors to radiation, 2 final, closely related factors must be considered. First, both destructive and reparative processes are involved. Second, the agent is limited by a therapeutic ratio, that is, the ratio of tumor sensitivity to the vulnerable state of healthy tissues treated in the same manner. The effect of hematoporphyrin on the therapeutic ratio is still undetermined. In normal mice, 5 mg. of hematoporphyrin has a defensive action against total body irradiation, but small doses of 0.1 mg. increase susceptibility of healthy mice to x-rays.

Of human subjects, no untoward damage to skin or other sound tissues has yet been observed. With ulcerating tumors, in fact, porphy-

rin appeared to repair, including regrowth of blood vessels and skin.

Hematoporphyrin greatly reduces oxygen consumption in mice, rats, and rabbits without changing arterial oxygen content. Inhibition of enzymes such as pepsin and catalase also indicates that, in high concentrations at least, the compound may have powerful physiologic effects beyond those previously known.

A major difficulty in porphyrin therapy is the strong photodynamic action. The basic reactions appear to be photochemical oxidation and protein denaturation. Whether photodynamic effects are related to x-ray sensitivity is not clear, but most if not all photodynamic compounds are fluorescent. Investigation of therapeutic possibilities of nonfluorescent metal and other porphyrin complexes would be interesting.

Another limitation is that, after use of porphyrin, only the irradiated area responds. Widespread or hidden metastases are not included.

In future investigations, efforts will be made to elicit a general response by (1) employment of radioactive porphyrin that might localize in and sensitize both the primary and the metastatic lesions and (2) utilization of both radioactive and other porphyrins with agents found to have a systemic action on tumor growth.

It is emphasized that the combined use of hematoporphyrin and x-rays is an experimental procedure which is, at least at the present time, unsuited for general use. The preliminary results obtained must be reevaluated after a larger series and a longer follow-up period are available.

Editorials

Greetings to the Staff

At the beginning of each academic year, I like to give a word of greeting to the staff. To some this occasion represents nothing more than the continuation of activities that have been carried on in the past. To most of us, however, the beginning of a new academic year is a thrilling experience—a time to review the accomplishments of the past year and to express our ambitions and hopes for the future.

As this year begins, we have completed one year of operation in the new part of our physical plant known as the Mayo Memorial, and our total medical enterprise has officially been christened the University of Minnesota Medical Center. The various units of this Center, which will retain their own names and significance, are the Medical School, the School of Public Health, the School of Nursing, the University of Minnesota Hospitals, et cetera. It may take us a while to get used to this new name, but it expresses, I am sure, the total concept of the College of Medical Sciences.

Moving into the new facilities went along very smoothly, and it shook down much more rapidly and in better shape than all of us, who were concerned with the moving, had hoped for.

One of the new items to greet you this year will be a new staff meeting bulletin. The BULLETIN will have a new format and will be printed and distributed twice a month. In the past it has been sponsored by the University Hospitals and the Minnesota Medical Foundation. As an additional sponsor of the new BULLETIN, we welcome the Minnesota Medical Alumni Association. I look forward to a new and more interesting bulletin with better readability and wider circulation.

The purpose of these staff meetings is to improve the quality of medical care of the patient by critical review and valuation of the work of the professional staff. This involves all members of the medical team, such as physicians, nurses, record librarians, technicians, and others too numerous to mention who participate. I hope that this year will see a continuation of the excellent staff meetings of the past and further progress in the work of the College of Medical Sciences, achievements in which each and every one should participate and take pride.

—Harold S. Diehl

About the New Bulletin

This issue marks an important change in the manner of the publication of the BULLETIN. Gone are the familiar maroon and gold cover and the mimeographed pages. A redesigned, distinctive cover now encases printed pages, and the handy "pocket book" format has been adopted. Even the name is new; henceforth, our official title will be UNIVERSITY OF MINNESOTA MEDICAL BULLETIN. In his greetings to the staff, Dean Diehl has referred briefly to these changes, but perhaps a few additional words are in order.

