

UNIVERSITY OF MINNESOTA

MEDICAL

BULLETIN

WINTER 1988



**Life Link III:
A Life-Saving
Rescue Team**

A PUBLICATION OF THE MINNESOTA MEDICAL FOUNDATION

UNIVERSITY OF MINNESOTA
MEDICAL
 BULLETIN WINTER 1988

A Publication of the Minnesota Medical Foundation

The Toughest Transport Ever 2

A valiant effort by the Life Link III crew and University doctors saves the life of a Worthington man.

Tracking Pain 8

U of M researchers uncover a pathway to the brain which may help control chronic pain.

Unearthing Secrets of the Past 10

UMD paleopathologist investigates disease patterns in ancient cultures in an effort to solve medical mysteries.

CCRF: Pursuing a Dream 13

The Dawn of a Dream benefit raises much-needed funds for research into children's cancer.

Pharmacology: An End and a Beginning 16

The Department of Pharmacology continues to expand its role in medical education and research at the University.

Medical School Newsbriefs 18

MMF Report 22

Alumni Update 25

Historical Perspective inside back cover

Calendar of Events back cover



page 2



page 8



page 10



page 13

The Minnesota Medical Foundation was founded in 1939 by a dedicated group of faculty members and medical alumni who saw the need for private support to build a strong future for the Medical School. A non-profit organization, MMF raises and disburses funds for medical education and research at the University of Minnesota Medical Schools in the Twin Cities and Duluth.

Publishing Information: The University of Minnesota Medical Bulletin is published quarterly by the Minnesota Medical Foundation on behalf of the University of Minnesota Medical Schools (Minneapolis and Duluth), Minnesota Medical Alumni Society, and the Minnesota Medical Foundation. Statements and opinions published herein are exclusively those of the authors themselves. There is no subscription fee. No advertising is accepted. Publication is made possible by contributions to the Minnesota Medical Foundation.

Publication Office: Minnesota Medical Foundation, Box 193-UMHC, University of Minnesota, Minneapolis, Minnesota 55455. Phone (612) 625-1440.

Change of Address: Please enclose old and new address and mail to: The Minnesota Medical Foundation, Box 193-UMHC, University of Minnesota, Minneapolis, Minnesota 55455.

Board of Trustees: Paul G. Quie, M.D., President; Nadine G. Smith, M.D., Vice President; George D. McClintock, Secretary; Roger E. Larson, Treasurer; Anthony Bechik, David M. Brown, M.D., Sandra K. Butler, H. Mead Cavert, M.D., John B. Coleman, M.D., William E. Coyne, Ph.D., Ronald J. DeSellier, Frazier Eales, M.D., Beth H. Erickson, Phyllis B. France, N.L. Gault Jr., M.D., Erwin L. Goldfine, Bobby I. Griffin, David W. Hamilton, Ph.D., Terrance Hanold, Clayton Kaufman, Kenneth H. Keller, Ph.D., David M. Lebedoff, Malcolm A. McCannel, M.D., Donald W. McCarthy, Rudolph W. Miller, Charles F. Moldow, M.D., William A. O'Brien, M.D., Frederick M. Owens Jr., M.D., Carl R. Pohlad, James W. Reagan, Raymond W. Scallen, M.D., Stephen G. Shank, Steven Sjoblad, James R. Spicola, Neal A. Vanselow, M.D., John M. Warder.

Staff: Editor, Jean Murray; Public Relations Coordinator, Elaine M. Cunningham; Executive Director, David R. Teslow.

On the Cover: The skill of the Life Link III crew was critically important in the rescue effort of Richard Frisch. Photo by Dan Kieffer.

The Minnesota Medical Foundation supports the research and educational missions of the University of Minnesota Medical Schools by encouraging private contributions.



The Medical Practitioner, the Medical Teacher, the Medical Researcher — All Learners

The high value the physician places upon learning the sciences and the humanities has been essential to medical education since the Middle Ages. One of the great teachers of that time, Moses Maimonides, stated that one can only appreciate the fullness of comprehension, of truth and enlightenment when one has proceeded quite far in the sciences. Only then can one comprehend the true order of being. Thus physicians of the Middle Ages were expected to study and learn anatomy and body functions, physics, mathematics, philosophy, and language. This tradition continued for centuries throughout the Middle East and then entered Europe, where contemporary medical education had its origins.

A century ago, the most distinguished physician in North America, William Osler, recognized the scientific value to clinical medicine of the autopsy, developed by Rudolph L.K. Virchow; of physiology, developed by S. Weir Mitchell; and of microbiology, made possible by Antonj Van Leeuwenhoek's applications of the microscope. Osler taught his students to integrate knowledge and reason in eliciting patients' problems through the use of the physical examination, the laboratory sciences, intellectual inquiry, and knowledge gained through experience. He encouraged students to constantly strive to understand the causes and mechanisms of disease, and to integrate science with traditional bedside values.

