

MEDICAL BULLETIN

UNIVERSITY OF *Minnesota*



in this issue

- FRESHMAN CLASS PROFILE
- TUMORS OF THE THYMUS
- VERTEBRAL TUBERCULOSIS
- POLYBASIC POLYMERS

VOLUME XXXIX, NUMBER 4

DECEMBER 1967

EDITORIAL STAFF

W. ALBERT SULLIVAN, JR., M.D.

Editor

EIVIND HOFF, JR.

Executive Editor

ADMINISTRATIVE SPONSORS

Minnesota Medical Foundation

KARL W. ANDERSON, M.D.

President

MALVIN E. HERZ

Vice-President

ROBERT A. ULSTROM, M.D.

Secretary-Treasurer

EIVIND O. HOFF, JR.

Executive Director

Board of Trustees

JOHN F. ALDEN, M.D.

RAY AMBERG

HOWARD A. ANDERSEN, M.D.

T. RICHARD ANDERSON

EARL E. BAKKEN

MRS. FRANK W. BOWMAN

H. MEAD CAVERT, M.D.

CARL E. CHRISTENSON, M.D.

HERMAN E. DRILL, M.D.

PAUL DWAN, M.D.

PHILIP L. ECKMAN, M.D.

BERTIN C. GAMBLE

M. MELVIN GOLDFINE, M.D.

BERNARD HALPER, M.D.

WILLIAM HARTFIEL, M.D.

O. M. HEIBERG, M.D.

JOHN M. HOLLEBN

ROBERT B. HOWARD, M.D.

L. G. IDSTROM, M.D.

DENNIS J. KANE, M.D.

JAMES E. KELLEY

YORK E. LANGTON

LEWIS W. LEHR

SAMUEL MASLON

CHARLES A. NEUMEISTER, M.D.

RUSSELL O. SATHER, M.D.

HAROLD G. SCHEIE, M.D.

VERNON D. E. SMITH, M.D.

HAROLD VAN EVERY

RICHARD L. VARCO, M.D.

CECIL J. WATSON, M.D.

University of Minnesota Medical School

MALCOLM MOOS, *President*

University of Minnesota

ROBERT B. HOWARD, M.D., *Dean*

College of Medical Sciences

H. MEAD CAVERT, M.D., *Associate Dean*

ROBERT A. ULSTROM, M.D., *Associate Dean*

ROBERT J. MCCOLLISTER, M.D., *Assistant Dean*

ROBERT O. MULHAUSEN, M.D., *Assistant Dean*

University of Minnesota Hospitals

JOHN H. WESTERMAN, *Director*

Minnesota Medical Alumni Association

L. G. IDSTROM, M.D., *President*

KENNETH P. MANICK, M.D., *Vice-President*

LEONARD ARLING, M.D., *Vice-President*

GEORGE W. JANDA, M.D., *Secretary*

EMERSON E. HOPPE, M.D., *Treasurer*

UNIVERSITY OF MINNESOTA
Medical Bulletin

Official Publication of
UNIVERSITY OF MINNESOTA HOSPITALS
MINNESOTA MEDICAL FOUNDATION
MINNESOTA MEDICAL ALUMNI ASSOCIATION

Circulation this issue: 6,300

24 Pages

VOLUME XXXIX

December 1967

NUMBER 4

C O N T E N T S

FRESHMAN PROFILE

The Class of 1971

ROBERT J. MCCOLLISTER, M.D. 98

MEDICAL SCIENCE

Carcinogen Induced Tumors of the Thymus

OSIAS STUTMAN, M.D. 104

Surgical Management of Vertebral Tuberculosis

WILLIAM J. KANE, M.D., Ph.D.,
R. WILLIAM NEUMANN, M.D., PAUL G. PATTERSON, M.D.,
and JOHN H. MOE, M.D. 106

*Hemodynamic and Biophysical Effects of
Polybasic Polymers: Clinical Implications*

ALDO R. CASTANEDA, M.D., Ph.D.,
WARD O. GRIFFEN, JR., M.D., Ph.D.,
GARY W. LYONS, M.D., Ph.D.,
EUGENE F. BERNSTEIN, M.D., Ph.D.,
HENRY GANS, M.D., Ph.D., K. C. WEBER, B.S.E.E.,
and I. J. FOX, M.D., Ph.D. 108

DIVISION OF MEDICAL HISTORY 111

LIFE INSURANCE GIVING 118

Published monthly from September through June at Minneapolis, Minn. No advertising accepted. Second class postage paid at Minneapolis, Minn. Address all communications to The Editor, University of Minnesota Medical Bulletin, 1342 Mayo Bldg., University of Minnesota, Minneapolis, Minn. 55455.

Freshman Profile

The Class of 1971

Robert J. McCollister, M.D.*

A near record-breaking size class of 161 freshman students entered the Medical School in September. The Admissions Committee, under the able chairmanship of Dr. A. B. Baker, Director of the Division of Neurology, carefully evaluated 643 applications to select the class which will graduate in June, 1971. The applicant group included 370 residents of Minnesota and 273 non-residents. A total of 66 women applied for admission.



Robert J. McCollister

The selection procedure is thorough and lengthy, and insures careful consideration of every applicant. The deadline for submission of applications is October 15 and for several weeks thereafter, the applications are put in order for complete evaluation. The bulk of the work of the Committee is accomplished between November 15 and January 15 of the School year prior to Fall matriculation of the entering class. After preliminary administrative screening, completed applications are reviewed, independently and separately, by two Committee members. Following this double review, the application is presented to the entire Committee for discussion. After acceptance of his application, the student is notified promptly. Every effort is made to notify all applicants of a final action by January 20.

Applicants are not routinely required to appear in person but, on occasion, are asked to do so, usually for the purpose of clarifying questions about their academic work, outside employment, general background or special interests which have not been presented in sufficient detail in the application. Many students are seen in the Medical School office during the summer and fall. In total, more than one half of all applicants are interviewed.

*Assistant Dean, Medical School Affairs, College of Medical Sciences, University of Minnesota.

This year's entering class of 161 students is almost entirely composed of residents of Minnesota. Of the seven non-resident regular matriculants, two are from Iowa, one each from Nebraska, Ohio, North Dakota and South Dakota. One student is from Zanzibar, a graduate of Carleton College with a Master's degree from the University of Minnesota. The class members represent all areas of the state and come from homes in rural, urban, northwoods, Iron Range and southern farmland areas. The counties of origin of the students are as follows: *Hennepin* (47), *Ramsey* (30), *St. Louis* (13), *Olmsted* (8), *Itasca* (5), *Stearns* (4), *Mower*, *Kandiyohi*, *Dakota* and *Pipestone* (3 each), *Lyon*, *Mille Lacs*, *Clay*, *Brown*, *McLeod*, *Marshall*, *Stevens*, *Fillmore*, *Le Sueur* (2 each), *Isanti*, *Chippewa*, *Beltrami*, *Meeker*, *Benton*, *Freeborn*, *Sherbourne*, *Blue Earth*, *Wadena*, *Houston*, *Norman*, *Martin*, *Winona*, *Dodge*, *Faribault*, *Hubbard*, *Anoka* (1 each). Thirteen women students were included in the class, all state residents and all, save one, single. Some of the women attended the University of Minnesota, others came from Creighton, Duke, Hamline, Gustavus Adolphus, St. Olaf, Bethel, Carleton, Bemidji State and Illinois. Seven had majored in chemistry or biology, one each in mathematics and history. The remaining women had completed three years of college before entering Medical School.