The BULLETIN will appear twice monthly between October 15 and June 15 except that no January first issue will be published. Each issue will contain abbreviated versions of two hospital staff meeting reports and, in addition, significant news concerning the Medical School and its Faculty, the University Hospitals, the Minnesota Medical Foundation, the Minnesota Medical Alumni Association, and the University's program in Continuation Medical Education. Brief comments on topics of current interest will appear in the Editorial section. The Board of Editors has been reconstituted, and its members will share the editorial responsibility of preparing each issue for publication.

Members of the staff attending the weekly hospital staff meetings will continue to receive each week, as in past years, complete reports of the proceedings in mimeographed form but without covers or news pages. These mimeographed reports, complete with tables, graphs, and references, will also be available to readers of the BULLETIN on request.

The BULLETIN will be sent as before to all members of the Minnesota Medical Foundation. We are sure that in its new form it will have an added appeal for alumni and for all physicians in practice in our state. Ultimately it will result in increased interest in and support of the Foundation and the Medical Alumni Association. Comments and suggestions concerning the BULLETIN will always be welcome.

Minnesota Medical Foundation

The appearance of this BULLETIN is a project in which the Minnesota Medical Foundation is proud to participate. The publication aims to inform the alumni of the University of Minnesota Medical School, other members of the medical profession, and the community at large, about the accomplishments of the Medical School and of the University Hospitals. It marks an attempt to perpetuate down the years that ties of friendship among the alumni of the School after they have graduated.

Since this BULLETIN does represent one of the activities of the Minnesota Medical Foundation, it is appropriate at this time to answer the oft recurring questions, what is the Minnesota Medical Foundation, and what are its purposes and accomplishments? Many individuals look upon the State University and its professional schools as organizations whose functions are amply supported by the State Legislature. They assume that with this support, the University should have no serious financial worries. The Legislatures of the State of Minnesota have recognized the worth of the University and they have been generous to the institution. There are, however, many functions and activities, imperative to the very life of a University, for which the Legislature cannot assume responsibility and for which help outside of the Legislature is needed.

The dignity and greatness of an educational institution resides in its faculty and student body. A superb faculty will not only disseminate the accumulated knowledge of the ages to the students, but its members will seek out the new in a creative fashion, not only for the benefit of their students, but for mankind in general. In a medical school, this added effort of the faculty resides in research. But research activities require equipment, personnel and supplies, and it was—and still is—in this area for which the Legislature has provided insufficient funds. This deficiency was one of the motivating factors in the organizing of the Minnesota Medical Foundation in 1937. A small group of faculty members and graduates of the Medical School, who were in practice, recognizing the need for such an organization, joined together in this project. By the time that World War II had engulfed the energies of most individuals, the Foundation had grown from a handful of persons to a membership of several hundred. The war and the

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years immediately thereafter had brought about a changed attitude toward research in universities. Foundations, governmental agencies, private organizations, and individuals began to meet the critical needs of the schools, including the University of Minnesota Medical School, in the field of research. In addition, the people of the State of Minnesota and their Legislature, made possible the great Mayo Memorial building with all of its facilities. Since the needs for research were being met in more ample fashion, the Minnesota Medical Foundation turned its attention more and more to the financial needs of the undergraduate medical students. This was another critical area where the needs were not being met by the Legislature, and there was no reason why the Legislature should make scholarships and loans available for students. But members of the Foundation and the faculty recognized that the progress of some highly talented students was being jeopardized because of financial needs. For the school year 1949-1950, five \$500 scholarships were made available to students through the effort of the Foundation, and particularly as a result of the enthusiasm and work of Dr. Donald Cowling, the distinguished President Emeritus of Carleton College. The scholarship program gained momentum so that for the school year 1955-1956, 21 scholarships became available. This program should and can expand. An endowed scholarship fund is now the aim of the Foundation. There is a critical need for outstanding leaders in the medical sciences, and it is to be hoped that no boy or girl of ability in Minnesota will be denied the opportunity to fulfill this need because of lack of money. This is a most worthy cause for the Foundation to support.