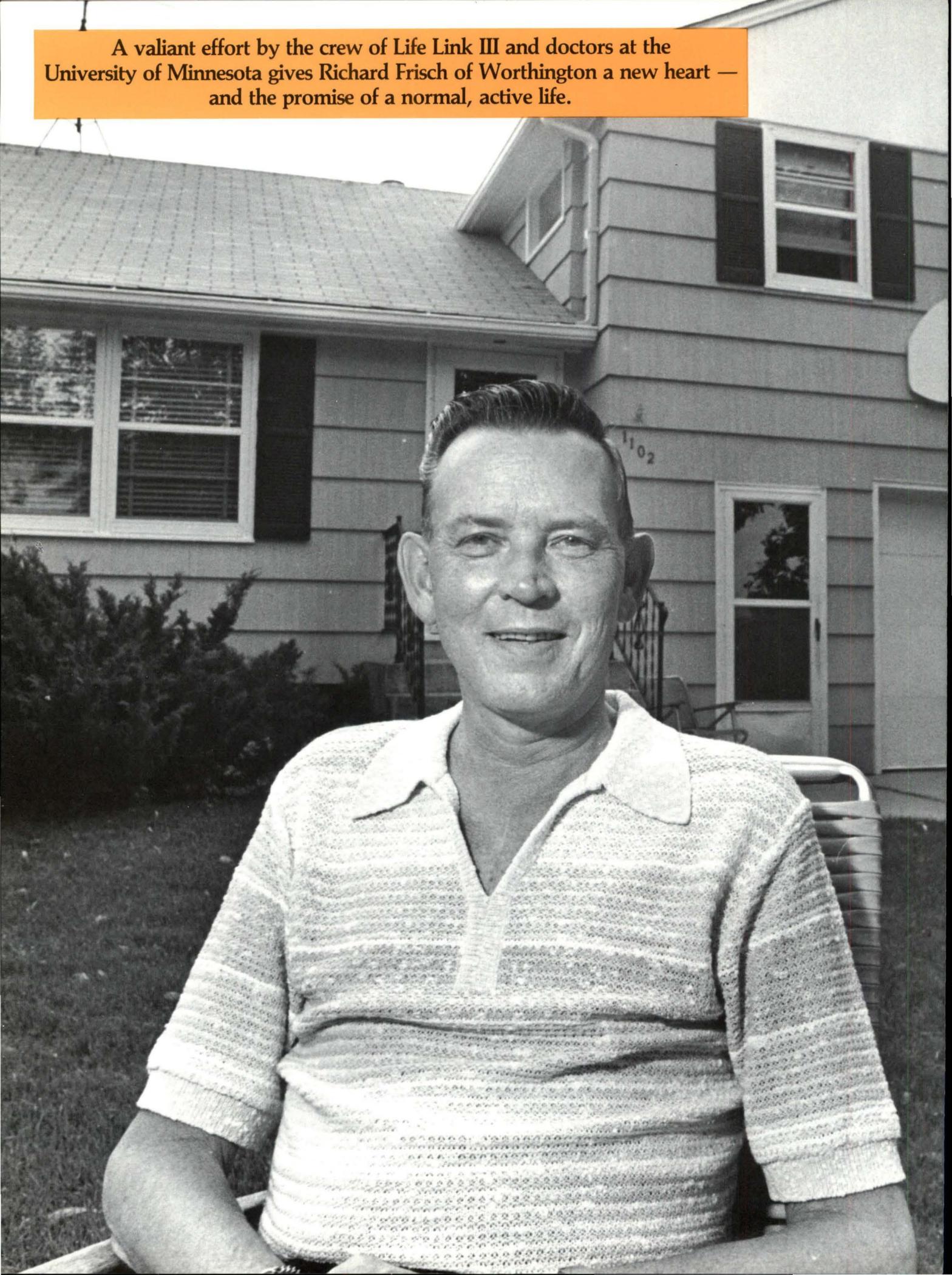
Twenty-five years later, Dr. Abraham Flexner urged the development of full-time basic and clinical science faculty in medical schools in conjunction with hospitals dedicated to the medical schools. He said that teaching and research must permeate each other. He urged that the critical method of research dominate all teaching. Flexner cited the University of Minnesota Medical School as an example of the proper blending of basic and clinical research and education in preparing physicians for the practice of medicine. He felt that this medical school would be complete when the University Hospital was established in 1911.

Flexner was concerned that, without a firm base in science, physicians would be ill-prepared to understand and apply the rapid advances in medicine that he anticipated would occur in their lifetime. Without adapting to and understanding these changes, physicians, decades after graduating from medical school, would know little more than when they received their diplomas. Flexner's laudable values created a virtual revolution in medical education that continues to this day.

It is from the experiences of practical medicine that we have learned what probing questions to ask in the laboratory. For example, observations of the influence of normal sexual cycles upon hormonally dependent tissues such as the breast and the testicle have led to the development of laboratory techniques to measure estrogen and androgen receptors which subsequently led to new and highly effective therapies for treating malignancies of those organs. The clinical observation that certain malignancies are particularly prevalent in families has led to the discovery of genetic linkages in some cancers which are definable at molecular levels. The clinical observation of recurrence of tumors with a different phenotype suggested the need to seek new biochemical and genetic determinants of tumors. These studies have led to important fundamental studies in molecular biology. These and many other significant laboratory advances have occurred because both the physician and the basic researcher are learners. We must continue to seek this cross-fertilization of ideas and the spirit of inquiry which results from alert and questioning minds.

David M. Brown, M.D., Dean
University of Minnesota Medical School

A valiant effort by the crew of Life Link III and doctors at the University of Minnesota gives Richard Frisch of Worthington a new heart — and the promise of a normal, active life.



THE TOUGHEST TRANSPORT EVER



It was early afternoon on April 30, 1987, when Dr. John Strony, a cardiology fellow at the University of Minnesota Medical School, embarked on a medical odyssey.

By Michael Moore

Richard Frisch at his Worthington, Minnesota, home.

Strony was asked by Dr. Maria-Teresa Olivari, medical director of the heart transplant program, cardiology section, to accompany the Life Link III air ambulance to bring back Richard Frisch, 55, a patient on the heart transplant waiting list. Strony knew the situation was serious, because a cardiologist seldom accompanies the emergency physicians and paramedics on helicopter or airplane missions flown by Life Link III, which is owned jointly by University Hospital, St. Paul Ramsey Medical Center, and Abbott Northwestern Hospital. What he didn't know was that he was headed for the toughest patient resuscitation and transport of his career.

On the flight to Sioux Falls, South Dakota, Strony reviewed Frisch's medical history, preparing himself for the challenge that lay ahead. Richard Frisch suffered his first heart attack in 1968, and then in November 1986 he had a second. He was transported from his home town of Worthington, Minnesota, to Sioux Valley Hospital, where tests revealed that severe damage to the left side of his heart had reduced its pumping ability to only 13 percent.

Frisch was referred to the University of Minnesota Hospital and Clinic, where cardiologists estimated that, without a heart transplant, he had only six months to a year to live. Fortunately for Frisch, he was otherwise in good health, which earned him a spot on the University's heart transplant waiting list. Because he was in stable condition, Frisch was sent home with a beeper that would signal him if a suitable donor heart became available.

Richard and his wife Shirley began a tense waiting game, hoping and praying



Richard Frisch, second from right, talks with pilot Mike Andersen, right, flight team members Cheryl Alinder, LPN, EMT-P, and John Hall, EMT-P, left, and his wife, Shirley, center.

that his heart would keep pumping long enough for someone else's generosity to give him a second chance at life. Like thousands of other families whose loved one needs an organ transplant, the Frisch family waited for the tragic news that a special person had died — someone who expressed a desire to be a donor, and whose grieving family granted the request that their loved one leave a living legacy.

The Frisch's waiting was made somewhat easier by the surprising fact that Richard felt good. He was able to play golf and work at Rune's Furniture and Carpet, which he had managed for 30 years. On April 28, however, he fainted while walking near the store. He went home to rest, and Shirley knew he was in trouble: "I could tell he wasn't feeling well, and I tried to take his pulse but I couldn't find one." She called their sons to drive him to the hospital, but by the time they arrived he was much worse. "His eyes just rolled back and the color of his skin drained," Shirley remembers. They called an ambulance and Doug Frisch began to perform CPR. When the ambulance arrived, the paramedics took over, but their monitor showed no heart-beat. They administered a shock to restart his heart, and Frisch regained consciousness. He astounded everyone by saying, "I think I'll walk to the ambulance."

