

MEDICAL BULLETIN

UNIVERSITY OF *Minnesota*



in this issue

- COMMENCEMENT—1968
- VESICAL DYSFUNCTION
- BIOSYNTHESIS OF INSULIN
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VOLUME XXXIX, NUMBER 10

JUNE 1968

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

Circulation this issue: 5,900

44 Pages

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June 1968

NUMBER 10

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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.



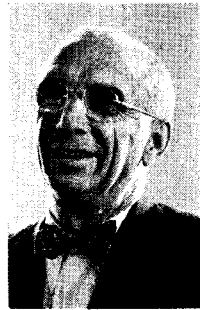
Commencement



The Class of 1968

One hundred fifty two new physicians received MD degrees in Commencement Exercises at the University of Minnesota Medical School on June 7-8, 1968. The 142 men and women of the Class of 1968 represent the second largest Medical School graduating Class in history. They were among approximately 4,000 students who received University degrees this Spring. There are now an estimated 5,425 living graduates of the Medical School.

Graduation week activities peaked June 7 at the Senior Recognition Day Program, held this year for the first time in Northrop Memorial Auditorium, the event having out-grown the capacity of Mayo Auditorium. Nearly 1,200 guests attended, and heard the main address, "*Opportunity Unlimited*," given by former **Dean Harold S. Diehl**. Dr. Diehl (Med. '18) was speaking on the occasion of his 50th anniversary since graduation, as well as his 10th anniversary since retiring as Dean of the Medical School.



Harold S. Diehl

Dr. Robert B. Howard, Dean of the College of Medical Sciences, presided, and **Dr. H. Mead Cavert**, Associate Dean for Medical Student Affairs, presented the Class of 1968. **Lowell R. Quenemoen**, Class President, responded for the Class, and the *Declaration of Geneva* was administered by **Dr. Reynold A. Jensen**, professor and retiring director of the Division of Child Psychiatry.

Dr. William H. Knobloch, Department of Ophthalmology, and **Dr. Donald W. Robertson**, Department of Anatomy, were honored as recipients of the 1968 *Distinguished Teaching Awards* of the Minnesota Medical Foundation. These coveted awards were presented by Dr. O. L. Norman Nelson (Med. '31), president of the Minnesota State Medical Association, which provides the cash prize of \$1,000.00 accompanying



Donald W. Robertson



William H. Knobloch

each award. Knobloch and Robertson were the 11th and 12th faculty members to receive the awards, which are given on the basis of a poll of the Medical School student body, in recognition of superior teaching accomplishment.

Student honors were accorded the following:

American Medical Women's Association *Award of Achievement*
Margaret E. Wright Rick

Southern Minnesota Medical Association
Award for Proficiency in Medicine and Surgery
Dale N. Gerding

Borden Award for *Research Achievement during Student Years*
David G. Levitt

Rollin E. Cutts Memorial *Award for Surgical Research*
James D. McLeod

Upjohn Award for *Outstanding Services and Leadership*
Michael J. Rietbrock

Minnesota Dermatological Society
Award for Meritorious Research in Dermatology
Thomas W. Holm

Mediclinics Scholarships
to Juniors for scholastic and professional achievement
Roger L. Gebhard and Richard S. Burns

Alpha Omega Alpha *National Honor Medical Society*
John Bergman
Robert M. Bruce
John W. Copenhaver, Jr.
Joel T. Deweese
Rodney R. Dick
Allan R. Frost
David E. Gambill
Dale N. Gerding
Richard S. Gregory
Allan L. Goldman
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W. Vincent Perrelli	Thomas C. White
Robert R. Reick	John F. Zurek
Margaret E. Wright Rick	

Cyrus P. Barnum, Jr. Society
for combined Medical and Graduate Study

Ronald E. Blackmore	Neil P. Rosenthal
David G. Levitt	Bernard E. Statland
Chun K. Loh	

James E. Moore Society
for special interest in medical and surgical research

Ronald E. Blackmore	Richard E. Latchaw
Kenneth R. Carter	Lowell R. Quenemoen
John W. Copenhaver, Jr.	Robert R. Reick
John D. Gambill	Michael J. Rietbrock
Dale N. Gerding	Thomas E. Sedlock
Richard S. Gregory	Bernard E. Statland
William H. Hollinshead	Thomas C. White
Robert I. Hustrulid	

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Medical Student Adytum Cabinet

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Richard E. Latchaw	John F. Schwalbach

At the Recognition Day program, it was announced that Dr. J. Arthur Myers (Med. '19), emeritus professor of public health, has made a gift to the Minnesota Medical Foundation which will provide a copy of the forthcoming book, "*Masters of Medicine: An Historical Sketch of the College of Medical Sciences, University of Minnesota, 1888-1966.*" for each member of the Class of 1968.

INTERNSHIPS

Thirty four percent of the Class will take internships in

Minnesota hospitals. Thirty two percent chose California assignments. Collectively, 75% of the Class selected rotating-type internships, and 25% chose straight specialty internships. Sixty three percent are interning at major teaching hospitals. Sixty three percent, also, were matched to their first choice of hospital under the 1968 National Intern Matching Program.

GRADUATION WEEK

Graduation week activities for the Seniors included a 18-hole Golf Tournament won by Bob Hustrulid, former Minnesota varsity golfer, with a low gross 71. Jack Barker shot a net 53 and John Gambill an actual 150 to carry other prizes off the University Golf Course.

Mike Rietbrock and Dr. John Branthaver swept aside 50 competing players to win the Doubles Tennis Tournament. Gary Falk won the Bridge Tournament, with John Zurek taking booby prize.

Over 100 seniors and their families enjoyed the Senior Class Picnic at Como Park with its endless softball game, and about 50 celebrated at the Senior Class Dinner Dance one evening with music provided by the "Neon Circus."

CLASS FUND

For the third straight year, the Senior Class in Medicine has established a Class Fund with the Minnesota Medical Foundation. Michael Rietbrock and J. Milo Meland organized a committee of 14 seniors who obtained pledges from about 55% of the seniors prior to Graduation. The campaign is continuing.

The *Class of '68 Fund* consists of \$15.00 annual gifts for the first five years after graduation, to be followed by a re-pledge campaign. The Fund will exist for 25 years, and will eventually be turned over to the Medical School for a purpose designated by the Class of 1968.

Margaret E. Wright Rick was appointed chairman of the *Class of '68 Fund* with Michael Rietbrock as vice chairman. Other members of the Class Fund Committee are J. Milo Meland, David Knowles, Roger Mattison, Bjorn Monson, Terry Schulte, Dale Dobrin, James Gavisier, Bob Hustrulid, James Nathe, Paul Ossman, Lowell Quenemoen, and William Stewart.