The membership has continued to expand, now numbering approximately 1000 members. Membership is open to any interested individual. Every alumnus of the University of Minnesota Medical School should be an active member. Every physician in the State of Minnesota should belong. To be a part of this "community of friends" on behalf of sound medical education and productive medical research and to receive the latest information on the advancements in medicine through the medium of the BULLETIN are privileges that can be enjoyed by any individual who will become a member of the Minnesota Medical Foundation.

Wesley W. Spink, M.D.,
President,
Minnesota Medical Foundation

Alumni Association

With the publication of the first issue of the BULLETIN, the Alumni Association of the University of Minnesota Medical School comes "into its own." We have been in existence since the first class of medics graduated in 1884. Now, for the first time, we will be able to reach our members twice a month and keep them informed and up-to-date on the goings on in the Medical School and amongst the alumni themselves.

During the past year the Alumni Association has carried on a number of projects which have been most successful. The publication of the Alumni Directory, the Homecoming Banquet and the Annual Luncheon for the Senior Class are accomplishments of which we are proud. During this coming school year we hope to out-do ourselves in this regard. More and more of our alumni are interesting themselves in our projects and in time we hope to have one of the strongest alumni groups in the country. Working in close association with the Minnesota Medical Foundation, we are able to see the fruits of our labors in the improved research and teaching facilities of our school.

Recently we paid tribute to DR. OWEN H. WANGENSTEEN, '21, upon the completion of twenty-five years as head of the Department of Surgery. The accomplishments of this devoted alumnus have been important in placing our Medical School in the position of prestige in which we find it today. It was heartening to see so many of our illustrious alumni around for this momentous occasion.

This year we are holding our Annual Homecoming Banquet at the Radisson Hotel in Minneapolis on Friday night, October 28th. We hope that an overflow crowd will be present to partake of the festivities and to help pay honor to the members of the Class of '30 who will be there to celebrate their 25th anniversary.

Wm. C. Bernstein,
President,
Minnesota Medical Alumni Association

Medical School Activities

We are pleased to welcome the following people who have joined our faculty in recent months:

DR. BERNARD GLUECK, JR., Associate Professor of Psychiatry, graduated from Harvard Medical School in 1938, served his internship at Beth Israel Hospital, his residency at Pennsylvania Hospital. After four years with the Air Force he entered private practice. Subsequently he served as Director of the Sex Research Project of the New York State Department of Mental Hygiene and as Associate Psychoanalyst, Columbia University Psychoanalytical Clinic.

DR. DEWEY ZIEGLER, Assistant Professor of Neurology, also a graduate of Harvard Medical School, received his graduate training in neurology at Columbia and Harvard. Before accepting the position here, he was an Associate in Neurology at Columbia University College of Physicians and Surgeons.

DR. WILLIAM J. W. FELTS, Assistant Professor of Anatomy, comes to us from Tulane University. His research interest is in growth and development of transplanted bone.

DR. FRED GOETZ, Instructor in Medicine, is a 1946 graduate of Harvard Medical School. Before coming here he was Chief Medical Resident at Massachusetts General Hospital. His principal interest is diabetes.

DR. JAMES C. DAHL, returns as Instructor in Medicine after two years in the armed forces. Dr. Dahl graduated from the University of Minnesota in 1946. Electrocardiography is his chief interest.

DR. FRANK MORRELL, Instructor in Neurology, a graduate of Columbia University College of Physicians and Surgeons, joined our faculty on July 1, 1954. He has spent the past year, however, in special study at the Neurological Institute in Montreal.

MISS EVELYN J. SANBURN has been appointed as an Assistant Professor in the School of Public Health nursing program. She is a native of Ohio and has a bachelor's degree from Western Reserve University and a master's degree from the University of Michigan. She comes to Minnesota from Richmond, Virginia, where she was assistant director of the combined public health nursing service.