At Worthington Regional Hospital, Frisch's blood pressure was found to be dangerously low, and his heart was beating too fast. The doctor decided that an

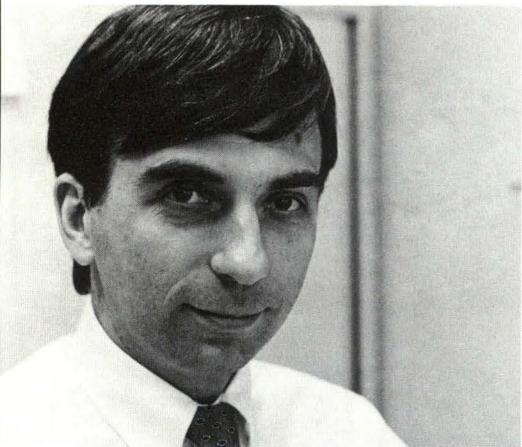
intra-aortic balloon pump was needed to increase the pumping efficiency of Frisch's heart. But the closest facility capable of inserting the balloon pump was in Sioux Falls, and Frisch's blood pressure was too low for him to survive the trip. Then, for no apparent reason, his blood pressure rose, and the family decided to risk the ambulance trip.

At Sioux Valley Hospital, cardiologists inserted the balloon pump by threading a catheter up the leg artery into Frisch's aorta. A balloon on the end of the catheter is connected to an external supply of carbon dioxide, which is triggered by an electrocardiograph to inflate the balloon. The balloon pump relieves tension on the interior walls of the heart, allowing it to perform better when fatigued.

Even with the balloon pump taking some of the load off his heart, Frisch was in critical condition. His kidneys had stopped functioning, his blood pressure was extremely low, and his heart was still beating too fast. After 48 hours, cardiologist Paul Carpenter conferred with Olivari at the University of Minnesota, and they decided to have the Life Link III critical care airplane transfer Frisch to Minneapolis. Enter Dr. John Strony.

Michael Moore is a science writer for University of Minnesota office of Health Sciences Public Relations.

Susan Rooney, public relations coordinator for Life Link III, contributed information to this article.



Nancy Mellgren

Dr. John Strony, cardiology fellow at the University of Minnesota Medical School.



The Life Link III crew transports a patient into the air ambulance.

Dwindling hope

"When I arrived, they were in the midst of resuscitating Mr. Frisch again," says Strony. "I joined Dr. Carpenter, and we worked on him for about an hour. Although we were able to get a heart rhythm back, we were unable to get any kind of pump function; he just wasn't sustaining any blood pressure. We weren't doing CPR the whole time; he would come back, start generating his own blood pressure and rhythm, so we'd watch him for a few minutes and then he'd go again. Finally, the last 35 minutes we had to do straight CPR."

Because of the length of time Frisch required CPR, the physicians were concerned about how much neurological function he would have if he recovered. Despite what seemed a hopeless situation, they did everything they could to give Frisch a chance of surviving, keeping him well oxygenated and continuing medications to try to control his heart arrhythmia and stimulate his blood pressure. When Frisch didn't improve, Carpenter spoke with his family.

"Dr. Carpenter came out and told us they had done everything they could," Shirley Frisch says. "They were going to place him on a respirator and they gave us a few minutes to see Dick for the last time."

Ten minutes later, Richard Frisch came back. Amazingly, his blood pressure was climbing and his heart rhythm stabilized, giving him another chance at life. He even began moving his arms. "We watched him closely for the next 20

minutes, trying to ascertain his neurological status," says Strony. "He was moving all extremities and was responding."

The question then became how to improve Frisch's chances of making it back to University Hospital for a truly life-saving heart transplant. "I wouldn't transport him in that unstable condition; he just would not have made it," Strony declares. A telephone conference between Drs. Strony, Olivari, and Steves Ring, director of the University's heart transplant program, came up with an answer: a left ventricular assist device.

Ring explains that while the balloon pump can take some of the workload off the heart, "It can only take things so far; then you have to look for other alternatives, either an assist device or a heart transplant." Ring says a ventricular assist device is essentially half of an external artificial heart. It is used a couple times each year to sustain very critical patients on the University's heart transplant waiting list. Most patients who die waiting for a new heart die suddenly and unexpectedly, he says, and unlike Frisch they are unable to be resuscitated.

Ring says the University prefers ventricular assist devices as bridges to heart transplants because they are far less expensive and much safer than the still-experimental artificial heart. The patient's heart is not removed, as is necessary for an artificial heart, so the pump doesn't require burning any bridges — if the patient's heart recovers the pump is simply removed; if the heart doesn't recover, the pump can be left in for 7 to 14 days, which is hopefully enough time to find a

donor organ.

As Ring was making arrangements to fly a Bio-Pump ventricular assist device (see sidebar) to Sioux Valley Hospital, physicians at the hospital discovered that they had one in their medical supply room. Heart surgeon John Owens was called in to insert the device. He had never installed a Bio-Pump and was unfamiliar with the surgery required, but fortunately, the surgery is fairly uncomplicated and can be performed by any experienced heart surgery team like the one at Sioux Valley Hospital.

Ring described the procedure to Owens, who then agreed to operate. Basically, the operation involves inserting two tubes into the heart. One tube is sewn into the patient's left atrium to drain blood out of the heart and carry it to the Bio-Pump, which bypasses the left pumping chamber of the heart. The other tube returns the blood to the aorta, which distributes the blood to the rest of the patient's body.

The physicians received permission from the Frisch family to insert the Bio-Pump, and Owens proceeded. "He did a very nice job," comments Ring.

A team effort

Richard Frisch had passed one more hurdle, but he still had to survive the trip to University Hospital. Strony and the Life Link III crew immediately began planning the logistics of that trip. They not only had a patient to care for, they also had a technological nightmare of medical devices to power and monitor. Frisch was hooked up to the balloon pump, the Bio-Pump, and a ventilator. A mass of tubes jutted from his chest incision to drain excess fluid from around his heart and lungs. He was receiving blood transfusions and several types of intravenous medications. A Swan-Ganz catheter positioned within Frisch's heart allowed Strony to monitor his heart function.

Needless to say, all that equipment required an enormous amount of power and space. The paramedics began scrambling to find ways of supplying that much power during the ambulance trip to the airport, and then on the plane to Minneapolis. First, they discovered that Sioux Falls didn't have an ambulance capable of delivering enough electrical power. A fire rescue vehicle was finally located that could support their needs.

The plane presented another set of



Dan Kieffer

Pilot Mike Andersen of Life Link III.

challenges. The paramedics had to determine how to fit the four medical personnel, Frisch, and the equipment into the limited space available. They also had to figure out how to keep all the devices running on the two-and-one-half amps available from the plane's batteries. The hospital's biomedical products department helped determine how much power would be required, as well as how much backup power could be drawn from batteries.