In the entire class, 119 or 74%, had completed four years of college and most of these students had been awarded baccalaureate degrees. Slightly more than half had obtained their pre-medical education at the University and all but 10 percent took their college work somewhere within the state. Schools in Minnesota represented in the spectrum of undergraduate collegiate experience included the University of Minnesota (81), Augsburg (3), Bethel (1), Carleton (4), Concordia (2), Gustavus (7), Hamline (6), Macalester (5), St. John's (9), St. Mary's (2), St. Olaf (5), St. Thomas (6), State Colleges (7). Out-of-state schools included Amherst, Columbia, Dartmouth, Duke, Harvard, Iowa State, Luther, Marquette, North Dakota State, Wisconsin and Yale.

The class as a whole had earned records of substantial academic achievement in college. Eighty percent of the class had a grade point average of 3.1 or better. The overall average grade point was 3.33.

Thirty-four of this entering class were married at registration time in September. A total of 19 children of these medical student fathers were listed. *One entering student has six children.* The ages of the students range from 20 to 38, with a modal age of 22.

The students' parents represent a broad cross section of Minnesota life. The occupations of the fathers present an interesting spectrum: businessmen (22), physicians (14), teachers (13), farmers (11), engineers (10), laborers (8), accountants (7), salesmen (6), clerks (5), ministers (4), bankers (4), postal employees (4), executives, landlords, lawyers, pharmacists (3 each), and chemists, dentists, insurance agents, machinists, truckers (2 each). Other occupations of fathers which were listed included controller, piano teacher, plumber, pit boss, cattle buyer, contractor, editor, forester, printer, Air Force officer and painter.

Eighty-one students, just 50% of the class, were the oldest child in a sibship. One student was the youngest of 12 children.

The students were polled informally on plans for practice. Of the 110 who answered the query about plans for specialty education, 22 stated they planned for none while 88 had formed tentative plans for some specialty training. The fields of pediatrics and surgery were mentioned most often as possible specialty choices.

Of the original class of 161 students, two have withdrawn because of lack of interest in medicine, neither on the basis of academic failure.

Ten members of the Class of 1971 are on scholarship from the Minnesota Medical Foundation. Ten more received microscope loan scholarships from the Minnesota Medical Alumni Association.

1967-68 FRESHMEN

Albers, David G. St. Cloud, Minn. St. John's Univ.	Beecher, John T. New Ulm, Minn. Macalester College	Caldwell, Kenneth C. St. Paul, Minn. Univ. of Minn.
Anderson, John H. Austin, Minn. St. Olaf College	Bibelheimer, Daniel J. Minneapolis, Minn. Univ. of Minn.	Callender, Thomas B. Moorhead, Minn. Moorhead State
Baker, Patricia W. Minneapolis, Minn. Duke University	Briese, Bruce C. Faribault, Minn. Macalester College	Carlson, Pamela A. Edina, Minn. U. Calif. Santa Barbara
Balfanz, John R. St. Paul, Minn. Hamline Univ.	Bronson, Michael A. Hibbing, Minn. College of St. Thomas	Carter, Darrell L. Ada, Minn. Univ. of Minn.
Barton, Thomas G. Ames, Iowa Iowa State	Buhr, James B. Sauk Centre, Minn. Concordia College	Chamberlain, Dennis J. Taconite, Minn. Itasca Jr. College
Baudler, John R. Austin, Minn. Univ. of Minn.	Burnett, Joseph W. New Ulm, Minn. Univ. of Minn.	Chopp, Richard T. Grand Rapids, Minn. Itasca Jr. College
Beck, Charles L. Fergus Falls, Minn. Univ. of Minn.	Butzer, Stephen C. Mankato, Minn. St. Mary's College	Univ. of Minn.