New members of our Clinical Faculty include DR. FREDERICK T. BECKER, Clinical Instructor in Dermatology; DR. MARTIN E. JANSSEN,

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Clinical Instructor in Medicine; and DR. HENRY W. COHEN, Clinical Assistant in Medicine.

Others have left the Medical School to accept positions elsewhere or to enter private practice. We regret losing these outstanding individuals but wish them success in their new ventures.

DR. HOWARD L. HORNS, former Assistant Dean and Associate Professor of Medicine has entered private practice in Minneapolis with the Nicollet Clinic. He will continue as a member of our Faculty, however, as Clinical Associate Professor of Medicine.

DR. C. KNIGHT ALDRICH, former Associate Professor of Psychiatry, became Professor and Head of the Department of Psychiatry at the University of Chicago Medical School on September 1.

DR. ROBERT I. WISE, former Assistant Professor of Medicine and Bacteriology, and Director of the Hospital Bacteriology Laboratory, resigned September 1 to become Assistant Professor of Medicine and Director of the Division of Antibiotic Therapy, Jefferson Medical College, Philadelphia, Pennsylvania.

DR. FAE Y. TICHY, former Assistant Professor of Neurology, left the University to enter private practice in Pasadena, California, with the Sheldon Clinic.

DR. FRANK MARTIN, former Assistant Professor of Medicine at the Veterans Administration Hospital, has entered private practice in Minneapolis. He will continue as Clinical Assistant Professor of Medicine.

The following members of the Faculty have been promoted since July 1:

DR. JOSEPH T. KING from Associate Professor to Professor of Physiology.

DR. E. B. BROWN from Associate Professor to Professor of Physiology.

DR. CYRUS P. BARNUM, JR., from Associate Professor to Professor of Physiological Chemistry.

DR. CARL B. DRAKE from Clinical Associate Professor to Clinical Associate Professor Emeritus of Medicine.

DR. LAN A. BROWN from Assistant Professor to Associate Professor of Neurology.

DR. MILDRED ZIEGLER from Assistant Professor to Associate Professor of Pediatrics.

DR. FRANZ HALBERG from Assistant Professor to Associate Professor of Physiology.

DR. JOHN A. JOHNSON from Assistant Professor to Associate Professor of Physiology.

DR. CARLOS MARTINEZ from Assistant Professor to Associate Professor of Physiology.

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- DR. JOSEPH A. RESCH from Clinical Assistant Professor to Clinical Associate Professor of Neurology.
- DR. WILLIAM F. MALONEY from Instructor to Assistant Professor of Medicine.
- DR. RICHARD T. SMITH from Research Fellow to Assistant Professor of Pediatrics.
- DR. NEAL GAULT from Instructor to Assistant Professor of Medicine.
- DR. MAURICIO DA SILVA from Research Fellow to Assistant Professor of Pediatrics.
- DR. IRVING C. BERNSTEIN from Clinical Instructor to Clinical Assistant Professor of Psychiatry.
- DR. CYRUS C. BROWN from Medical Fellow to Instructor in Medicine.
- DR. JOHN A. LOGOTHETIS from Medical Fellow to Instructor in Neurology.
- DR. FOUAD BASHOUR from Medical Fellow to Instructor in Medicine.
- DR. RICHARD P. DOE from Medical Fellow to Instructor in Medicine.
- DR. KURT POLLAK from Medical Fellow to Instructor in Otolaryngology.
- DR. JOHN K. LOVE, JR., from Teaching Assistant to Instructor in Physiology.
- DR. FREDERICK BOLLUM from Teaching Assistant to Instructor in Physiological Chemistry.

Recognition Exercises

Last June 10, the Medical School honored its graduating Senior Class at Recognition Exercises held in the Mayo Memorial Auditorium. These Exercises, held the evening before the regular University Commencement, provided the Faculty an opportunity to bid farewell to the Senior Class in a less formal manner than is possible at the all-University event. Highlight of the evening was an outstanding address by DR. HOWARD A. RUSK, Professor and Chairman, Department of Physical Medicine and Rehabilitation, New York University. The program was received with enthusiasm by students, members of their families, and faculty members.