"We found out that we would be able to run the balloon pump, the assist device, and the ventilator, but we would not be able to have any active chest drainage — we'd just have to rely on water level for passive drainage," says Strony. "That made me worry about tamponade (heart failure caused by pressure from fluid buildup in the chest cavity) during the trip. We had to keep his chest closed to keep the site as free from infection as possible for the transplant, so we just had to accept the risk of tamponade." The hospital provided Strony with a set of surgical instruments he could use to open Frisch's chest if it became necessary to relieve pressure on the heart.

To add suspense to the already urgent situation, a storm was moving in, threatening to prevent the flight. The air ambulance would not be able to fly over the storm, because high altitudes would interfere with the IV drips and pressure requirements of the medical equipment sustaining Frisch.

When everything was prepared for the transport from the hospital to the airport, Strony notified his colleagues at University Hospital. "Everyone there was

on the edge of their seats wondering if and when we were going to get Mr. Frisch back. Dr. Ring called in a surgical team as soon as I let him know we were ready to leave."

Strony and the anesthesiologists at Sioux Valley Hospital made sure that Frisch was completely anesthetized so that he would not wake up on the trip. "If he moved at all, he would rip those lines out and exsanguinate (bleed to death) within 30 seconds," says Strony.

The ride to the airport went smoothly, and the team had just finished getting everything in place aboard the plane when it started to rain. "The pilot was actually taxiing down the runway as we were closing the doors," recalls Strony. "The pilot did what he was supposed to do — he concerned himself with getting us back. He didn't worry about any of the logistics we were dealing with, he just stayed in constant contact with the control tower to find us the quickest and safest flight plan."

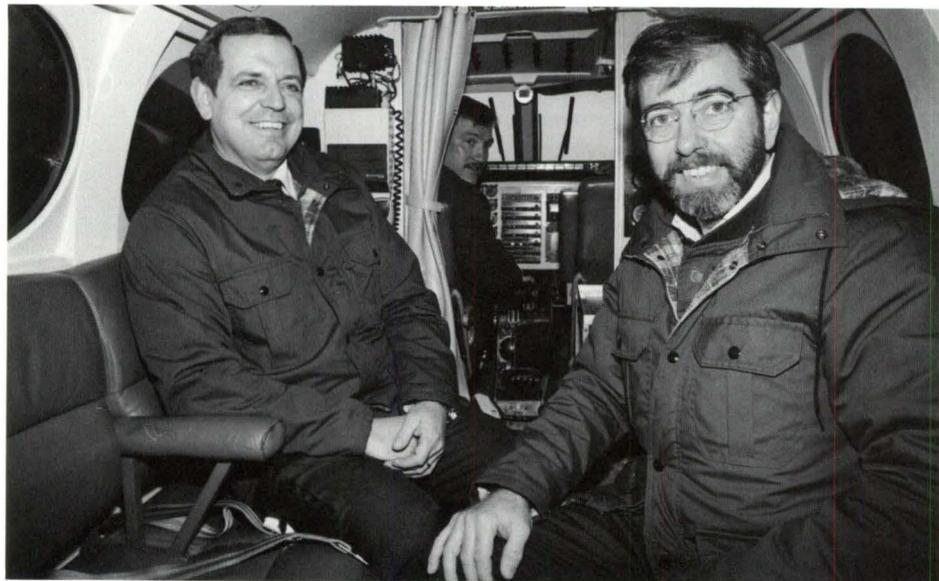
The plane stayed ahead of the storm, but the pilot had to descend at times when pressure built up in the IV bottles. "About 20 minutes from our estimated time of arrival, Mr. Frisch's blood pressure started to diminish, and I worried that he was beginning to tamponade," says Strony. "We shut down the balloon pump for a few seconds and switched over to the chest tubes, but that was unsuccessful. So we had to take a gamble and start infusing him with blood and fluids; that brought his pressure back up."

The plane landed at Holman Field in downtown St. Paul and immediately taxied into a hangar, where an ambulance and team of paramedics waited. The ambulance was a new model and had sufficient power, but the paramedics had found that it was susceptible to power surges if overloaded. "We estimated that we had about 30 minutes of battery power left on the Bio-Pump, since we had used about 15 minutes during the flight. So for the 20-minute drive to the hospital we went on battery power rather than take the risk of blowing out the ambulance unit," says Strony.

"We hooked up the chest tubes to suction and drained out literally 200 cc's of blood. The blood pressure shot right up to about 120, and Mr. Frisch stabilized quite nicely for the ambulance trip," recalls Strony.

The ambulance made good time getting to University Hospital in Minneapolis, and the emergency room and surgery teams were waiting. "We knew we were getting short on battery power, so we rushed Mr. Frisch into the elevator to get him to intensive care, where we could plug into an electrical supply. Just as the elevator doors opened, the Bio-Pump alarm went off — we were out of power. A quick walk soon became a fast run to the nearest outlet, and he came right back when we plugged the device in," Strony remembers.

It was about 2:30 in the morning, "and that's when we realized we were totally exhausted," says Strony. "Everyone on the team that day realized in retrospect



Life Link III crew members Dennis Cusick, Emergency Medical Technician-Paramedic (EMT-P), left, pilot Mike Andersen, center, and John Hall, EMT-P, right.

Dan Kieffer

The multi-use BIO-PUMP

Appropriately enough, the medical device that would play a large part in saving Richard Frisch's life was developed and is produced in Minnesota. An Eden Prairie company, Bio-Medicus, Inc., marketed the first left ventricular assist device, called the Bio-Pump, in 1975. Much of the early testing of the Bio-Pump was done by Dr. Perry Blackshear Jr., Ph.D., director of graduate studies in biomedical engineering at the University.

The Bio-Pump is essentially half of an external artificial heart. It is an uncomplicated-looking, clear plastic, triangular device. Smooth conical surfaces within the pump are rotated by electromagnetic energy. The rotation gives momentum to blood flowing through the pump housing, gently pumping the blood without any harsh physical contact that can damage red blood cells.

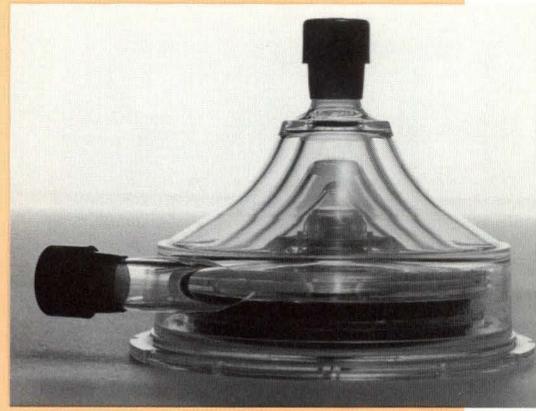
The Bio-Pump became commercially available in 1975. Bio-Medicus has since introduced a model for pediatric patients and a model that is 20 percent more efficient than the original model. Surprisingly, in this age of high-priced medical technology, the Bio-Pump costs only \$160, and is disposable. A Bio-Console provides A/C power to the Bio-Pump and

Immediately afterward, Dr. Nancy Ascher, director of the University's liver transplant program, led a team of surgeons who transplanted a third kidney "piggy-back" fashion onto his own two kidneys. The combined heart and kidney transplant was the first at University Hospital, and only two or three others have been reported worldwide, says Ring.