THE MEDICAL BULLETIN

- Connelly, Donald P.
Breckenridge, Minn.
N. Dak. State Univ.
- Crowson, Terry W.
Rochester, Minn.
Rochester Jr. College
Univ. of Minn.
- Cullen, Michael T.
Willmar, Minn.
College of St. Thomas
- Dahms, Robert D.
St. Paul, Minn.
College of St. Thomas
- Davis, William E.
Rockford, Ill.
Luther College &
Seminary
- Desnick, Robert J.
Minneapolis, Minn.
Univ. of Minn.
- Diamond, John D.
St. Paul, Minn.
Univ. of Minn.
- Dixon, Suzanne D.
Minneapolis, Minn.
Creighton Univ.
- Dunlap, Roy J.
St. Paul, Minn.
College of St. Thomas
- Ebeling, Brian T.
Minneapolis, Minn.
Univ. of Minn.
- Ehlers, Sally M.
Marshall, Minn.
Hamline Univ.
- Elliott, Richard C.
Hayfield, Minn.
Macalester College
- Elmquist, Thomas H.
Big Lake, Minn.
Univ. of Minn.
- Erkkila, John C.
Chisholm, Minn.
Dartmouth College
- Evans, James M.
LeSueur, Minn.
St. John's Univ.
- Evans, John P.
Sauk Rapids, Minn.
St. John's Univ.
- Evans, Thomas R.
St. Anthony, Minn.
Univ. of Wisconsin
- Fellman, Randall E.
Pipestone, Minn.
Univ. of Minn.
- Ewy, Wayne E.
St. Paul, Minn.
Hamline Univ.
Univ. of Minn.
- Fischer, David A.
Warren, Minn.
Northwestern Univ.
- Fleisher, Thomas A.
Rochester, Minn.
Univ. of Minn.
- Fohlmeister, Uwe W.
Minneapolis, Minn.
Yale Univ.
- Frantz, Ivan D.
St. Paul, Minn.
Univ. of Minn.
- Fruen, Paul R.
St. Paul, Minn.
S. Dak State
Iowa State
- Gage, John W.
Rochester, Minn.
Carleton College
- Gardin, Susan D.
Anoka, Minn.
Gustavus Adolphus
- Genich, Mark H.
Burnsville, Minn.
Univ. of Minn.
- Gentry, Jon F.
Duluth, Minn.
UMD
- Gill, Tyler H.
Virginia, Minn.
UMD
- Golden, Marshall J.
St. Louis Park, Minn.
Cal. Tech.
Univ. of Minn.
- Grant, John J.
Robbinsdale, Minn.
Univ. of Minn.
- Grendahl, Marvin J.
St. Paul, Minn.
Univ. of Minn.
- Grodin, Warren K.
St. Paul, Minn.
Univ. of Minn.
- Haberman, David A.
St. Paul, Minn.
Univ. of Minn.
- Hadley, Stephen L.
Springfield, Va.
UMD
- Haggart, Thomas D.
Watertown, S. Dak.
Univ. of Cal. Berkeley
- Handrich, Roger P.
Glencoe, Minn.
Gustavus Adolphus
- Hansen, DuWayne A.
Minneapolis, Minn.
Univ. of Minn.
- Hartley, James M.
Brooklyn Center, Minn.
Macalester College
- Hass, Wayne F.
Minneapolis, Minn.
Univ. of Minn.
- Henrickson, Lynn A.
Guthrie, Minn.
Univ. of Minn.
- Hergott, Lawrence J.
LeSueur, Minn.
St. John's Univ.
- Hill, Patty Lee
St. Paul, Minn.
St. Olaf College
- Hofteig, John H.
Mound, Minn.
Augsburg College
- Hoogwerf, Byron J.
Edgerton, Minn.
Calvin College
- Horn, Allen L.
Paynesville, Minn.
St. John's Univ.
- Hurwitz, Thomas D.
St. Paul, Minn.
Univ. of Minn.
- Iverson, Richard B.
St. Louis Park, Minn.
Univ. of Minn.
- Jagunich, Barbara J.
Iron, Minn.
Bemidji State
- Johnson, Donald E.
Edina, Minn.
College of St. Thomas
Univ. of Minn.
- Julsrud, Paul R.
Rushford, Minn.
St. Olaf College
- Kaufman, Stephen C.
Minneapolis, Minn.
Univ. of Minn.
- Keating, John J.
Minneapolis, Minn.
Univ. of Minn.
- Klugman, Joseph J.
St. Louis Park, Minn.
Univ. of Minn.
- Kluznik, John C.
Minneapolis, Minn.
Univ. of Minn.
- Knutsen, Bruce E.
Duluth, Minn.
UMD
- Koehntop, Douglas E.
Morris, Minn.
UMM
- Lacey, Keith F.
Chatfield, Minn.
Univ. of Minn.
- Lack, Ernest E.
Minneapolis, Minn.
Univ. of Pacific
Univ. of Minn.
- Landmark, James D.
Minneapolis, Minn.
Univ. of Minn.
- Larson, Gerald M.
Milaca, Minn.
Univ. of Minn.
- LaTendresse, Charles
Eveleth, Minn.
Eveleth Jr. College
UMD
- Leland, Robert W.
Bricelyn, Minn.
St. Olaf College

THE MEDICAL BULLETIN

- Leverone, Joseph P.
Minneapolis, Minn.
Univ. of Minn.
- Lilligren, James T.
Edina, Minn.
Univ. of Minn.
- Lind, Robert G.
Hamilton, Ohio
Gustavus Adolphus
- Liukonen, LoAnn
Braham, Minn.
Bethel College
- Luck, Tedford C.
Duluth, Minn.
UMD
- Lushine, Frank G.
Minneapolis, Minn.
Univ. of Minn.
- Lyon, Larry E.
Luverne, Minn.
Hamline Univ.
- MacDonald, Sanford D.
Marshall, Minn.
Univ. of Minn.
- Marking, George H.
Minneapolis, Minn.
Columbia College
- Matson, Barbara C.
Hancock, Minn.
Carleton College
- Matthew, Albert D.
Hopkins, Minn.
Univ. of Minn.
- McCabe, Steven T.
Minneapolis, Minn.
Univ. of Minn.
- McConahey, William M.
Rochester, Minn.
Harvard Univ.
- McEwen, Claudia A.
Duluth, Minn.
UMD
- McGrath, Joseph V.
St. Paul, Minn.
Marquette Univ.
- Metcalf, Michael D.
Princeton, Minn.
Macalester College
- Miller, George E.
Minneapolis, Minn.
Univ. of Minn.
- Moberg, Mark T.
Minneapolis, Minn.
Univ. of Minn.
- Moessner, Harold F.
Lincoln, Nebr.
Univ. of Nebr.
- Moore, Joseph P.
Minneapolis, Minn.
College of St. Thomas
- Myers, William P.
Rochester, Minn.
Rochester Jr. College
- Nelsen, Lawrence T.
Willmar, Minn.
St. Olaf College
- Nelson, Jeffrey W.
St. Paul, Minn.
Univ. of Minn.
- Nelson, Stephen J.
Minneapolis, Minn.
Univ. of Minn.
- Nerothin, Paul W.
Minneapolis, Minn.
Gustavus Adolphus
- Nousaine, Dennis
New York Mills, Minn.
Univ. of Minn.
- O'Dea, Robert F.
St. Paul, Minn.
St. Mary's College
- Olsen, Richard D.
Montevideo, Minn.
Pacific Lutheran
- Olson, David E.
Minneapolis, Minn.
Gustavus Adolphus
- Olson, David G.
West Concord, Minn.
Univ. of Minn.
- Ono, Alfred K.
Minneapolis, Minn.
Univ. of Minn.
- Ophoven, Thomas A.
Hopkins, Minn.
Univ. of Minn.
- Palmer, David H.
Blackduck, Minn.
Univ. of Minn.
- Parham, Janice J.
St. Paul, Minn.
Univ. of Minn.
- Patel, Vit U.
Zanzibar
Carleton College
Univ. of Minn.
- Patka, James B.
Virginia, Minn.
Univ. of Minn.
- Pearson, Harold V.
Darwin, Minn.
St. John's Univ.
- Petersen, Jerry R.
Minneapolis, Minn.
Augsburg College
- Peterson, Bruce A.
Warren, Minn.
N. Park College
Univ. of Minn.
- Peterson, Gregory J.
St. Paul, Minn.
Gustavus Adolphus
- Peterson, Lawrence P.
Minneapolis, Minn.
Univ. of Minn.
- Peterson, Robert A.
Hutchinson, Minn.
Hamline Univ.
- Phillips, Leona C.
Grand Rapids, Minn.
Univ. of Illinois
- Poljack, Stuart J.
Winona, Minn.
St. Mary's College
Univ. of Minn.
- Polta, Thomas A.
Grand Rapids, Minn.
St. John's Univ.
Itasca Jr. College
Univ. of Minn.
- Priedkalns, Juris
Australia
Univ. of Sydney
- Puffer, Steven G.
White Bear Lake, Minn.
Univ. of Minn.
- Rasmussen, Richard W.
Minneapolis, Minn.
Univ. of Minn.
- Rocheleau, Rainer G.
Duluth, Minn.
Univ. of Minn.
- Rom, William N.
Ely, Minn.
Univ. of Colorado
- Rose, Richard M.
St. Paul, Minn.
Univ. of Minn.
- Rossini, James D.
St. Paul, Minn.
St. John's Univ.
- Rupp, Henry J.
Caledonia, Minn.
Univ. of Minn.
- Scanlan, Timothy M.
St. Paul, Minn.
St. John's Univ.
- Schiller, Philip J.
Wadena, Minn.
Univ. of Minn.
- Schubert, Robert C.
St. Paul, Minn.
St. John's Univ.
- Schwab, Jeffrey P.
Edina, Minn.
College of St. Thomas
- Scobie, Sandra J.
Rochester, Minn.
Univ. of Minn.
- Serpos, Alan D.
Rochester, Minn.
Univ. of Minn.
- Sivertson, Alan R.
Dalton, Minn.
Moorhead Jr. College
Univ. of Minn.
- Smith, James C.
St. Paul, Minn.
Univ. of Minn.
- Smith, Richard V.
Willmar, Minn.
Univ. of Minn.