Postgraduate Education

The following is a tentative list of medical continuation courses to be presented by the University of Minnesota during the remainder of the 1955-56 academic year:

October 20-21	Techniques in General Practice
November 7-11	Radiology for Radiologists
November 21-23	Fractures for General Physicians
December 1-3	Gastroenterology for General Physicians
January 5-7	Obstetrics for General Physicians
January 30-February 1	Emergency Surgery for General Physicians
February 2-4	Mental Deficiency for General Physicians, Pediatricians, Obstetricians, and Child Psychiatrists
February 6-10	Neurology for General Physicians and Specialists
February 13-15	Internal Medicine for Internists
February 16-18	Cancer Detection for General Physicians
February 27-29	Eye, Ear, Nose, and Throat for General Physicians
March 5-7	Pediatrics for General Physicians
March 19-21	Cardiovascular Diseases for General Physicians
April 9-11	Radiology for General Physicians
April 12-14	Gynecology for Specialists
April 16-18	Endocrinology for General Physicians
May 7-12	Electrocardiography for General Physicians
May 14-19	Proctology for General Physicians
May 24-26	Surgery for Surgeons
June 4-6	Dermatology for General Physicians

The University of Minnesota reserves the right to change this schedule without notification.

Courses are held at the Center for Continuation Study on the campus of the University of Minnesota. Usual tuition fees are \$20 for a two-day course, \$25 for a three-day course, and \$40 for a one-week course. These are subject to change under certain circumstances.

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Specific announcements are sent out for each course to all members of the Minnesota State Medical Association and to any physicians who request information for a specific course, about six weeks to two months before the date of the course. For further information, write to

Dr. Robert B. Howard, Director, Dept. of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14, Minnesota

Techniques in General Practice

The continuation course in *Techniques in General Practice* will be given on October 21 and 22. The two day program, held under the auspices of the Center for Continuation Study, will be held in the University Hospital. Registrants will view demonstrations of and have an opportunity to participate in a number of procedures with which the general physician must be familiar.

Radiology for Radiologists

Neuroradiology will be the subject of this year's course in *Radiology for Specialists* which will be given from November 7 to 11 at the Center for Continuation Study and the adjacent Museum of Natural History Auditorium. Advance registration indicates that approximately 300 physicians will attend this program. DR. HAROLD O. PETERSON, *Clinical Professor of Radiology*, has assembled an excellent faculty which includes DRS. DONALD MCRAE, *Chief of Radiology*, Montreal Neurological Institute, McGill University Faculty of Medicine, Montreal, Canada; ERNEST H. WOOD, JR., *Professor of Radiology*, University of North Carolina School of Medicine, Chapel Hill; ERIK LINDGREN, *Professor of Radiology*, Serafimerlasarettet, Stockholm, Sweden; and ARTHUR E. CHILDE, *Associate Professor of Radiology*, University of Manitoba, Winnipeg, Canada.

Coming Events

- October 18 Minnesota Pathological Society Meeting; THE FIRST ANNUAL E. T. BELL LECTURE; "The Pyrrol Pigments in Relation to Hemoglobin Catabolism"; *Dr. C. J. Watson*, Professor and Head, Department of Medicine, University of Minnesota Medical School; Mayo Memorial Auditorium; 8:30 P.M.
- October 20-21 Continuation Course in Techniques in General Practice
- October 28 Minnesota Medical Alumni Association Dinner Meeting; Radisson Hotel, Minneapolis.
- November 7-11 Continuation Course in Radiology for Radiologists
- November 10 ANNUAL LEO G. RICGLER LECTURE; "Some Functional Implications and Some Possible Applications of the Collateral Circulation of the Lung"; *Dr. Averill Liebow*, Professor of Pathology, Yale University School of Medicine, New Haven, Connecticut; Mayo Memorial Auditorium; 8:15 P.M.
- November 21-23 Continuation Course in Fractures for General Physicians
- December 1 JOURNAL-LANCET LECTURE; "Mechanism of Abdominal Pain"; *Dr. H. L. Bockus*, Professor and Chairman, Department of Medicine, University of Pennsylvania Graduate School of Medicine, Philadelphia; Mayo Memorial Auditorium, 8:15 P.M.
- December 1-3 Continuation Course in Gastroenterology for General Physicians