Two weeks later, Frisch's body began to reject the donor kidney. But just as he had so many times already, Frisch recovered from the brink again. His own kidneys started functioning, and surgeons removed the donor kidney.

Frisch was discharged from University Hospital on May 30. He only had to move two blocks, however, joining Shirley at Potter's House, a home away from home for organ transplant patients and their families. Potter's House is supported by charitable donations to the Children's Transplant Association.

The Frischs returned to Worthington on July 9, eager to thank all the people who helped them with cards, letters,



The Bio-Pump is made by Eden Prairie-based Bio-Medicus, Inc.

monitors its function. Back-up battery units provide 30 to 60 minutes of stand-by power.

According to Robert G. Mills, director of sales and marketing at Bio-Medicus, the Bio-Pump is not only widely used as a temporary heart assist device, it is also used as a blood bypass unit during many surgical procedures, including aortic coronary bypass operations and liver transplants. It is most commonly used as part of a heart-lung machine during heart operations, because it is less damaging to red blood cells than the traditional rollers used in the heart-lung machine.

Bio-Medicus says the Bio-Pump has been used in more than 75,000 clinical procedures. Mills estimates the company's 1987 sales at \$12 million.

visits, and a citywide fundraiser. Richard has since returned to the golf course and work, at least part time. The couple hopes to be able to go dancing again soon.

Frisch returns to University Hospital for monthly checkups and heart biopsies, to detect whether his new heart is being rejected. He is doing fine and his chances of living long past retirement are very good, says Ring. "We keep the heart transplant registry here in the Minnesota Heart and Lung Institute, and our heart transplant program has the best survival rate in the world — over 97 percent one-year and over 90 percent five-year survival."

With Richard Frisch's record of beating even the worst odds, there is little doubt that he will live to enjoy many years to come. Reflecting on the harrowing experience they experienced, Shirley says that it was "a dream, a nightmare, and a miracle all combined into one. The doctors never quit. Anyone at any point could have said that's it, but they always gave him a chance."

that this was the hardest transport he or she had ever done. It was a real team effort. Each person had his or her own job to do: the two nurses, a paramedic, the pilot from Life Link III, and myself. Everybody did their job and did it well, so you never had to worry about who was doing what. Even the transfers from rescue wagon to plane to ambulance went very smoothly."

A transplant milestone

The Frisch family joined Richard at University Hospital the next morning, and again they began a tense vigil. His kidney failure slowed the removal of the anesthetics from his system, so he remained paralyzed. Until physicians could be sure there was no brain damage, they could not place him on the critical list for a heart transplant.

Two days into the vigil, Shirley Frisch saw her husband's eyebrow move. "I asked if I should open his eyes for him and Dick nodded yes." Slowly he began to move his arms, fingers, and toes.

With brain damage ruled out, there was just one more barrier to prevent Frisch from obtaining a donor heart. His kidneys were still not functioning, and that is one of the exclusion criteria used to ensure distribution of scarce donor organs to those who can most benefit, explains Ring.

But because Frisch had already been accepted on the list and all other physical factors were good, it was decided to transplant both a heart and a kidney, if a suitable donor became available. "We didn't think he would survive a heart transplant without a functioning kidney, and we thought there was only a 50/50 chance of his own kidneys recovering, so we decided to give him a third kidney at the same time as his heart transplant," says Ring.

Ultimately, what made Frisch's transplants possible was the availability of an older donor whose heart didn't meet the standard criteria for transplantation. "The donor's kidneys would have been transplanted, but the heart probably wouldn't have been used," says Ring. "We're expanding the donor age criteria in our program at the same time we're expanding the recipient age limit, so we decided to go ahead with the transplants for Mr. Frisch."

On May 8, 1987, Ring led a team of heart surgeons in a four-hour operation to transplant a new heart into Frisch.

T R A C K I N G

U of M researchers uncover a pathway to the brain which may lead to ways to control chronic suffering.



Dr. Giesler has been involved in pain research for 13 years.

By Elaine Cunningham

Half the people in the world will at one time or another suffer from chronic, untreatable pain, says Dr. Glenn Giesler Jr., University of Minnesota associate professor of cell biology and neuroanatomy.

Chronic pain may be the result of arthritis, cancer, back injury, or a myriad of other diseases and injuries. It is the cause, says Giesler, of Americans missing nearly 700 million work days each year at a cost to the economy of \$90 billion.

"It is a tremendous problem," Giesler stresses. "Chronic pain can be disabling. Yet, we know very little about the mechanisms of pain."

Giesler and two graduate students at the University of Minnesota Medical School are trying to change that. Their research looks at the pathways involved with pain and at how pain triggers the body's autonomic and emotional responses. Their results are providing the clues that may eventually lead researchers to ways to control chronic pain. The research is supported in part by grants to the Minnesota Medical Foundation from Herbert Luxenburg and the Henri Green family.

Giesler's most significant result, thus far, has been the discovery of a direct projection from the spinal cord to the hypothalamus (a basal part of the brain that forms the floor of the third ventricle and includes vital autonomic regulatory centers).

Researchers have long known that the spinal cord is an integral part of the pain process, according to Giesler. Many of the neurons located along the spinal cord respond most to painful stimuli, and pain in different areas of the body activates different neurons along the spinal cord.

"When you experience pain," Giesler explains, "not only do you have a conscious sensation of how it hurts and where it hurts, but your heart rate and blood pressure change. The hypothalamus controls the body's autonomic responses such as heart rate and blood pressure."

"What we never knew was how this happens — how the information traveled to the hypothalamus. There was no evi-

Photos by Nancy Mellgren

PAIN

dence to support a connection from the spinal cord to the hypothalamus. We found a direct connection — the first time any research has found this.”

Originally, Giesler and his research team of Rami Burstein and Ken Cliffer were studying the spinal cord and known pain systems. They were not actively looking for a projection from the spinal cord to the hypothalamus. But, while recording action potentials in cell bodies of the spinal cord, they noticed an antidromic activation of spinal cord neurons from low levels of current in the hypothalamus. This hinted at a direct pathway from the brain to the spinal cord.

All neurons have axons that carry information, Giesler explains. Most of the neurons along the spinal cord have axons that project only to other areas within the spinal cord. Giesler realized this discovery of a possible projection from the spinal cord to the hypothalamus could explain the changes in autonomic responses such as blood pressure and heart rate which occur during the pain process.