Thirty seven members of the Class of 1968 were assisted during Medical School by the Scholarship Fund of the Minnesota Medical Foundation. Dozens more were aided by loans from the Foundation.



A. S. Alderman



Michael T. Anderson



Richard H. Angell



Howard J. Ansel



Barbara R. Arnold



James E. Balow



John D. Barker Jr.



James G. Baron



John H. Berg Jr.



John Bergman



Curtis J. Black



Ronald E. Blackmore



Paul M. Blum



John R. Bonde



David R. Brown



Robert M. Bruce

- Alderman, Aleksandra S.**
Minneapolis
University of Minnesota
Intern: Long Island College
Hosp.
New York, N.Y.
- Anderson, Michael Thomas**
Le Sueur
University of Minnesota
Intern: Veterans
Administration Hosp.
Minneapolis
- Angell, Richard Henry**
St. Paul
Carleton College
Intern: Highland General
County Hosp.
Oakland, Calif.
- Ansel, Howard Justin**
St. Louis Park
University of Minnesota
Intern: Hennepin County
General Hosp.
Minneapolis
- Arnold, Barbara Ruth**
Pengilly
University of Minnesota
Intern: Univ. of Utah Hosp.
Salt Lake City, Utah
- Balow, James Edward**
Red Wing
College of St. Thomas
Intern: W. Va. Univ. Hosp.
Morgantown, W. Va.
- Barker, John Dennis, Jr.**
Duluth
Hamline University
Intern: St. Mary's Hosp.
Duluth
- Baron, James Gregory**
Minneapolis
University of Minnesota
Intern: San Joaquin General
Hosp.
Stockton, Calif.
- Berg, John Howard, Jr.**
Minneapolis
University of Minnesota
Intern: Bethesda Lutheran
Hosp.
St. Paul
- Bergman, John***
St. Paul
University of Minnesota
Intern: Fresno General Hosp.
Fresno, Calif.
- Black, Curtis Jan**
Deephaven
Carleton College
Intern: St. Paul-Ramsey Hosp.
St. Paul
- Blackmore, Ronald Ernest**
Biwabik
University of Minnesota
Intern: U. of M. Hospitals
Minneapolis
- Blum, Paul Mitchell**
St. Louis Park
Dartmouth
Intern: U. of M. Hospitals
Minneapolis
- Bonde, John Richard**
St. Paul
University of Minnesota
Intern: Long Island College
Hosp.
New York, N.Y.
- Brown, David Raoul***
Edina
University of Minnesota
Intern: Univ. of Michigan
Affiliated Hosp.
Ann Arbor, Mich.
- Bruce, Robert Michael***
St. Louis, Mo.
Washington University
Intern: Barnes Hospital
St. Louis, Mo.

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Robert M. Bunes



Fredrick A. Burris



Thomas P. Cairns



Ronald G. Campbell



Bruce E. Carlson



Kenneth R. Carter



John C. Colla



J. W. Copenhaver Jr.



Kent B. Crossley



Richard C. Cutshall



Mark V. Dahl



Joel T. Deweese



Rodney R. Dick



Dale T. Dobrin



John N. Dunne



Carlton R. Erickson

- Bunes, Robert Morris**
Minneapolis
University of Minnesota
Intern: Highland General
County Hosp.
Oakland, Calif.
- Burris, Fredrick Anthony**
Aitkin
Macalester College
Intern: U.S. Public Health
Service
Staten Island, N.Y.
- Cairns, Thomas Patterson***
Bemidji
University of Minnesota
Intern: Methodist Hospital
of Indiana
Indianapolis, Ind.
- Campbell, Ronald Gene**
Great Falls, Mont.
Montana State College
Intern: St. Paul-Ramsey Hosp.
St. Paul
- Carlson, Bruce Edward**
Minneapolis
Carleton College
Intern: Iowa Methodist Hosp.
Des Moines, Iowa
- Carter, Kenneth Robert***
Ada
University of Minnesota
Intern: St. Mary's Hosp.
Duluth
- Colla, John Charles**
West Allis, Wis.
University of Wisconsin
Intern: Barnes Hosp.
St. Louis, Mo.
- Copenhaver, John William, Jr.**
St. Paul
Carleton College
Intern: Northwestern Hosp.
Minneapolis
- Crossley, Kent Bertram**
Faribault
Carleton College
Intern: U. of M. Hospitals
Minneapolis
- Cutshall, Richard Charles**
Rochester
University of Minnesota
Intern: Weld County General
Hosp.
Greeley, Colo.
- Dahl, Mark Victor**
Minneapolis
Wesleyan University
Intern: Univ. of Oregon
Medical Hosp.
Portland, Oregon
- Deweese, Joel Towne**
Bemidji
Dartmouth College
Intern: Weld County General
Hosp.
Greeley, Colo.
- Dick, Rodney Ray**
St. Peter
Goshen College
Intern: Strong Memorial
Hosp.
Rochester, N.Y.
- Dobrin, Dale Thomas**
Minneapolis
University of Minnesota
Intern: Hennepin County
General Hosp.
Minneapolis
- Dunne, John Nicholas**
Minneapolis
College of St. Thomas
Intern: Veterans
Administration Hosp.
Minneapolis
- Erickson, Carlton Russell***
Willmar
University of Minnesota
Intern: Bethesda Lutheran
Hosp.
St. Paul

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Ronald D. Evans



Gary L. Falk



Michael C. Flanagan



Theodore L. Fritsche



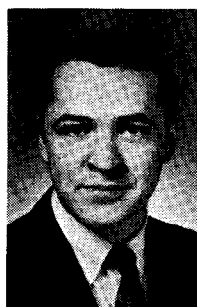
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David E. Gambill