THE MEDICAL BULLETIN

- Soderflund, Joseph F.**
Minneapolis, Minn.
Univ. of Minn.
- Stanley, William F.**
Minneapolis, Minn.
Univ. of Minn.
- Stegeman, Charles A.**
Austin, Minn.
Austin Jr. College
Univ. of Minn.
- Stein, Neil A.**
St. Paul, Minn.
Univ. of Minn.
- Strandness, Martin J.**
Fargo, N. Dak.
Gustavus Adolphus
- Sweet, Richard M.**
Minneapolis, Minn.
Univ. of Minn.
- Thiel, Robert A.**
Minneapolis, Minn.
Carleton College
- Thompson, Michael B. A.**
Moorhead, Minn.
Moorhead State
- Thorson, Steven J.**
Albert Lea, Minn.
Univ. of Minn.
- Tilsner, Thomas J.**
St. Paul, Minn.
Univ. of Minn.
- Timming, Richard C.**
Minneapolis, Minn.
Univ. of Minn.
- Tripp, Michael R.**
Belgrade, Minn.
Univ. of Minn.
- Traux, Walter D.**
Maplewood, Minn.
Univ. of Minn.
- Varani, William B.**
Grand Rapids, Minn.
St. John's Univ.
- Warnken, Mark G.**
St. Cloud, Minn.
Univ. of Minn.
- Weber, Glenn A.**
Minneapolis, Minn.
Univ. of Minn.
- Wold, Philip A.**
Sioux City, Iowa
Augsburg College
- Wolff, John H.**
St. Paul, Minn.
Amherst College
- Wood, Ray W.**
Granada, Minn.
Univ. of Minn.
- Young, William W.**
Farmington, Minn.
Hamline Univ.
Univ. of Wis.



Cancer Research

Carcinogen Induced Tumors of the Thymus*

Osias Stutman, M.D.†

In recent years it has been demonstrated that the thymus plays an important role in the development of immune capacity in mammals. Removal of the thymus in the newborn period in a number of species, including mice, causes a defective development of the lymphoid tissues, an inability to respond immunologically to a variety of stimuli, and early death. These functions of the thymus are mediated at least partly by an inductive factor, probably humoral, that promotes development of the lymphoid cells and/or immunological competence.

It has been demonstrated that thymus grafts in neonatally thymectomized mice promote only host-type immunologically competent cells. Two other non-exclusive mechanisms in restoration involve a seeding in the periphery of thymus derived cells and a traffic of cells, probably of bone marrow origin, through the thymic parenchyma. Chemically-induced functional non-lymphoid thymic tumors in mice proved to be a useful experimental model to study thymic function. The functional capacity of some of the induced thymomas was indicated by its effect when grafted into neonatally thymectomized mice. Tumor grafts prevented early mortality, induced immunological restoration (measured as homograft immunity and graft-vs.-host capacity) and produced variable degrees of lymphoid recuperation. Chimera analysis of the tumor grafted animals in the allogeneic combinations indicated that all the immunocompetent cells in the spleens of the restored animals were of host origin. This indicates that the tumor has a true inductive capacity and that lymphoid contamination of the thymoma graft had no role in the recuperation. In the allogeneic combination the animals eventually rejected the thymoma after temporary growth.



Osias Stutman

*From a report to the Staff Meeting of University Hospitals on Nov. 24, 1967.
†Medical Fellow Specialist, Department of Laboratory Medicine, University of Minnesota; Recipient, 1967 C. J. Watson Research Award of the Minneapolis Society of Internal Medicine.

From these experiments it is suggested that the "thymic function" of the thymoma may have a critical period of time for induction of restoration. From our experiments this period seems to be of 20 days or less. In the absence of "thymic function" this competence is not permanent, since those animals, competent when tested at 150 days, showed a marked impairment of homograft rejection when grafted at 350 days of age. Immunological recovery usually occurred in absence of complete lymphoid recovery, indicating a dissociation between the competence inducing and the lymphopoietic components of the thymic function. A decrease in restoration effectivity was observed when the grafting of the tumor was delayed after neonatal thymectomy.

To study this in more detail, the synergistic effect of cells from different origin in association with the thymoma was studied in the delayed restorations. It was found that when the thymoma was associated with adult spleen, bone marrow and thymus or with newborn spleen, thymus and liver cells, high number of restorations were obtained. On the contrary, when the thymoma was associated with embryonic hemopoietic cells from the liver, even in high numbers, no restorations were observed. When the embryonic liver cells were associated with thymus grafts, reconstitution was observed. These results indicate that the thymoma may act only as an expander of a population of cells in the peripheral lymphoid tissues that received some thymic influence (probably through traffic) before thymectomy was performed. The fact that the normal thymus was capable of maturing the embryonic cells may indicate that the normal thymic stroma may act as a site of differentiation of "possible competent" cells. At the same time the thymic stroma may be able to produce expanding substances of the poietin type, capable of expanding the already committed stem cells in the peripheral lymphoid tissues.

It appears from the present experiments that some non-lymphoid thymomas with biological functions can be induced by direct application of carcinogens into the thymus of newborn mice and that their biological functions can be tested by their effect on neonatally thymectomized mice. The thymoma model proved very useful in the understanding of the thymic functions.

Orthopedics

Surgical Management of Vertebral Tuberculosis*

William J. Kane, M.D., Ph.D.,† R. William Neumann, M.D.‡
Paul G. Patterson, M.D.,§ and John H. Moe, M.D.¶

Vertebral tuberculosis is the most common of the skeletal sites of tuberculosis, although the introduction of specific antibiotics has led to a major reduction in the incidence of this disease. The older orthodox methods of treating vertebral tuberculosis have been subjected to continuing review; they have included recumbency, immobilization, and hospitalization in conjunction with constitutional therapy.