Because of the significance of the discovery, Giesler and company needed to confirm beyond doubt that this pathway existed. In a second round of experiments, they injected a chemical tracer into the hypothalamus, which is transported from the terminals of axons back to their cell bodies. Two days later, the research team found the tracer in cell bodies within the spinal cord. This process, known as retrograde transport, revealed just those neurons in the spinal cord with a direct projection to the hypothalamus.

“We repeated the process using three different retrograde tracers,” Giesler says. All three tracers were found in the spinal cord.

In his final experiment, Giesler used antegrade transport to confirm the connection. Chemical tracers were injected into the spinal cord and, a few days later, were found in axons and terminals in the hypothalamus. While searching the hypothalamus for these antegrade tracers, the researchers made another unexpected discovery. Not only were tracers evident in the hypothalamus, but in several areas of the limbic lobe of the

brain as well. This area of the brain, according to Giesler, controls the body’s emotional responses.

“Tumors on these areas of the brain,” he says, “are known to cause bizarre behavior, such as ferociousness. We know pain causes changes in the emotions. The results we have now provide some hints as to how pain finds its way to the part of the brain that controls emotions.”

Since his initial discoveries, Giesler and his research team have completed additional experiments using antegrade and retrograde transport to confirm the connection from the spinal cord to the limbic lobe.

According to Giesler, there is very little research going on that looks at the emotional mechanisms of pain.

Giesler has been involved in pain research for the past 13 years. He trained with Dr. William D. Willis at the Marine Biomedical Institute at the University of Texas Medical Branch in Galveston, and at the Laboratoire de Physiologie des Centres Nerveux in Paris, France. He has also held research appointments in the Department of Psychology at the University of California, Los Angeles, and at the Veteran’s Hospital in Long Beach, California. He has been at the University of Minnesota since 1980, first as an assistant professor of anatomy and now as an associate professor.

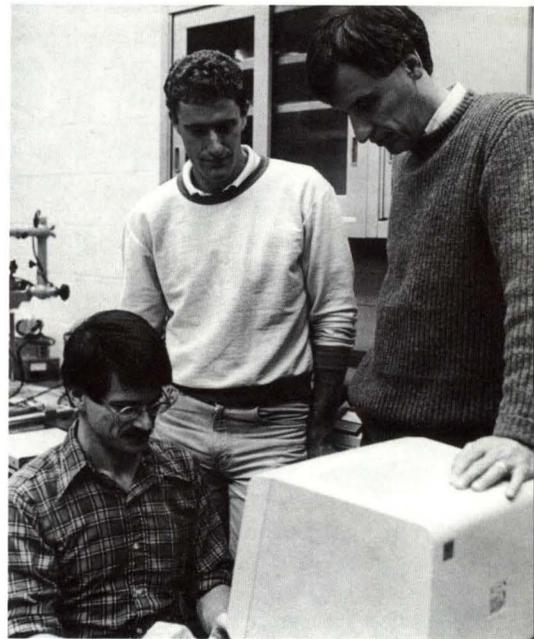
Giesler holds a bachelor’s degree in psychology from California State University and both a master’s and a Ph.D. in physiological psychology from UCLA. He has written numerous articles on pain.

In his current experiments, Giesler has been using rat models.

“In the past,” he says, “rats have proven to be a very good model for the primate spinal cord.”

His research will go on to use other animal models and eventually primates. He stresses, however, that applying his findings to patients suffering from chronic pain is, at best, several years down the road.

“What we now know,” Giesler explains, “is that pain begins in peripheral areas of the body, activating the neurons along the spinal cord, which



Dr. Glenn Giesler, right, and graduate students Ken Cliffer, left, and Rami Burstein, center, are researching the pathways of pain at the University of Minnesota Medical School.

project information to the hypothalamus (affecting heart rate, pulse, etc.), and also to areas of the brain known to be related to emotions.”

Future research will have to try to answer questions like: How do the peripheral receptors transmit information to the spinal cord neurons? What transmitters do the spinal cord neurons use? Are there different transmitters for individual neurons? Can we interrupt these transmissions pharmacologically? Surgically? What is the relationship between pain and emotional suffering?

Eliminating suffering is the key to controlling chronic pain. Pain in itself, Giesler says, serves a purpose by alerting us to injury. For example, when a person touches something hot, it is the sensation of pain that causes the hand to be withdrawn before severe damage is done.

So the ideal, Giesler explains, “would be if we could find ways to disrupt the transmission so that the patient could still feel pain but wouldn’t suffer from it.”

By identifying the pathways by which pain travels, Giesler’s research is the first step toward finding that ideal. 

UNEARTHING Secrets of the Past

UMD paleopathologist Dr. Arthur Aufderheide's investigations of disease patterns in ancient populations could help solve some present-day medical mysteries.

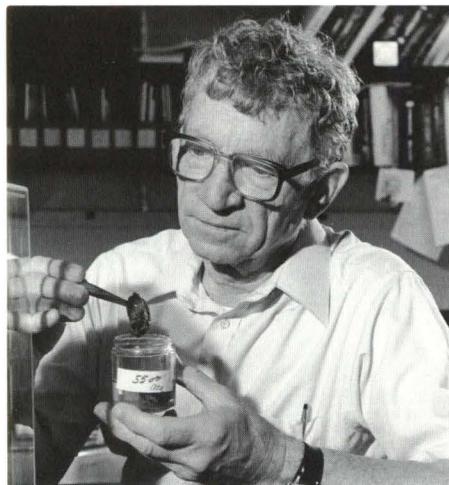
By Patricia Miller

Rain hasn't fallen in the Atacama desert on the border of South Peru and Chile in a millennium, but to Dr. Arthur Aufderheide, professor of pathology and laboratory medicine at the University of Minnesota, Duluth (UMD) School of Medicine, it's the only place in the world he finds appropriate specimens for his research.

Aufderheide is investigating possible correlations between disease patterns in ancient populations and cultural variables, such as diet. His ultimate objective is to discover if lifestyle or a failure to adapt to an environment causes certain disease patterns. Because he needs the physical remains of ancient populations to conduct his research, he travels to the Atacama desert near Arica, Chile, to exhume and study 4,000- to 5,000-year-old mummies.

"If you are working with ancient populations as a pathologist, you need a population to study," says Aufderheide, who is one of only a handful of soft-tissue paleopathologists in the world. He has been studying mummies for more than 10 years. In that time, he has become internationally recognized for his specialty, which he refers to as the optimum way to make use of his medical skills and anthropological interests.

In 1986, Aufderheide diagnosed a lead poisoning epidemic — nearly 300 years after it happened — by using atomic absorption spectroscopy, a relatively new chemical analysis method, to measure the amount of lead in bones of 17th century Barbados slaves. He also solved a long-standing mystery surrounding Egyptian mummies when he discovered that black pigment in the mummies' joints — previously thought to be an indication of



Ken Moran

Dr. Aufderheide examines a piece of pelvic bone from which he was able to determine the age of the specimen.

alkaptonuria, a joint disease — was actually caused by a resin used in the Egyptian embalming process.