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James B. Gavisier



Kendall A. Gerdes



Dale N. Gerding



Allan L. Goldman



John E. Graham III



Richard S. Gregory



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Minneapolis
Macalester
Intern: Providence Hosp.
Portland, Ore.
- Falk, Gary Lee**
Minneapolis
University of Minnesota
Intern: Hennepin County
General Hospital
Minneapolis
- Flanagan, Michael Cyril**
Minneapolis
University of Minnesota
Intern: U.S. Naval Hosp.
St. Albans, N.Y.
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New Ulm
University of Minnesota
Intern: Porter Memorial Hosp.
Denver, Colo.
- Frost, Allan Roger***
Grand Marais
Willamette University
Intern: Univ. of Oregon
Medical Hosp.
Portland, Ore.
- Gambill, David Earl**
Rochester
St. Olaf College
Intern: Highland General
County Hosp.
Oakland, Calif.
- Gambill, John Douglas**
Rochester
Northwestern University
Intern: U.S. Public Health
Service
San Francisco, Calif.
- Gaskin, Fred Wayne**
Eyota
Hamline University
Intern: Riverside County
General Hosp.
Riverside, Calif.
- Gasway, Robert Michael**
Minneapolis
University of Minnesota
Intern: St. Paul-Ramsey Hosp.
St. Paul
- Gaviser, James Barry**
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Intern: W. Va. University
Hosp.
Morgantown, W. Va.
- Gerdes, Kendall Alan**
Waseca
Dartmouth College
Intern: Fresno General Hosp.
Fresno, Calif.
- Gerding, Dale Nicholas***
Belgrade
St. John's University
Intern: Peter Bent Brigham
Hosp.
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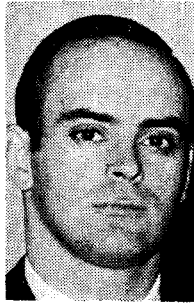
W. H. Hollinshead



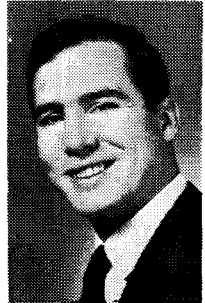
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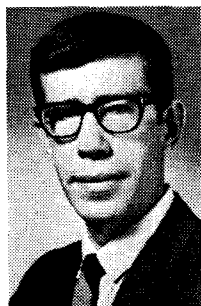
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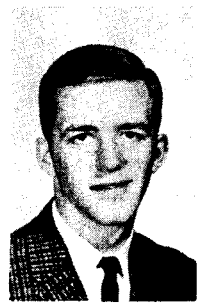
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Cleveland, Ohio
- McLeod, James Douglas**
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- McPartlin, Thomas Hugh**
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Santa Barbara, Calif.
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Canby
Luther College
Intern: W. Va. Univ. Hosp.
Morgantown, W. Va.
- Myers, Gary Harris**
Minneapolis
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Intern: Veterans
Administration Hosp.
Los Angeles, Calif.
- Nacht, Larry Elliott***
Minneapolis
University of Minnesota
Intern: Hennepin County
General Hosp.
Minneapolis
- Nathe, James Edward**
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Intern: Medical College of
Virginia Hosp.
Richmond, Va.

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General Hosp.
Orange, Calif.

Niedringhaus, Robert Dale*
Mobridge, So. Dak.
Luther College
Intern: W. Va. Univ. Hosp.
Morgantown, W. Va.

Noran, William Harold
Edina
University of Minnesota
Intern: Los Angeles County
General Hosp.
Los Angeles, Calif.

Oeljen, Carl George
Waseca
University of Minnesota
Intern: Univ. of Utah Hosp.
Salt Lake City, Utah

Olson, Robert Carl Martin
Minneapolis
University of Minnesota
Intern: Highland General
County Hosp.
Oakland, Calif.

Ossmann, Paul Malcolm
St. Paul
St. John's University
Intern: St. Paul-Ramsey Hosp.
St. Paul

Ostlund, Warren Francis, Jr.
Minneapolis
University of Minnesota
Intern: Los Angeles County
General Hosp.
Los Angeles, Calif.

Perrelli, W. Vincent*
St. Paul
College of St. Thomas
Intern: Yale New Haven
Medical Center
New Haven, Conn.

Pietan, Jerald Henry
Wells
Hamline University
Intern: St. Mary's Hosp.
Duluth

Pike, John Kent, Jr.
Minneapolis
Northwestern University
Intern: Highland General
County Hosp.
Oakland, Calif.

Poggi, Raymond Gene
Minneapolis
University of Minnesota
Intern: Providence Hosp.
Portland, Ore.

Pope, David Arthur
Janesville
Mankato State College
Intern: St. Mary's Hosp.
Duluth

Quenemoen, Lowell Russell*
Clarkfield
Carleton College
Intern: Univ. of Michigan
Affiliated Hosp.
Ann Arbor, Mich.

Reese, Jerry Thomas*
Marshall
University of Minnesota
Intern: Los Angeles County
General Hosp.

Reick, Robert Raymond
Minneapolis
Carleton College
Intern: Harbor General Hosp.
Torrance, Calif.

Remington, Charles Lewis, Jr.
Billings, Mont.
University of Minnesota
Intern: U.S. Public Health
Service
New Orleans, La.

* Scholarship Awardee, Minnesota Medical Foundation



Margaret E. W. Rick



Michael J. Rietbrock



Neil P. Rosenthal



S. Richard Roskos



Lorraine J. Rubis



Jerald C. Sadoff



Russell A. Sather



Stephen E. Schmitz



Terrence A. Schulte



John F. Schwalbach



Thomas E. Sedlock



John A. Seibel



David T. Sidney



Joel B. Sigdestad Jr.



Ronald D. Soltis



David L. Sorley

Rick, Margaret Ellen Wright
 St. Paul
 Macalester College
 Intern: U. of M. Hospitals
 Minneapolis

Rietbrock, Michael John
 Oconomowoc, Wis.
 University of Wisconsin
 Intern: W. Va. Univ. Hosp.
 Morgantown, W. Va.

Rosenthal, Neil Paul
 St. Paul
 Calif. Institute of Technology

Roskos, Stephen Richard
 Minneapolis
 Yale University
 Intern: Lenox Hill Hosp.
 New York, N.Y.

Rubis, Lorraine Joyce
 Minneapolis
 University of Minnesota
 Intern: Cleveland
 Metropolitan Hosp.
 Cleveland, Ohio

Sadoff, Jerald Charles
 Minneapolis
 University of Minnesota
 Intern: Veterans
 Administration Hosp.
 Minneapolis

Sather, Russell Alan
 Crookston
 University of Minnesota
 Intern: Parkland Memorial
 Hosp.
 Dallas, Tex.

Schmitz, Stephen Earl*
 Hutchinson
 University of Minnesota
 Intern: Los Angeles County
 General Hosp.
 Los Angeles, Calif.

Schulte, Terrence Anthony*
 St. Paul
 St. John's University
 Intern: Los Angeles County
 General Hosp.
 Los Angeles, Calif.

Schwalbach, John Francis*
 Windom
 Creighton University
 Intern: Fresno General Hosp.
 Fresno, Calif.

Sedlock, Thomas Elden
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 University of Minnesota
 Intern: Lenox Hill Hosp.
 New York, N.Y.