William Kane

The introduction of antituberculosis chemotherapy permitted a more direct surgical attack upon the spinal lesion. During the last two decades increasing attention has been directed to the evacuation of spinal abscesses with curettage of the lesion and anterior spinal fusion. In instances of Pott's paraplegia there has been a general acceptance of this direct approach to the disease focus. In tuberculous spondylitis without neurologic complication the surgical management has gained slower acceptance; it is the opinion of the authors that a direct anterior decompression of vertebral tuberculous abscesses in conjunction with an anterior interbody fusion is warranted. An abbreviated defense of this view follows.

No one will dispute the aims of the local treatment of skeletal tuberculosis. They are prevention of deformity, restoration of motion whenever feasible or, if not, ankylosis in stable position, removal of purulent tissue and prevention of secondary infection. There is reasonable agreement that a posterior spinal fusion, *per se*, does little or nothing for the abscess of tuberculo-

*From a report to the Staff Meeting of University Hospitals on December 8, 1967

†Assistant Professor, Division of Orthopedic Surgery

‡Medical Fellow, Division of Orthopedic Surgery

§Instructor, Division of Orthopedic Surgery

¶Professor and Head, Division of Orthopedic Surgery

sis spondylitis and that the abscess itself delays healing. Only by anterior removal of the caseous necrotic tissue and sequestra of the abscess is decompression adequate and further destruction arrested; only by anterior elimination of the abscess may the causes producing spinal cord pressure and neurologic deficits be removed and restitution of the vertebral column be attempted, usually achieving ankylosis. Obtaining fusion is believed to prevent kyphosis and paraplegia; abscess decompression and fusion are independently sought yet are technically interdependent and the anterior surgical approach achieves both goals. The indications for surgery are progressive bone destruction, slow or incomplete resolution of bone disease in spite of chemotherapy, or progressive neurologic symptoms. Since the development of paraplegia is attended by a major increase in mortality, it is essential to prevent this calamitous complication. The advantages of the direct surgical approach to tuberculous spondylitis are a shortened recovery period, a higher fusion rate, and a diminished overall mortality rate. Of course such a program requires excellent facilities, including modern surgical, nursing, and hospital refinements.

Most of the recent large series dealing with tuberculous spondylitis have been accumulated in developing countries or locations where crowding and poverty are endemic. Attending physicians and authors have conceded that the treatment regimens have been created out of a necessity to compromise with what they believe is ideal therapy. One series (Konstam and Blesonsky, 1962) from Africa was simply founded on the "need for a rational mass therapy on the cheapest and simplest lines" since a lack of hospital beds and operating time prevented other alternatives.

It is foolish to force demanding therapeutic regimens derived from sophisticated medical centers on an unprepared, underdeveloped medical population. We believe it equally foolish to limit the therapeutic opportunities available to patients in modern medical centers on the basis of information derived from large series of disadvantaged patients in underdeveloped regions. The risks of modern day surgery and anesthesia are well balanced by gains in decrease in morbidity, prevention of complications, and shortened hospital stay. It is our belief that further study will demonstrate the efficacy and desirability of anterior surgical intervention in vertebral spondylitis in those locations and circumstances conducive to diminished surgical risk.

Physiology

Hemodynamic and Biophysical Effects of Polybasic Polymers: Clinical Implications*

Aldo R. Castaneda, M.D., Ph.D.,†
Ward O. Griffen, Jr., M.D., Ph.D.,‡
Gary W. Lyons, M.D., Ph.D.,§
Eugene F. Bernstein, M.D., Ph.D.,¶
Henry Gans, M.D., Ph.D.,** K. C. Weber, B.S.E.E.,††
and I. J. Fox, M.D., Ph.D.‡‡

*P*olybasic polymers (electropositive) are commonly used clinically to neutralize heparin (electronegative) which is given to patients on cardio-pulmonary by-pass. Protamine sulfate, a basic protein, was recently joined as antiheparin agent by the synthetic polybasic polymer, hexadimethrine bromide (Polybrene, Abbott) (HdBr). Originally our purpose was to study the hemodynamic changes following rapid intravascular injections of these substances since the nearly complete absence of toxic effects of such injections reported in earlier studies was at variance with the well-known propensity of polybasic polymers to produce red blood cell (RBC) aggregation.



I. J. Fox

Hemodynamic changes following intravascular injections of HdBr

Approximately 5 sec following right ventricular (R.V.) injections of HdBr in dogs pretreated with heparin a marked rise in pulmonary artery (P.A.) pressure occurred simultaneously with a moderate brief fall in systemic arterial (S.A.) pressure

*From a report to the Staff Meeting of University of Minnesota Hospitals on January 5, 1968. A portion of this material is from the thesis submitted to the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the M.S. degree in Physiology by Drs. A. R. Castaneda and G. W. Lyons.

†Associate Professor, Department of Surgery, University of Minnesota

‡Chairman, Department of Surgery, University of Kentucky

§Instructor, Department of Surgery, University of Minnesota

¶Associate Professor, Department of Surgery, University of Minnesota

**Assistant Professor, Department of Surgery, University of Minnesota

††Trainee, Department of Physiology, University of Minnesota

‡‡Associate Professor, Department of Physiology, University of Minnesota

and in pulmonary flow (C.O.). P.A. and S.A. pressures rapidly returned to control levels whereupon a secondary much more marked fall in S.A. pressure and in C.O. occurred. That the initial fall in S.A. pressure and its associated rise in P.A. pressure was due to RBC aggregation and microembolization of small pulmonary vessels was evidenced by (1) the fact that when HdBr was injected into the left heart an initial rise in S.A. pressure appeared which was followed by the typical, marked secondary fall in S.A. pressure and (2) by data from the optical density studies discussed below. The marked and prolonged secondary fall in S.A. pressure following intravascular injections of HdBr was shown to be due to the release of endogenous histamine.

Following these studies, which differed in their results from earlier studies performed with this substance, HdBr was voluntarily withdrawn from clinical use by the manufacturer.

Changes in the Optical Density (O.D.) of Blood from addition of Polybasic Polymers

The size, shape, orientation and concentration of the red blood cells, by reflection and scattering of incident light, account for most of the O.D. of blood. Aggregation of red blood cells, by leaving "plasma spaces" between the clumped cells, would be expected to decrease the O.D. of blood and this is what was found. Injection of HdBr into the R.V. with sampling of the HdBr-blood mixture via densitometers (800 $m\mu$) simultaneously from the P.A., left atrium (L.A.) and femoral artery revealed a disproportionately large decrease in the O.D. of the blood sampled from the L.A. That this disproportionate decrease in the O.D. of blood sampled from the L.A. was due to temporary trapping of RBC clumps in the pulmonary microcirculation was corroborated by the finding of a marked transient decrease in the hemoglobin content of the blood sampled serially from the L.A.