Aufderheide long has been intrigued by anthropology. Although he says he always had "an amateur interest" in the subject, his field work with arctic Eskimos in transition from wilderness to town lifestyles fueled his passion for the past.

"The field experiences in the arctic provided the opportunity to experience anthropology first hand. When traveling in the field we were constantly bumping into archaeological sites, and in that climate there is nothing to cover the

archaeological structures," he says. During his arctic studies, from 1964 to 1982, Aufderheide began mapping and photographing the arctic finds — a project that culminated in a report for the Canadian National Museum of Man in Ottawa. His documentary film on the Eskimos and their lifestyle also is shown at the museum.

But Chile is where he finds the climate perfect for his current work. Extremely dry conditions result in the natural preservation of bodies buried centuries ago in the hot sand. Unlike eviscerated Egyptian mummies, which are unsuitable for his studies, the majority of Chilean mummies were buried intact.

"Of course, the degree of preservation ranges from skeletons to almost perfect," he says. "For 8,000 years people have lived there and buried their dead, and by an accident of climate, preserved the body and the diseases."

Aufderheide recently returned from his third Chilean trip, where this year he spent 14 weeks working on an anthropological dig on the team of Marvin Allison of the Medical College of Virginia. Aufderheide's participation was funded in part by the Minnesota Medical Foundation and the National Science Foundation.

The digs were conducted in ancient cemeteries, easily found because of their proximity to former village sites which are close to water sources. Mummies are found buried in sand-filled holes in a limestone base. Seven Chilean cultures spanning a period of time from 6,000 B.C. to 1,500 A.D., and a variety of lifestyles, were represented.

"Lifestyles of the mummies varied dramatically. Older civilizations were hunt-

Patricia Miller is senior information representative at the University of Minnesota, Duluth, School of Medicine.

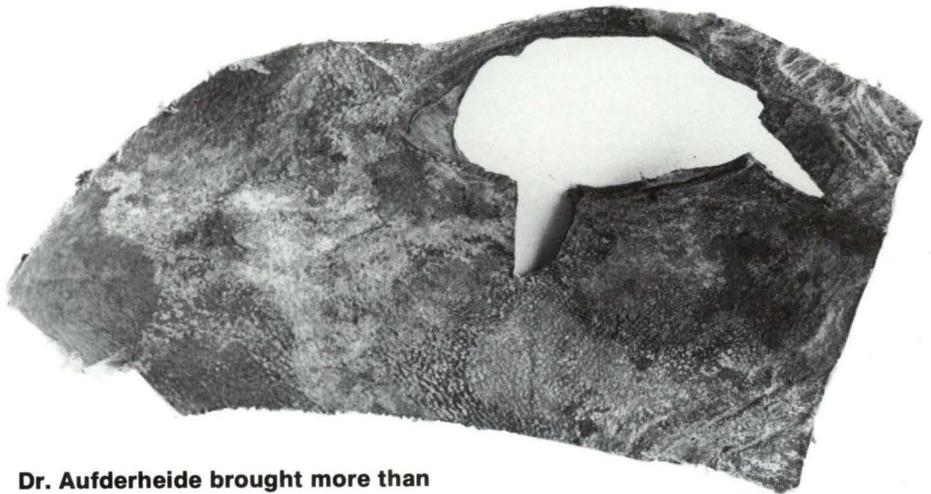


Ken Moran

Dr. Aufderheide and student Kristi Swenson examine the heart of a male mummy whom died at age 18. Through examination of the heart, Aufderheide determined that the young man died of kidney failure when he developed kidney stones that blocked the kidney ducts, a condition evident from the state of the heart.

ers, other were herders of llamas and alpacas, and the more recent civilizations were agricultural groups and fishermen," Aufderheide says.

Aufderheide dissected 64 mummies, primarily from the Chinchorros, an ancient fishing civilization known for burying their dead with occupation-related grave goods including fish hooks and nets. His field work primarily is to collect specimens for his research at UMD, and he returned to the United States with 2,000 samples hand-carried by himself and students. Because this year's work centers on diet, those sam-



Dr. Aufderheide brought more than 2,000 specimens with him on returning to the U.S., including the mummified abdominal wall.



Dr. Aufderheide examines specimens on-site in Arica, Chile.

ples also included collections of a group of foods which might have been included in the diet 4,000 years ago.

"We spent a lot of time collecting samples of things they might have eaten. In the highlands at 4,600 feet we collected animal bones and grasses, we caught fish from the ocean, and we sent divers down to collect shellfish, which were a very rich source of food for these people," he says.

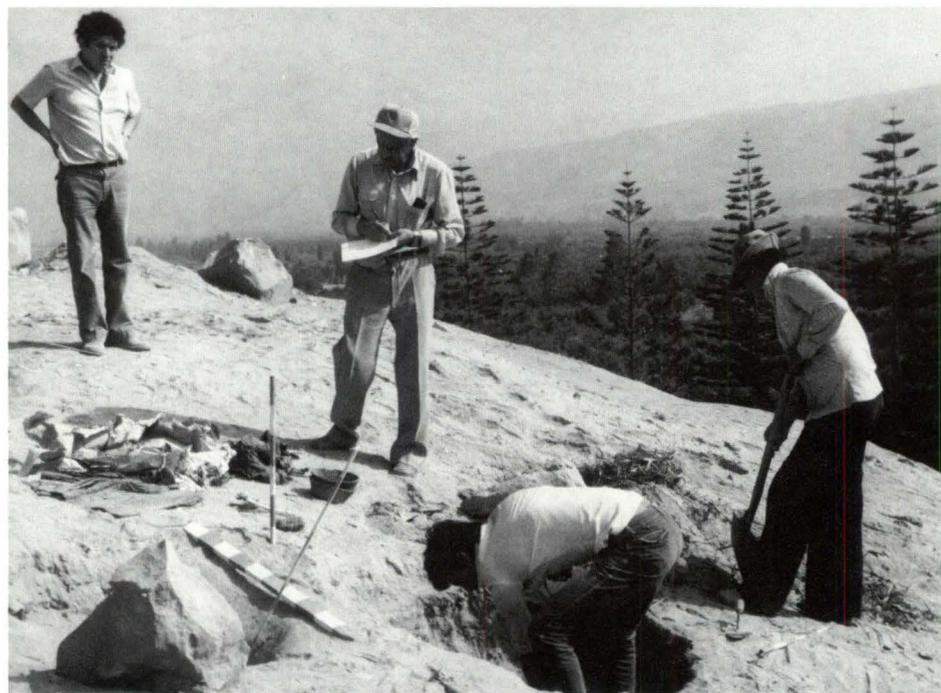
But, as Aufderheide points out, knowing what's on the menu doesn't necessarily mean knowing what specific foods comprised the diet and in what quantities.