Seibel, John Arthur
 Minneapolis
 Marquette University
 Intern: Riverside County
 General Hosp.
 Riverside, Calif.

Sidney, David Theodore*
 Minneapolis
 Augsburg College
 Intern: Santa Clara Medical
 Center
 San Jose, Calif.

Sigdestad, Joel Bernhard, Jr.*
 Moorhead
 Concordia College
 Intern: Parkland Memorial
 Hosp.
 Dallas, Tex.

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 Intern: U. of M. Hospitals
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Sorley, David Luverne
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Bernard E. Statland



David A. Stead



Eugene P. Stecz



Diane C. Stein



William B. Stewart



William L. Streitz



Arnulf L. Svendsen



Jon M. Talsness



William M. Uggen



Allen L. Van Beek



C. Edward Vaurio Jr.



Janice T. Vollmer



Lee R. Wales



David L. Wallace



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Justin L. Wass

Statland, Bernard Eugene

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University of Wisconsin
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New York, N.Y.

Stecz, Eugene Philip

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University of Notre Dame
Intern: Los Angeles County
General Hosp.
Los Angeles, Calif.

Stein, Diane Carravetta

Riverdale, N.Y.
Columbia University
Intern: Beth Israel Hosp.
New York, N.Y.

Stewart, William Bennett

Minneapolis
University of Minnesota
Intern: Univ. of Colorado
Medical Center
Denver, Colo.

Streitz, William Leonard

Waseca
University of Minnesota
Intern: Orange County
General Hosp.
Orange, Calif.

Svendsen, Arnulf Lohren

Minneapolis
University of Minnesota
Intern: St. Paul-Ramsey Hosp.
St. Paul

Talsness, Jon Melvin

International Falls
University of Minnesota
Intern: Orange County
General Hosp.
Orange, Calif.

Uggen, William Martin

Wells
University of Minnesota
Intern: St. Mary's Hosp.
Duluth

Van Beek, Allen Lester

Westfield, No. Dak.
North Dakota State University
Intern: U.S. Army Brooke
General Hosp.
San Antonio, Tex.

Vaurio, C. Edward, Jr.

Minneapolis
Hamline University
Intern: Hennepin County
General Hosp.
Minneapolis

Vollmer, Janice Turner

Minneapolis
Colby College
Intern: Veterans
Administration Hosp.
Minneapolis

Wales, Lee Robert*

St. Paul
University of Minnesota
Intern: Univ. of California
Affiliated Hosp.
Los Angeles, Calif.

Wallace, David Lloyd*

Minneapolis
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Intern: Fresno General Hosp.
Fresno, Calif.

Walta, Douglas Craig*

Brookings, So. Dak.
St. John's University
Intern: W. Va. Univ. Hosp.
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Wass, Justin Leo*

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Michael D. Weiner



Thomas M. Werges



Paul R. Wernick



Thomas C. White



James J. Wiberg



Robert B. Wright



Gary E. Wyard



John F. Zurek



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St. Paul
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Werges, Thomas Michael
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Wernick, Paul Rodney
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San Francisco, Calif.

White, Thomas Clement*
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Intern: Strong Memorial
Hosp.
Rochester, N.Y.

Wiberg, James John*
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St. John's University
Intern: Veterans
Administration Hosp.
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Wright, Robert Busse
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Northwestern University
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Hosp.
Sacramento, Calif.

Wyard, Gary Edwin
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* Scholarship Awardee, Minnesota Medical Foundation

Neurologic Vesical Dysfunction*

Colin Markland, M.D.,† Shelley Chou, M.D.,‡
Hugh D. Westgate, M.D.,§ Kenneth F. Swainan, M.D.,¶
and William Bradley, M.D.††

In the last five years renewed interest in electronic and pharmacological vesical stimulation together with more sophisticated methods for urinary diversion have shown the need to improve diagnosis and measurement of the bladder's neuromuscular function. Past diagnostic methods have been imprecise and often unable to define the exact site of the neural or muscular lesion interfering with normal voiding.

Being unable to define the exact site of the disease urologists have focused their diagnostic acumen towards anatomical outlet obstruction, a problem easily rectified. However, true obstruction has often been mythical, for most patients with neurologic dysfunction do not have objective signs of anatomical outlet narrowing. To this end, partial cystectomy, transurethral resection of the bladder outlet and neurectomy have been popular operations hopefully to aid micturition, though often with little hope of success, for most neurologic bladders are devoid of contractility. When contractility is completely lost the bladder acts only as a "septic tank" until pyelonephritis leads to eventual loss of renal function. Any operation to improve urinary drainage requires previous accurate measurement of the permanent lesion causing neural or muscular dysfunction.

Treatment for neurologic dysfunction, whatever the causation or whatever therapy is contemplated, must relate to the degree of accurately diagnosed residual vesical function. If such measurements then show that neural or muscular function is irredeemably lost, there is then a rational basis for definitive treatment. Treatment may include some type of urinary diver-

* From a report to the Staff Meeting of University of Minnesota Hospitals on June 14, 1968, presented by the Divisions of Urology, Neurosurgery, Neurology, and the Departments of Pediatrics and Anesthesiology.

† Associate Professor and Acting Head, Division of Urology

‡ Associate Professor of Neurosurgery

§ Associate Professor of Anesthesiology

¶ Associate Professor of Pediatrics

†† Associate Professor of Neurology

sion or possibly, depending on current research, artificial muscle stimulation. In recent years the ileac conduit has been the preferred diversion for speeding the transmission of urine from the kidney to an abdominal collecting device. This operation favors sterile urine and preserves renal function.

At the University of Minnesota Hospitals we base the investigation and treatment of neurological vesical dysfunction on direct measurements of three critical functional systems. These are studied when assessing a patient to show the type and degree of the disability. The three systems measured are:

1. *Central neural control (testing the micturition reflex).*
2. *Peripheral neural control (testing pre and post-ganglionic neural excitability and the neuromuscular junction).*
3. *Detrusor muscle function. (Testing detrusor contractility.)*

Current clinical evaluation depends on these direct measurements; the basis for several tests being known, some however being new in concept.

TESTS OF CENTRAL NEURAL CONTROL

Micturition is a complex neural reflex action involving the coordinative functioning of supra and infraspinal neural pathways. This involves besides the spinal cord, the sensory and motor cortex, the limbic system, several midbrain centers, and the cerebellum.

Information on the functioning of these areas can be best obtained from a slow fill water cystometrogram. With this simple test a continuous recording of bladder pressure is obtained while the bladder is slowly filled at the rate of 4 ml./min. with warm water. Such a record shows the nature of the reflex, its threshold, volitional control, temporal duration of the reflex and voiding efficiency. The afferent side of the micturition reflex arc is shown by the patient's first desire to void.