It was concluded that study of the changes in the O.D. of blood provides a sensitive test for the detection of RBC aggregation *in vitro* and *in vivo*.

Effect of polybasic polymers on RBC charge

Using a modified Northrup-Kunitz microelectrophoresis apparatus, it was found that increasing the HdBr concentration reduced the negative charge of the red blood cells in both plasma and Ringer's-RBC suspensions. Because of a difference noted in RBC charge in plasma-as compared to that in Ringer's-RBC suspensions in the absence of HdBr, the effect of varying the concentration of the plasma proteins in the suspending

medium on RBC charge was studied. Reducing the concentration of the plasma proteins consistently decreased the negative charge of the red cells.

Clinically, RBC aggregation has generally been noted under conditions of extreme vasoconstriction, *e.g.* burns, heart-lung bypass, etc. Such vasoconstriction, because of the resultant drop in capillary hydrostatic pressure which leads to a flow of interstitial fluid into the capillaries, may be associated with a marked fall in the plasma protein concentration of the blood in the capillaries. Thus, the charge of the red cells may be decreased during vasoconstriction if our *in vitro* data are relevant to the *in vivo* situation. However, further study is necessary to corroborate this hypothesis and, especially, to determine what role changes in RBC charge play in the production of RBC aggregation *in vivo*.

The Omission of Heparin Neutralization Clinically

Because of the untoward effects of intravascular injections of HdB_r, heparin neutralization was omitted following open-heart operations in 204 consecutive patients at University of Minnesota Hospitals. Of this number, 123 patients were operated on for acquired heart disease and underwent a single or multiple prosthetic valve replacement. Before cannulation, heparin was administered intravenously in a dosage of 2 mg/kg in all patients.

Post-operative bleeding. Four patients in the entire series evidenced excessive post-operative bleeding. In two of these, in whom the Lee-White clotting times were over 40 and 60 min. respectively, neutralization with heparin became necessary whereas in the other two patients obvious bleeding sites were found on re-exploration. Thus the Lee-White clotting time may be used to distinguish patients in whom bleeding is due to improper hemostasis from those in whom it stems from an excess of circulating heparin requiring neutralization.

Thromboembolic complications. (1) *Early thromboembolism.* It is considered significant that none of the 123 patients with open-heart surgery for acquired heart disease and prosthetic valve replacement in whom heparin neutralization was omitted had any evidence of post-operative thromboembolism. (2) *Late thromboembolism.* In 52 of the original 63 patients in whom heparin was not neutralized and who have been followed for a period of from 13 to 26 months only one typical case (transient arm paresis) with one additional possible case of thromboembolism (transient cerebellar dysfunction) occurred. Of the remaining 11 patients, two were lost to follow-up, seven have died

from causes other than thromboembolism and two gave incomplete answers on their questionnaires but do not appear to have suffered from thromboembolism.

In view of the high reported incidence of thromboembolic complications following prosthetic valvar replacement, (for example, an incidence of 32% in a recent review from another medical center), the complete absence of early thromboembolic complications in our series and the relatively low incidence of late thromboembolic complications, two of 53 patients in whom heparin was not neutralized postoperatively, clearly seem significant.

Medical School News

Medical School Offers First Seminars In History of Medicine

Medicine may seem as modern as a heart transplant but doctors also owe a debt to the many researchers whose centuries of painstaking work laid the groundwork for the principles taken for granted today.

The College of Medical Sciences at the University of Minnesota recognized this debt and created a Division of the History of Medicine in July, 1967.

Dr. Leonard Wilson, professor of the history of medicine and the first chairman of the new division, will begin teaching two seminars winter quarter. The seminars, *Development of Modern Medicine* and *Older Medical Traditions*, are being offered to senior medical students.

Professor Wilson said Dr. Owen Wangenstein, professor and chairman emeritus of the department of surgery, was the prime mover in establishing the History of Medicine library section of the Bio-Medical library.

The history of medicine library, on the fifth floor of Diehl Hall, has some 8,000 volumes from the 16th through the 19th centuries. When the Bio-Medical library was started 43 years ago, a consistent effort was made to collect professional journals into the 19th century, Dr. Wilson explained.

"While medicine has undergone some profound changes in recent years, it is essentially a very old subject. Many of the

sciences were developed by medical men," Dr. Wilson pointed out.

He also cited two main reasons for studying medical history:

"It makes a physician or medical student critically aware of the sources and bases for his instruction, much of which



Prof. Leonard Wilson

has to be taught as catechism without examining the evidence on which the knowledge is based.

"It also helps the physician or medical student to develop a self awareness. An understanding of the traditions of his profession helps him realize where he is and makes him aware of the strengths and limitations of his knowledge."

A native of Canada, Dr. Wilson received his college education in that country and England. He received his Ph.D. in the history of science in 1958 at the University of Wisconsin. Afterward he taught at the University of California at Berkeley and at Cornell University before going to Yale University in 1960. In 1965 he was promoted to associate professor in the department of history of science and medicine. He joined the University of Minnesota faculty when the division he heads was formed last July.

RADIATION THERAPY

Dr. Giulio J. D'Angio, chief of the division, has announced his resignation effective June 30, 1968. He will leave Minnesota to become Director of Radiation Therapy at the Memorial Hospital of New York City, with concurrent appointments as professor of radiology at Cornell University and professor of biophysics at Cornell Graduate School. He has been on the Minnesota faculty since July 1, 1964.

RADIOLOGY

A fourth-year medical student, Dale N. Gerding of Belgrade, Minn., was named recipient of the *Becquerel Prize* in Radiology for 1967. The prize is given annual by the Department of Radiology for the outstanding research paper by a medical student.

PATHOLOGY

Dr. Jesse E. Edwards, clinical professor in the department and internationally known authority on cardiac pathology, is the new president of the American Heart Association. He has long been active in Heart Association circles, and was formerly on the staff of the Mayo Clinic. Dr. Edwards is full time director of laboratories at Charles T. Miller Hospital, St. Paul, Minn.

The University of Minnesota announced its operating costs for the year ending June 30, 1967 totaled \$164,094,235.93 for all campuses and all stations. Of this total, the State of Minnesota provided 31 percent. The balance was provided by federal appropriations, student tuition and fees, self-supporting auxiliary enterprises (such as the Minnesota Medical Foundation), trust funds, and intercollegiate athletic receipts.

During the year the University invested an additional \$21,607,235.95 in building construction, remodeling, and land purchases. On June 30, 1967 the University owned 17,644.78 acres of land and 885 buildings. Total value of the University's buildings, land, equipment, livestock, and book collections exceeds \$274,000,000.