Medical School Faculty

ADMINISTRATION

COLLEGE OF MEDICAL SCIENCES

Harold S. Diehl, Dean
William F. Maloney,
Assistant Dean
Neal Gault, Assistant Dean

HOSPITALS

Ray M. Amberg, Director
Gertrude M. Gilman,
Associate Director
Tomic Romson,
Assistant Director,
Manager of the Variety
Club Heart Hospital,
In charge of Service
and Supplies

Eugene Staples,
Assistant Director,
Manager of the
Out-Patient Department,
Fiscal Officer

Merle McGrath,
Hospital Fiscal Supervisor

Florence Julian, Director
of Nursing Services

Angeline Mannick,
Director of Nutrition

Hallie Bruce,
Chief Pharmacist

Irene Foster, Director
of Volunteer Services

Ethel Harrington,
Personnel Officer

ANATOMY

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Professor and Head

Professor
Lemen J. Wells

Associate Professors
Berry Campbell
J. Francis Hartmann
R. Dorothy Sundberg
W. Lane Williams

Assistant Professor
William J. L. Felts

Instructors
Anna-Mary Carpenter
Mona L. Coetzee
Joseph Davidson
Carl H. Beggstad
Sheldon M. Lagard

Ronald Meader
Richard A. Pettee

Teaching Assistants
Carl T. Friz
Charles Good
Sayed K. Hamed
Genell Knatterud
Edwin M. Masters
Austin Yates

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Associate Professor and
Head

Professor Emeritus
Ralph T. Knight

Clinical Associate Professor
Joe W. Baird

Clinical Assistant Professor
Ellis N. Cohen

Instructor
Joseph J. Buckley
James H. Matthews
D. Stuart Weatherhead

Clinical Instructor
Bryce C. Anthony
Russell W. Bagley
Shirley J. Cedarleaf
Charles W. Field
John R. Gordon
Wallace J. Paulson
Earl A. Schultz
Stanley P. Wesolowski

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Warren C. Bogle
Kodo Frukawa
Charles F. Galway
Donald Murray Hayes
Shu-Kang Ho
William Henry Houlton
Albert J. Jackson
Alfhild I. Jensen
Loren J. Larson
Louis Levitt
Francis Macaulay
Alastair Ian Napier
Arthur Jacob Oswald
Byron D. Petersen
Genaro A. Ramirez
Byron H. Roberts
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G. E. Gifford
L. C. McLaren
William H. Murphy, Jr.
F. J. Roth

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M. Martins daSilva

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Hospital Hematologist
Franklin Wallace,
Associate Professor of
Zoology,
Consultant in Parasitology
Ruth Hovde,
Assistant Professor in
Medical Technology
Verna Rausch,
Assistant Professor in
Medical Technology
Grace Mary Ederer,
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Technology
Lorraine Gonyea, Instructor
in Medical Technology,
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Russell J. Eilers
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 Althea Kessler
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 Elsa Proehl
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Professor
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Assistant Professor
 Elizabeth M. Cranston
Teaching Assistants
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 AND REHABILITATION**

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 Professor and Head
Professor
 William G. Kubicek
Clinical Professor
 Miland E. Knapp
Assistant Professors
 Borghild Hansen
 Ruby M. Overmann
Instructors
 Marian Eliason
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 Marvin Lepley
 Wilbur L. Moen
 Martin Mundale
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Masazumi Kawakami

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G. Wendell Hopkins
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Jennings Peteler
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Jean Carlin
Pieter deVryer
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Albert Rosen

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Daniel Wiener

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Gayle Lumry
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Professor and Head
(on leave of absence)