Cystometrograms should be interpreted with great caution, preferably using such terms as a "shift to the left or shift to the right." This avoids misinterpretation due to changes in the tonus or the elastic component of the detrusor muscle. Any type of vesical pressure recording is liable to be easily affected by infection, overstretch, cold and drugs. We feel it wise to avoid such terms as lower, upper motor neuron, spastic, atonic automatic, autonomous, hypo and hyperreflexic, areflexic and son on, for these terms are often meaningless when related to the autonomic nervous system and the detrusor muscle. So often similar terms or "classifications" are based on cystometric findings and reflect signs of acute cystitis rather than the specific underlying neural or muscular lesion.

Rapid fill air cystometry

Currently we are performing cystometry by rapid filling of the bladder with room air. The pressure is recorded in a similar fashion as with the water cystometry, the air being pumped in quite rapidly, to evoke the reflex and sensation within four to five minutes. The low coefficient of friction and air's compressability make this test attractive as a rapid practical evaluation for bladder function. If a micturition reflex, usually with 500-600 mls. bladder filling is shown in the awake patient, this is the most sensitive index of an intact neural pathway.

PERIPHERAL NEURAL FUNCTION

This is tested by measurements of the pre and post-ganglionic efferent parasympathetic axon and the neuromuscular junction. Neural excitability is thus directly measured and related to other neurological lesions.

Sacral root stimulation

This is a direct stimulatory test of the S-2, S-3, S-4 efferent nerve roots after a subarachnoid spinal anesthetic, or under the influence of Flaxedil to paralyze striated muscle. This is a practical clinical test, depending on insertion of small needle electrodes by the anesthesiologist (H.W.) into the sacral foramina to allow direct stimulation of the efferent nerves to the bladder. This gives information on the function and integrity of the pre and post-ganglionic sacral neural input. This test has been valuable for when each electrode is on the appropriate root its position is confirmed by a pulsed stimulation producing the appropriate somatic response. The stimulus is then changed to a tetanizing current and changes in bladder pressure recorded. This test is now being used in a variety of neurologic conditions, and has been valuable when a positive result is elicited. A negative response is interpreted with caution.

Transvesical stimulation

This is a direct stimulation test for pain and afferent neural function. The superficial and deep layers of the bladder are directly stimulated using transurethral fish hook electrodes passed through a panendoscope. Responses to touch and pain, and testing the pain response to direct stimulation are noted. This may be of value when considering later implantation of an artificial bladder stimulator.

Denervation supersensitivity testing

Supersensitivity to the action of Urecholine following rapid stretching of the bladder, indicates postganglionic denervation (Lapides). This test confirms postganglionic denervation. In-

fection, muscle loss and collagen replacement may affect the test and make it difficult to interpret.

Microelectrode measurements of neural excitability

Current conceptualization of initiation and spread of excitation within smooth muscle cells supports the concept of a combination of neural innervation and electrotonic conduction. Electrotonic conduction is facilitated by narrow intercellular spaces and cell contacts. Microelectrode recording of muscle activity determines the state of cell excitability and neuromuscular transmission i.e. whether peripheral disability is axonal or myopathic. In addition the dimensions and properties of the extracellular space may be measured by microelectrode determination of tissue resistivity.

Pharmacological assay of the action of drugs on the bladder

This test, presently confined to experimental use in the dog, depends on direct perfusion of the bladder with a drug under test. The detrusor muscle is then stimulated electrically or pharmacologically, the contralateral side acting as control. This gives a direct measurement of bladder contraction and when used with appropriately small doses, gives dose response curve. This may relate the action of the drug under test to its action on the pre and post-ganglionic axon and synapses or the neuromuscular junction.

Direct vesical stimulation

Direct stimulation of the bladder can be used as a diagnostic test. Recent laboratory studies have shown that when properly designed electrodes are applied to a mass of detrusor muscle effective micturition is obtained with sequential stimulation. This avoids additive fields of electrical activity. Appropriate isolation of the electrodes by thin sheets of light silastic lessens current spread. Sequential stimulation favors spread of excitation in a rostral to caudal direction, and probably closely resembles natural innervation.

MUSCLE CONTRACTILITY

Irrespective of the type or nature of the disease involving the neural input, any treatment aimed at restoring micturition depends on the degree of residual muscle function. Infection, overdistention, long continued disuse, may all rapidly cause smooth muscle myopathy and loss of contractility. The full extent of smooth muscle changes following denervation or disuse is not completely known but it is probable that marked changes in contractility occur much sooner than has been believed. We are attempting to measure altered contractility by the following techniques.

Electrical stimulation (used as a diagnostic test)

Electrical stimulation may be used in conjunction with denervation sensitivity testing as a measure of muscle impairment. Myopathic changes due to infection or vascular impairment with loss of muscle bulk and collagen replacement are evident as decreased intra vesical pressure rise with direct stimulation. This is further documented by quantitative biochemical techniques performed on biopsy specimens.

Pharmacological stimulation (Bethanechol chloride)

The response of the detrusor muscle following a 2 week course of 50 to 100 mgms. q.i.d., with continuous catheter drainage is a practical way to determine residual muscle contractility. The absence of a contractile response after such a course of treatment suggests that there has been a complete irredeemable loss of smooth muscle function.

Collagen assay

Smooth muscle myopathy is extremely difficult to detect by ordinary morphological examination, leading to study of hydroxyproline in bladder biopsies. Changes in the detrusor muscle mass may be detected well before histological changes are demonstrable. Our studies show that the collagen content of the bladder is stable throughout life, suggesting that biopsy assay may be useful to detect early myopathy.

Enzyme assay

Changes in the function of skeletal muscle enzymes have been noted after denervation. Similar changes might be expected in smooth muscle and we are presently measuring creatinine phosphokinase activity as a possible index of detrusor excitability.

Electron microscopy

Ordinary histological examination of the detrusor muscle is unrewarding to detect early dysfunction. Electron microscopy studies of the muscle are being performed to study the changes in cellular morphology and axon integrity.

These several diagnostic methods allow direct measurement of the central neural function, peripheral neural function and muscle contractility.

Anatomy

The Biosynthesis of Insulin*

G. Eric Bauer, Ph.D.†

The site of insulin synthesis has been investigated in isolated islet tissue of the goosefish (*Lophius americanus*). Knowledge of this process may be significant in understanding the fundamental lesion of pancreatic diabetes mellitus in man.