University Hospitals News

Administrators Appointed

Two University of Minnesota Hospitals administrators assumed new staff positions effective Dec. 15, 1967.

Thomas Jones, assistant director and instructor in the College of Pharmacy, replaced McCollum Brasfield as administrative officer in charge of the Variety Club Heart Hospital.

Brasfield, an assistant administrator since July 1, 1965, will devote full-time duties to the Community-University Health Care Clinic, 2016 Sixteenth Ave. S., Minneapolis.

The clinic program is a five-year demonstration project of the Children's Bureau of the Public Health Service. A staff of 20 doctors, dentists, social workers and psychologists from the University are providing health evaluations and care for the children of Seward, Adams and Greeley elementary school districts in Minneapolis.

Brasfield will be the clinical administrator working under Dr. Edward Defoe, associate professor of pediatrics and director of the project.

Presently, resident physicians from the pediatrics department spend two months at the clinic as part of their residency. Other University students who are being trained in various fields of the health sciences also serve at the clinic.

Satellite Pharmacy System

A satellite pharmacy system is being established at University Hospitals, and the main outpatient pharmacy has been relocated on the second floor of the Mayo Memorial.

The first satellite pharmacy was established in Masonic Memorial Hospital. Hospital officials intend to decentralize the University Hospitals pharmacy system to create a more complete and efficient pharmacy service to the nursing stations. The Masonic unit will also serve as a research base from which new concepts and ideas will be tried for further satellite units—notably one planned for the Variety Club Heart Hospital.

The new outpatient pharmacy on Mayo's second floor will provide a faster, more convenient service for outpatients. It will also serve as a clinical instruction laboratory for senior pharmacy students at the University, and a research area for new pharmacy dispensing systems.

A central pharmacy will remain open in its present location on the first floor of the Mayo Memorial building.

“Hard Sounds, Bunkal Asma, and Billy Reuben”

What physician has not suffered the pains of the disease called “transcription trouble”?

This widespread, recurrent ailment can easily occur in a setting where the need for skilled communication is greatest—and where dictating machines and a secretarial pool are utilized—such as a referral hospital.

A classic case of transcription trouble occurred several years ago at University of Minnesota Hospitals. The exact transcription produced by the secretary was saved for medical posterity, no doubt, by a distraught faculty member, who, like his innocent transcriber, shall remain anonymous:

—W. A. S.

Dear Dr. H.:

Your patient, E. W. was admitted to the University Hospital on May 29 and left the hospital against advise on June 8.

In November he developed left paridic chest pains suddenly. This pain persisted intermittently and has gradually assumed an angelo rather than peridic character. On a remployment physical examination in April, the patient was refused re-employment because of uminuria and quickshuria. Your most recent examination revealed mild diabetes meladis, obesidy, hypocalcemia and high pertensions via cardio damage in alburmin uria. At the time he presented to us, his only incopoasitation resulted from a left foot drop. He ralated that this had been presnet intermittently for the last year and a half and was associated with numbness and clumsyness of the left hand.

Mr. W. was a markable dismarkik middle aged male who appeared considerably older than his stated age. There was a slight productvie cough and an audible weis. He was very obese. Palpeilfisa was considerably wider than the right. There was a proptosis of the left glow. Veins were not dispended. Hard sounds were distant with A2 louder than P2; no murmurs were heard. Testies were tiny and there was hypostadious and a small bean. Fosfate was small. His hands were tiny with disproportionately short fifth fingers. Beetle pulses were not palpable with the exception of the left post terrial fibrial. Irilogocal exam revealed a putdrop on left with total inability to move the toes of that foot. Just a few fifths of the entire side of the

body. Sensation was grossly intact with the exception of hypoaesthesia, pain and cotton touch over the ball of the foot planters curvice of the wider foot, toes on the left. There was a left side hyporaffexite and a consultant interrupted the left toe sign in his abnormal period.

Laboratory examination revealed a trace of albuminuria. Hemogram was essentially normal. Bun was normal. Total lipase was slightly elevated with the total cholesterol of 248 mgm %. Twenty-four hours secretion of 17 keto steroids was low. Bilirubin was 1.9. Final tap showed normal pressure and the protein was borderline elevated at 59. Calcium, phosphorus, and alkaline phosphatase were normal. Blood chemistry was normal. Chest X-ray was negative. Skeletal survey revealed High Prothrombin changes in the cervical vertebra from the mineralization of the Dawson cell in the skull but no evidence of erosion. EKG revealed SPT changes of left ventricular strain and orthostatic and an old myocardial infarction could not be excluded.

The patient was given amoxicillin tablets which improved his breathing and remained essentially asymptomatic while in the hospital with the exception of the motor difficulty due to his left foot. A physical medicine consultant felt a left short leg brace would be necessary, but this was postponed pending complete neurological evaluation.

The patient was transferred to the neurological service for possible new myelography and surrival angiography, but he signed out against advice before a definitive diagnosis could be established.

Our discharge impressions of the medical service were diabetes mellitus, essential vascular hypertension, chronic bronchitis, excretory obesity, hypoadrenalism, hypogonadism, and congenital dwarfism. A progressive and or measurable neurological reason has by no means been excluded.

Mr. W's diabetes will probably be controlled by diet alone. He could probably be well maintained on any of the various monophenyl fumarate fedrin mixtures for his parkinsonism.

Mr. W. presented several interesting problems. I am sorry through the circumstances outlined that we were able to help him significantly. If we can be of further service please do not hesitate to write or call on us.

Yours truly,

Minnesota Alumni Dinner Held in New York

Twenty-one Minnesotans gathered to renew a fellowship at a Minnesota medical alumni party at the University Club in New York City Oct. 27. The dinner was held in conjunction with annual convention of the Association of American Medical Colleges.

Dr. Harold S. Diehl, former dean of the Medical School, presided as "Dean" once again, and delighted guests with reminiscences of his 23 years in the Minnesota deanship. Now 77 years old, he will retire in 1968 from the American Cancer Society. His Minnesota successor, Dr. Robert B. Howard, spoke on current affairs at the Medical School, including the proposed expansion. Mr. Eivind Hoff, director of the Minnesota Medical Foundation, described the recent \$4,000,000 bequest given to the Foundation, and Dr. H. Mead Cavert, associate dean for Medical Student Affairs, reported on current enrollment and admissions policies.

Alumni of the Medical School residing in New York City were invited. It was the third such Minnesota party held at AAMC conventions, the previous events being in Denver (1965) and San Francisco (1966). The next will be in Baltimore, Md. in October, 1968.