K. Wilhelm Stenstrom,
Professor and
Acting Head

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Clinical Assistant Professor
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Stewart C. Thomson
Alan E. Treloar

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Special Lecturer
Lila Elveback

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Myrtle Rueger

Medical Fellows
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Marcus Kjelsberg
Vernon Weckwerth

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Research Fellow
Ratko Buzina

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*Chief Psychiatric Social
Worker and Assistant
Professor*
Fred Gross

*Medical Social Work
Supervisor*

Helen Kretschmer

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Miriam Barrie
Frances Boone
Betty Brooks
Claire Censky
Margaret Graham
Audrey E. Niemi
Elizabeth Nowicki
Gertrude Tennant
Gertrude Weber

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Ziona Gordon
Harvey L. Kaplan
Adeline Mandel
Katherine M. Murphy
Ruth Nyquist
Margaret Rowan
Maureen Ryan
Gertrude Shiely

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Donald W. Cowan,
Assistant Director

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Robert G. Hinckley
Philip W. Hursh
Phillip D. Kernan
H. Douglas Lamb
Myron G. Messenheimer
Lydia I. Neibergs
Maurice A. Shillington
Stella H. Sikkema
Carol Snyder
Hugh J. Thompson

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 William Feller
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 Paul R. Finley
 L. Haynes Fowler
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 George O. Hilgermann
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 Douglas L. Johnson
 Harold A. Kaplan
 Irvine M. Karon
 Robert L. Koller
 Katherine Laine
 Donald R. Lannin
 Maurice L. Lindblom
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 Willma B. Nelson
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 Harley J. Racer
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 Samuel B. Solhaug, Jr.
 Robert J. Tenner
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Harold Hullsiek
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Clinical Assistant

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Emerson Hoppes

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Theodore H. Sweetser

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David M. Anderson
Hugo E. Miller
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Harold A. Reif
Milton Reiser
Richard S. Rodgers
Ragnar T. Soderlind
Gordon W. Strom

Clinical Assistant

Edward J. Richardson

Medical Fellows

Julian Ansell
Donald Bravick
John Cooper
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University of Kansas
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University of Washington
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University of Washington
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University of Utah
Dennis J. Kane,
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Kyu-Sook Her,
Taegu Medical College,
Taegu, Korea
Paulamaria Hoelscher,
University of Heidelberg,
Germany
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Universidad Nacional
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Vanderbilt University,
Nashville
Eugene H. Courtiss,
Boston University
Arthur E. Lyons,
Vanderbilt University,
Nashville
Walter H. Moran,
Harvard University
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University of Tennessee,
Memphis
Robert D. Sellers,
Vanderbilt University,
Nashville
Allen Silbergleit,
University of Cincinnati
Jimmy L. Story,
Vanderbilt University,
Nashville

WEEKLY CONFERENCES OF GENERAL INTEREST

Physicians Welcome

- Monday, 9:00 to 10:50 a.m. OBSTETRICS AND GYNECOLOGY
W-612, University Hospitals
- 4:00 to 6:00 p.m. ANESTHESIOLOGY
Todd Amphitheater,
University Hospitals
- Tuesday 12:30 to 1:20 p.m. PATHOLOGY
104 Jackson Hall
- Thursday 12:00 to 1:00 p.m. PHYSIOLOGY
214 Millard Hall
- Friday 8:00 to 10:00 a.m. NEUROLOGY
Station 50, University Hospitals
- 9:00 to 10:00 a.m. MEDICINE
Todd Amphitheater,
University Hospitals
- 1:30 to 2:30 p.m. DERMATOLOGY
Eustis Amphitheater,
University Hospitals
- Saturday 7:45 to 9:00 a.m. ORTHOPEDICS
Powell Hall Amphitheater
- 9:15 to 11:30 a.m. SURGERY
Todd Amphitheater,
University Hospitals

For detailed information concerning all conferences, seminars and ward rounds at University Hospitals, Ancker Hospital, Minneapolis General Hospital and the Minneapolis Veterans Administration Hospital, write to the Editor of the BULLETIN, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14.