G. Eric Bauer

During the development of the pancreas in several teleost fish, the islets separate from the exocrine tissue, and appears in the adult as a macroscopic aggregate called the Principal Islet or Brockmann Body. The Principal Islet contains cells that are functionally and anatomically analogous to B-cells of the mammalian Islets of Langerhans. Fish insulins are similar in structure and biological activity to mammalian insulins. The goosefish islet is especially large and entirely free of exocrine pancreatic tissue, and therefore offers excellent opportunities for study.

Goosefish are obtained at the Marine Biological Laboratory, Woods Hole, Mass. The Principal Islet is decapsulated, sliced, and incubated at 20° in the presence of Krebs-Ringer bicarbonate medium containing C¹⁴- or H³-labeled amino acids, under an atmosphere of 95% O₂-5% CO₂. After incubation, the tissue is homogenized in 5% trichloroacetic acid (TCA), and then washed. TCA-precipitable protein is extracted with acidified ethanol, to yield an alcohol-soluble fraction (ASF). As a test of the extraction procedure, I¹³¹-labeled bovine insulin is added to the incubation mixture in place of labeled amino acids. Following TCA precipitation and extraction, 80-90% of the I¹³¹ is recovered in the ASF, indicating that goosefish insulin is also recovered in this fraction.

*From a report to the Staff Meeting of University Hospitals on May 24, 1968
†Assistant Professor, Department of Anatomy, University of Minnesota

Amino Acid Incorporation into the Insulin-containing Fraction

The incorporation of amino acids into the ASF increases progressively with increasing times of incubation and is approximately linear during the first six-hour period. Incubation under anaerobic conditions, or in the presence of 100 $\mu\text{g}/\text{ml}$ of cycloheximide (which inhibits protein synthesis at the ribosome), inhibits incorporation by 90-99%. The specific radioactivity (cpm/mg protein) of purified ASF is about three times higher than that of the other TCA-insoluble proteins. Purification of insulin from the ASF yields preparations with insulin-like biological activities of 21-26 units/mg of protein, and high specific radioactivity.

These studies clearly demonstrate the *in vitro* incorporation of amino acid radioactivity into goosfish insulin.

The Subcellular Sites of Amino Acid Incorporation

Subcellular fractions are isolated from goosfish islet tissue, following various periods of incubation, by homogenization and differential centrifugation in 0.25 M sucrose. Fraction I (nuclei + unbroken cells) is isolated by centrifugation at $600 \times g$ for five minutes, Fraction II (secretion granules + mitochondria) at $6000 \times g$ for 10 minutes, and Fraction III (microsomes) at $105,000 \times g$ for 60 minutes; Fraction IV (the cell sap) remains as the supernatant. Seventy-five per cent of the insulin and 80% of the cytochrome oxidase (a mitochondrial enzyme) are recovered in Fraction II. The acid alcohol-soluble proteins (ASF) are prepared from these subcellular fractions. Analysis of the time course of amino acid incorporation into the ASF reveals that the most active site of incorporation is Fraction III (microsomes). Isolation of insulin from these fractions by polyacrylamide gel electrophoresis supports the view that insulin is subsequently transferred to Fraction II (secretion granules + mitochondria). Our conclusion is that insulin synthesis occurs in the endoplasmic reticulum (microsomes) of the cell, and that newly synthesized insulin is transferred to secretion granules for storage and subsequent release from the cell.

The Site of Biosynthesis of an Insulin Precursor

Recent studies by Steiner, and by Yip, have demonstrated the presence of a precursor of insulin in the mammalian pancreas. Apparently this molecule, termed proinsulin, consists of the two chains of insulin joined by a short polypeptide bridge. It has a molecular weight of about 9,000 (the mol. weight of insulin is about 6,000) and possesses solubility and immunologic properties similar to insulin.

We have analyzed alcohol-soluble fractions of goosefish islet tissue (after incubation with leucine-C¹⁴) by Sephadex column chromatography. The major radioactive peak has a mobility corresponding to mammalian proinsulin, suggesting that the synthesis of goosefish insulin proceeds also via a single-chain precursor.

Methods for the bulk isolation of Islets of Langerhans from rat pancreas, and separation of the tissue into its subcellular fractions, have been developed by Dr. Robert Sorenson of our Department of Anatomy. In a collaborative study (with Mr. Neil Baird, a graduate student) we have investigated the site of synthesis of proinsulin in rat islets, following incubation with leucine-H³. After one hour of incubation, highly labeled proinsulin appears in both Fraction III (microsomes) and Fraction II (secretion granules + mitochondria). After three hours of incubation, the incorporation into proinsulin of Fraction III remains elevated. In Fraction II, however, the labeling of proinsulin decreases markedly, while the labeling of insulin increases markedly, with respect to the one-hour values.

These experiments suggest that although proinsulin is synthesized in the endoplasmic reticulum (microsomes), and is converted to insulin by this cell organelle, the major site of conversion of proinsulin to insulin is within the maturing secretion granule.



Proctology

Scleroderma of the Large Bowel*

James Young, M.B., B.S., F.R.A.C.S.†

Scleroderma or Progressive Systemic Sclerosis is a collagen disease with a propensity for affecting the function of all organs and systems of the body. Although initially recognized as a dermatological condition, certain visceral manifestations have become well known, especially changes in the lower esophagus. Duodenal ileus and jejunal distension have been recognized more recently and malabsorption syndrome is not unusual. The colonic manifestations of this disease are specific yet are rarely described in the literature and certainly not mentioned in the standard texts.

The accompanying table shows the reported incidence of involvement of various viscera. It can be seen that the colon is involved in a relatively high proportion of cases. The figure of 40% would be a fair average and it would probably be higher if more radiographic studies had been ordered.

Clinical features

Large bowel scleroderma may be completely asymptomatic, despite clear radiologic evidence of involvement. On the other hand progressive atony and functional large bowel obstruction is not uncommon. More unusually, massive gangrene may occur often preceded by bleeding per rectum suggestive of ulcerative colitis.

Radiologic features

The classic finding is *sacculaton*, best seen in post evacuation films after a barium enema. They are found in highest concentration on the inferior aspect of the transverse colon. The saccule is broad mouthed, square shaped and usually 1 cm or more in diameter. Barium may persist in these saccules for many days.

Alternate areas of narrowing and dilatation may be found

*From a report to the Staff Meeting of University of Minnesota Hospitals on May 3, 1968

†Medical Fellow, Division of Proctology, Department of Surgery

without evidence of any mucosal defect. Dilatation may become gross, simulating megacolon. The haustral workings are lost and the colon takes on the appearance of an atonic tube.