Attending the New York City dinner were: Jason Aronson ('53); Darla Bjork ('65); Louis Hauser ('21); D. John Lauer ('37); Thomas Petrick ('41); Norton Ritz ('41); Paul C. Royce ('52); John D. Palmer ('62); Albuquerque, N. Mex.; Lewis A. Johnson ('55); Mitchell Rosenholtz ('56), Baltimore, Md., and Dr. Diehl ('18) and Mrs. Diehl. Medical School officials attending were Dr. Howard ('44); Dr. Cavert ('50); Dr. Robert O. Mulhausen, assistant dean; Dr. Robert McCollister, assistant dean, Mr. G. H. Gillman, fiscal officer; Mr. John H. Westerman, director, University Hospitals; David Preston, associate director; and Mrs. Diana Lilley, information services, and Mr. Hoff.



Medical Foundation News

Life Insurance Gift Plan to Begin

Life insurance and annuities have gained great popularity as modern instruments for charitable giving purposes. Colleges and universities agree that cash gifts and pledges to the Alumni Fund are usually insufficient for the institution's long range needs. As a result, attractive deferred giving programs employing sophisticated financial planning have sprung up around the country.

The Board of Trustees of the Minnesota Medical Foundation recently decided to initiate a deferred gift program of this kind at the University of Minnesota Medical School. The volunteer assistance of some of Minnesota's top life insurance people will be utilized.

Since most people considering a deferred gift to the Minnesota Medical Foundation will have an overriding desire to provide maximum security for their family first, the program will incorporate a no obligation information service on family financial planning, taxation, and charitable giving. Only those alumni and friends who desire such counseling will be contacted.

To introduce the concept of deferred giving to the Foundation, as well as family financial planning, an independent planning service—Variable Income Plans of Minneapolis, Inc.—has been authorized to work with the Foundation. V.I.P., Inc. is a group of experienced life insurance men representing several companies who will participate jointly. Most of the agents have achieved the C.L.U. designation (Chartered Life Underwriter), which denotes extensive training in estate planning, taxes, and life insurance.

Mr. Bradford D. Finch, C.L.U., is president of V.I.P., Inc., which is located at 5616 Olson Highway, Minneapolis, Minn. 55422. North American Life and Casualty Company of Minneapolis, Minn. will be the principal carrier. Details of the program are now being developed for implementation in 1968.

The Minnesota Medical Foundation already is owner of approximately \$50,000.00 worth of insurance policies on the lives of several alumni and friends. These policies have been donated to the Foundation spontaneously, for the most part.

The Foundation considers the adoption of a program of giving through life insurance to be a supplement to annual giving rather than a replacement. Life insurance bequests are created out of current income in the sense that the participant sets aside periodically and out of current earnings, on a tax deductible

basis, an amount for charitable or other community purposes in the organization in which he may be interested. The creation of bequests does not mean depletion of his existing capital. Instead, the benefaction is created out of earnings and an insured bequest enables every man to make a good and sizable gift.

Next month we will publish an article describing tax saving methods of giving through life insurance in connection with this new Minnesota Medical Foundation Program.

*Harold Van Every, C.L.U., Trustee,
Minnesota Medical Foundation*

Alumni Deaths

◆ 1903

Dr. John L. Shellman, Pacific Palisades, Calif. Died November 23, 1967. He was 90 years old and a member of Nu Sigma Nu fraternity. Dr. Shellman practiced EENT in St. Paul for many years with Dr. Elwyn Bray (Med. '06). He retired and moved to California in 1944. Among the survivors is a brother, Dr. Joseph F. Shellman of St. Paul, Minn.

◆ 1905

Dr. Oliver M. Porter, Atwater, Minn. Died September 7, 1967 in Minneapolis. He was 90 years old.

◆ 1913

Dr. Margaret Warwick, Buffalo, N.Y. Died September 19, 1967 of cancer. She was 80 years old and had served on the faculty of the University of Buffalo and University of Minnesota in pathology.

◆ 1924

Dr. Russell H. Frost, Edina, Minn. Died October 25, 1967 at the age of 67. He retired earlier this year due to ill health. He had been associated with the Veterans Administration Hospital in Fargo, N.D., and from 1950-59 was superintendent and medical director of the Glen Lake Sanatorium near Minneapolis.

◆ 1929

Dr. John G. Decker, Hasbrouck Heights, N.J. Died September 24, 1967 of a stroke. He was 65 years old.

◆ 1931

Dr. George C. Kelso, Pittsburg, Calif. Died December 24, 1967 of a heart attack. His widow resides at 163 Pueblo Drive in that city.

◆ 1938

Dr. Charles B. Will, International Falls, Minn. Died of a heart attack December 27, 1967. He was 56 years old. Dr. Will had practiced general medicine in International Falls since 1955, and was a partner of Dr. George Crow (Med. '57). Dr. Will was past president of the Range Medical Society and a nephew of Dr. William W. Will (Med. '05) of Bertha, Minn.

◆ 1940

Dr. Eugene B. Sorum, Eugene, Ore. Died October 1, 1967, age 52, of heart disease. He was a veteran of World War II and a staff physician at the University of Oregon Student Health Service.

MEMORIALS

The Minnesota Medical Foundation acknowledges with gratitude recent contributions made in memory of:

Mrs. Clara Arent	Dr. John D. Keyes
Susan Jane Adams	Emil F. Koski
John F. Benton	Mrs. Ethel MacDonald
Toni Beugen	Dr. Arthur F. Sether
Andrew Dahlstrom	Benjamin Shapiro
Ben K. Frost	Dr. A. L. Vadheim
Dr. Ernest M. Hammes, Sr.	George B. Vold
Dr. George C. Kelso	Dr. Charles B. Will
Marguerite L. Whaley	

Memorial gifts are a thoughtful means of honoring the memory of a relative, friend, or colleague. Gifts may be designated for specific purposes. The Minnesota Medical Foundation acknowledge all gifts to both donor and next of kin.

COMING EVENTS

University of Minnesota Medical School
CONTINUATION COURSES FOR PHYSICIANS

1968

Jan. 18 - 20	Otolaryngology
Jan. 25 - 27	Gynecology
Feb. 8 - 10	Psychiatry
Feb. 19 - 21	Internal Medicine
April 15 - 19	Proctology
April 20	Trauma
April 29 - May 1	Ophthalmology
May 23 - 25	Surgery
May 23 - 25	Anesthesiology

You and Your Will

Alumni and friends of the Medical School are urged to name the Minnesota Medical Foundation as a beneficiary in their will. The following form is suggested:

"I give to the Minnesota Medical Foundation the sum of _____ dollars, to be used in its work by direction of its Board of Trustees for the benefit of the University of Minnesota Medical School."

Funds may be bequeathed for specific purposes. For further information, contact the Executive Director, Minnesota Medical Foundation, 1342 Mayo Bldg., University of Minnesota, Minneapolis, Minn. 55455. Telephone: (A.C. 612) 373-8023.

Second Class Postage Paid
at Minneapolis, Minnesota



THE FRESHMEN STUDY NEUROANATOMY