All the above features may be seen in asymptomatic patients and hence an X-ray may provide valuable information both diagnostically and prognostically.

Pathologic features

Macroscopically, the colon appears thin-walled and pale. Saccules may or may not be obvious but patchy dilatation can usually be seen. Microscopically the lesion is seen to be a patchy loss of muscle with replacement fibrosis. Fibrosis may extend into the muscle from the submucosa or commence in the muscle layer itself.

The intrinsic nerve plexus becomes prominent, possibly a "relative" appearance due to muscular atrophy. Scattered intimal thickening in the small arterioles supplying the muscle wall is seen. Mucosal ulceration, lymphoid hyperplasia, and chronic inflammatory cell infiltration are less common findings.

Summary

It is apparent that certain specific changes occur in the colon of patients with scleroderma. While not a universal finding they are well worth looking for because they appear to be found only in this one condition. Attention is drawn to the pathologic basis for sacculation and atony. It is suggested that routine ordering of barium enema in these patients should be done. While the esophagus is involved more frequently, the changes are non-specific and may be simulated by achalasia or reflux esophagitis.

PERCENT INCIDENCE OF VISCERAL INVOLVEMENT IN SCLERODERMA AS DETERMINED BY X-RAY*

<i>Author</i>	<i>Colon</i>	<i>Small Bowel</i>	<i>Esophagus</i>	<i>Heart</i>	<i>Lungs</i>
Kemp Harper 1953	80%	30%	100%	25%	25%
Gondos 1960 (follow-through only)	25%	20%	47%	32%	28%
Fraser 1960	50%	22%	75%	—	35%
Metzaros 1959	42%	—	—	—	—
Heinz 1963	53%	44%	—	—	—

*References available from author.

Medical Foundation News

Dr. M. Melvin Goldfine, trustee, and Mrs. Goldfine entertained a Minnesota medical alumni group and their wives in San Francisco, Calif. during the recent A.M.A. meetings. Dr. O. H. Wangenstein, emeritus professor of surgery, was honored guest and principal speaker. Mr. Eivind O. Hoff, Jr., executive director of the Foundation, also spoke.

Guests attending the dinner, held at the Ritz Old Poodle Dog Restaurant, included Drs. Bancroft Brooks, Daniel C. Anderson, Allen Anderson, and Som Nayyar, all of the Class of 1957; Samuel Nerenberg ('45) and H. Robert Ripley (Mayo Grad. School).

Mr. Hoff spoke on the expansion program for the Health Sciences Center and the work of the Minnesota Medical Foundation. Dr. Wangenstein described the impact of alumni giving and private support contributed to the Medical School. Earlier in the A.M.A. meetings, Dr. Wangenstein was awarded the *Distinguished Service Award of the American Medical Association*, one of medicine's highest honors.

SCHOLARSHIPS

Fifteen college students who will enter the Medical School next fall have been awarded \$500 scholarships by the Minnesota Medical Foundation. They were among 89 who competed for the awards, based on pre-medical scholastic performance and need. Winners are Patricia M. Reuter, Arlys E. Kelly, James Tandias, Gene Kallsen, David G. Bue, Stephen J. Schultenover, Donald P. Braun, Peter O. Mjos, James A. Mohs, Randall D. Bjerke, Margaret A. Jacobson, Barry G. Welge, Monica Nothnagel, Burnell J. Mellema, and Robert R. Steuer.

Additional scholarships for sophomore, junior, and senior students will be announced later by the Foundation.

HAROLD G. SCHEIE TO RECEIVE OUTSTANDING ACHIEVEMENT AWARD

The Minnesota Medical Foundation will hold its annual Scholarship Awards Dinner on Monday, September 23, 1968 on the occasion of the opening of the fall quarter at the Medical School.

Dr. Harold G. Scheie, professor and head of ophthalmology at the Hospital of the University of Pennsylvania, will be main speaker, and will be presented the *Outstanding Achievement Award* of the University of Minnesota. Dr. Scheie (Med. '35) has had a distinguished professional career covering private

practice, academic medicine, and military service. He performed eye surgery on Lord Louis Mountbatten in Southeast Asia during World War II. A native of Warren, Minn., he is a trustee of the Minnesota Medical Foundation, and will be the 36th Medical School alumnus to receive the University's highest alumni honor.

Approximately 75 students will receive Minnesota Medical Foundation 1968 scholarships at the dinner, which will be by invitation only.

ANNUAL MEETING

All members of the Minnesota Medical Foundation are invited to attend the Annual Meeting of the Foundation, which will be held on Wednesday evening, October 23, 1968. Detailed invitation announcements will be mailed to all members early this Fall.

DRS. DIEHL AND VISSCHER HONORED

The Minnesota Medical Foundation was a co-sponsor with the Medical School of the Honors Dinner held June 6, 1968 at the Midland Hills Country Club for former Dean **Dr. Harold S. Diehl** and **Dr. Maurice B. Visscher**. Friends and colleagues paid personal tribute to Dr. Diehl, 1968 Commencement speaker, and to Dr. Visscher, who is retiring as Head of the Department of Physiology. **Dr. Robert Howard** was M.C., **Vice President William G. Shepherd** spoke for the University, and **Dr. O. H. Wangenstein** spoke for the Medical faculty.

Dr. Diehl was presented a plaque bearing the inscribed image of *Diehl Hall*, the biomedical library and research building which is named after him. Dr. Visscher received a album containing photographs of his contemporary department head colleagues at the Medical School.

*A habit cannot be tossed out the window; it must
be coaxed down the stairs a step at a time.*

—MARK TWAIN

Alumni Notes

Eleven senior medical alumni were among the 17 physicians honored this spring by the Minnesota State Medical Association for 50 years of medical practice.

Admitted to the distinguished Fifty-Year-Club were the following graduates of the University of Minnesota Medical School:

Class of 1918

Woodard Colby, St. Paul, Minn. Pediatrician.

Harold S. Diehl, Cass Lake, Minn., Administrator.

Thomas A. Love, South St. Paul, Minn., Surgeon and Family Practice.

Donald McCarthy, Minneapolis, Minn., Administrator.

Class of 1919

Herbert H. Busher, St. Paul, Minn., Surgeon (Deceased: Jan. 26, 1968)

Silas W. Giere, Benson, Minn., Family Practice

Anderson C. Hilding, Duluth, Minn., Pathologist, research.

C. Louis Lick, St. Paul, Minn., Family Practice.

Christian L. Roholt, McIntosh, Minn., Family Practice.

Lloyd H. Rutledge, Detroit Lakes, Minn., Family Practice and Surgery.

Virgil J. Schwartz, Minneapolis, Minn., Ophthalmology (Deceased: April 16, 1968).

◆ 1931

Burtis J. Mears has given up his private practice of internal medicine in St. Paul to accept the post of St. Paul City Health Officer. He will continue on the clinical faculty of the Medical School.

◆ 1935

Ralph V. Platou became executive secretary of the American Board of Pediatrics on July 1, 1968. Dr. Platou is former chairman of pediatrics at Tulane, and was professor of pediatrics at Univ. of Hawaii. He was also medical director of Kapiolani Children's Hospital, Honolulu.

◆ 1936

Grant F. Hartnagel of Red Wing, Minn. was elected president of the *Minnesota Obstetrical and Gynecological Society*.

◆ 1937

William V. Leary is fulltime in teaching and research at the M. D. Anderson Cancer Hospital, University of Texas, Houston. He was in private practice of internal medicine until three years ago. Now an associate professor of medicine, he says "I still call Ed Flink when the going gets tough!"

◆ 1938

Osler L. Peterson has been promoted to professor of preventive medicine at Harvard Medical School. Since 1962 he has been "visiting professor."

Deeply interested in the preventive, social and educational aspects of medicine, Dr. Peterson's more recent work is a study sponsored by the Hill Family Foundation, of the *Health Manpower for the Upper Midwest*.

◆ 1943

Frank J. Dixon, Jr. was at the Medical School on Feb. 9, 1968 to give the *J. S. Blumenthal Lecture*, titled "Autoimmunity and Human Nephritis." He is chairman of the Department of Experimental Pathology, Scripps Clinic and Research Foundation, LaJolla, Calif.

◆ 1944

Elizabeth A. McGrew, professor of pathology at the University of Illinois College of Medicine, is recipient of the sixth annual Award for Distinguished Service to Humanity from the Women's Auxiliary of Philadelphia's Albert Einstein Medical Center.

Dr. McGrew, 1967 president of the American Medical Women's Association, received the 1958 AMA *Hektoen Gold Medal* with four colleagues for a research exhibit illustrating methods for isolating cancer cells from circulating blood.

◆ 1947

William B. Weil, professor of pediatrics at the University of Florida, Gainesville, was named president-elect of the Society for Pediatric Research.

◆ 1956

John A. Gronvall, who has been associate and acting director of the University of Mississippi Medical Center for several years, has been named associate dean of the University of Michigan Medical School, effective August 1, 1968.

◆ 1957

Ronald R. Kyllonen writes that he was incorrectly listed recently in the MEDICAL BULLETIN as being at the University

of Wisconsin. His address is Box 511, Anoka, Minn., where he is chief of the Adolescent Treatment Unit at the Anoka State Hospital for disturbed adolescents.

◆ 1958

Loren R. Leslie was appointed director of the Kenny Rehabilitation Institute, Minneapolis, succeeding Dr. Paul Ellwood, who is executive director of the American Rehabilitation Foundation, sponsor of the institute.

Roger B. Arhelger rejoined the faculty of the University of Mississippi Medical Center this spring as an associate professor of pathology. He spent four years there prior to joining the University of South Texas Medical College, San Antonio, in 1966.

◆ 1959

Dale L. Anderson recently became associate director of Clinical Research for the Johnson & Johnson Co., New Brunswick, N.J. He completed his surgical training at the Mayo Graduate School in 1965.

◆ 1960

Thomas P. Kenefick was appointed an associate consultant in neurologic surgery at the Mayo Clinic. He is a resident in the Mayo Graduate School, and received the M.S. degree from the University this year.

◆ 1964

Samuel I. Berman was married May 18, 1968 to Mary Ellen Simons of Minneapolis. Sam is a flight surgeon with the Navy at Pensacola, Fla. His wife is a graduate of the University of Minnesota School of Nursing.

◆ 1965

Calvin L. Strand was married June 8, 1968 to Marilyn Jean Grawe of Williston, N.D. Cal is a resident in pathology at Hennepin County General Hospital. His wife is an administrative fellow at the Graduate School Research Center, University of Minnesota. They are living at 505 7th Ave. SE, Minneapolis.

◆ 1966

Roger Alan Johnson has been appointed medical director of the Faribault, Minn., State Hospital, succeeding Dr. Edward J. Engberg (Med. '13), who is retiring after 31 years in the post. Dr. Engberg was in private practice in St. Paul prior to his appointment in 1937. The hospital has 2,584 mentally retarded patients, and serves 36 counties in southern Minnesota.

Byron D. Danielson is with the USPHS, Indian Health Division, Santa Rosa Health Center, Sells, Ariz. 85634.

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SUPPLEMENT TO
MEDICAL ALUMNI DIRECTORY

(1966)

UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

This page is intended as a supplement to the MEDICAL ALUMNI DIRECTORY which was published in 1966. Detach this page and affix to your copy of the MEDICAL ALUMNI DIRECTORY on page 119.

1968 (M.D.)

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Gambill, David E.	Lava, Jeffrey S.	Rietbrock, Michael J.	Zurek, John F.

Alumni Deaths

◆ 1913

Dr. Martin Nordland, Minneapolis, Minn. Died March 23, 1968. He was 79 years old and had been a physician and surgeon in Minneapolis and Robbinsdale for more than 50 years. He retired in 1964, and had served many years on the clinical faculty in surgery at the Medical School, specializing in thyroid surgery. His widow, Mildred, resides at 2124 Kenwood Parkway, Minneapolis.

◆ 1926

Dr. Jay Conger Davis, Pompano Beach, Fla. Died May 31, 1968, aged 68 years. He had retired in 1954 after 25 years of practice in Minneapolis, and lived in Florida since.

◆ 1922

Dr. Harold G. Reineke, Cincinnati, Ohio. Died May 16, 1968 at the age of 70 years. He was clinical professor of radiology at the University of Cincinnati, and in private practice. Dr. Reineke was also a member of Nu Sigma Nu.

◆ 1961

Dr. Herman V. Dilliard, Minneapolis, Minn. Died June 25, 1968 at the age of 31, apparently of natural causes. He was born in Louisiana and had been a GP in Minneapolis since 1962.

MEMORIAL GIFTS

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

Etta M. Arneson	John Morrison
Hattie Downing	Guybert M. Phillips
J. Selmer Drage	Irma G. Reis
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This is the concluding issue of Volume XXXIX, University of Minnesota MEDICAL BULLETIN, which has consisted of ten issues published monthly from September, 1967 through June, 1968. No issues are published in July or August. Publication of Volume XXXX will begin in September 1968.

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