Part of this year's research will use scientific techniques, including stable isotope mass spectrometry to analyze bone samples, to reconstruct the diet, and to discover a correlation between it and the development of disease. Through this method, diet from the last 10 years of life can be reconstructed down to specific percentages of red meat, fish, and wild and domestic agricultural products.

Several ancient disease-related puzzles have surfaced that Aufderheide hopes to solve through examining the diet. Some of the ancient Chilean cultures he has examined show a high incidence of osteoporosis — a disease that causes degeneration of the bone — in women who died before age 40. Aufderheide also found a



A wrapped specimen as found in the field.



Members of the anthropological dig team.

mummy with gallstones and one with kidney stones, afflictions common today, but extremely rare in these cultures and possibly directly related to some out-of-the-ordinary part of their diet.

"We're not discovering new diseases. We're finding many that are present today but in different frequencies," notes Aufderheide.

Reconstructing diet also might solve the mystery of a male mummy found with wounds to the chest and face, possibly caused by a spear-like weapon. Aufderheide considers this particularly

intriguing because evidence of organized warfare is non-existent among the populations he has studied and mummies are rarely found with war-like injuries. He speculates the man might have been in the wrong place at the wrong time.

"It will be interesting to find out if he was an insider to the population, which ate a variety of fish and agricultural products, or a highlander whose diet consisted of potatoes, llama, and alpaca, and if his diet fits the group with which he was buried," says Aufderheide. 

CCRF: Pursuing a Dream

The highly successful 1987 Dawn of a Dream benefit for the Children's Cancer Research Fund (CCRF) featured the popular singing group, Gladys Knight and the Pips. Over \$223,000 was raised by the benefit to support research into children's cancer at the University of Minnesota Medical School. The following article by Drs. Mark E. Nesbit and Norma K.C. Ramsay details how the funds raised by CCRF are used.

Over 6,000 children are diagnosed annually with cancer. The section of Pediatric Oncology at the University of Minnesota is working hard to better understand the causes of different types of childhood cancer in order to improve prevention, treatment, and ultimately to cure cancer in children.

We've seen 1987 as a year of great growth toward our goal. CCRF continues to play an integral part in that growth by its continued financial support.

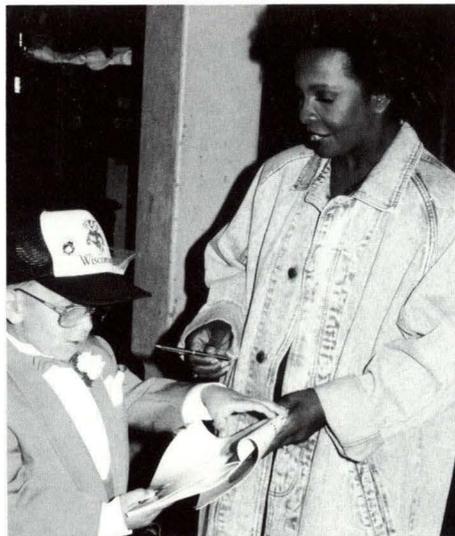
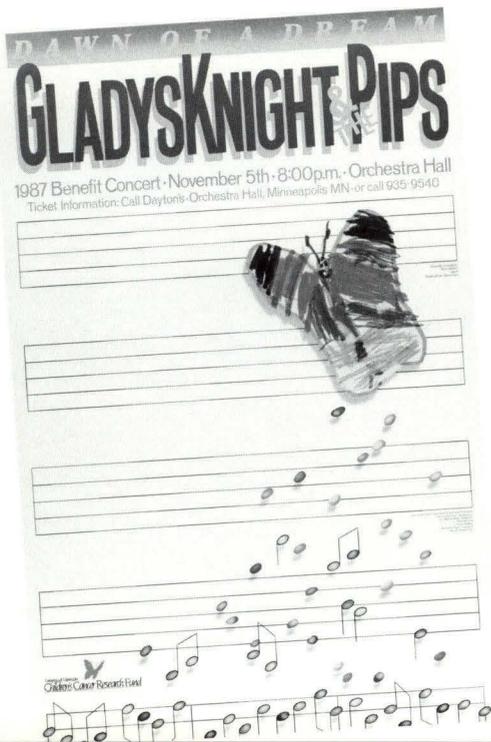
Thanks to many Minnesotans who have given generously to CCRF activities this past year, CCRF monies continue to

fund 25 percent of the budget of the Pediatric Oncology Division at the University of Minnesota. The remainder of the budget is funded from clinical revenue and grant support (primarily coming from the National Cancer Institute at the National Institutes of Health). With CCRF support we have been able to continue our activities in clinical trials, bone marrow transplantation, the study of late effects of children who have been successfully cured, and the exploration of new treatments that we hope hold promise for the future.

Dr. Joseph Neglia completed his fellowship training and joined our staff this past year. His interest in studying the

causes of childhood cancer, combined with the similar interests of Drs. Woods, Arthur, and Robison, has formed a collaboration that will set a new direction for scientific study for the next several years.

Under the guidance of Dr. Robison, we have developed the basis for this new direction. Dr. Robison and Dr. Woods have been funded by the National Institutes of Health to evaluate 200 children with childhood leukemia and lymphoma, looking for possible genetic and environmental causes. Preliminary data on the relationship of bovine virus and immunity of the parents was presented at the spring National Cancer meeting by these investigators. Dr. Robison recently received a large five-year grant to study prenatal and pregnancy-related causes of acute leukemia in infants. These grants, along with a grant received by Dr. Neglia to evaluate the development of second malignancies following successful treatment of childhood leukemia, provide a



Poster contest winner Steve Kristof receives an autograph from Gladys Knight.

What is CCRF?

The Children's Cancer Research Fund (CCRF) has provided financial support for studies in the Pediatric Oncology Division of the University of Minnesota for the past 30 years. Originally CCRF concentrated its energies in leukemia research, but recently the scope of the effort has been enlarged; CCRF now supports training and research studies on all types of childhood cancers.

The major objective of the fund is to help ensure the quality and progress in the fight against children's cancer and to maintain the excellence in this field for which the University of Minnesota is noted. Although CCRF's goal is to put itself out of business by helping to find a cure to children's cancer, the operating mission of CCRF is to improve life expectancy for these children and to assist patients and their families in the process of recovery.

The fund is operated entirely from personal and corporate contributions and special events, and is managed by the Minnesota Medical Foundation. Over 90 percent of the funds received directly support the conquest of cancer.

CCRF started very small — with a family that decided they wanted to make a contribution. It was a grass-roots organization — a group of parents concerned about children's cancer.

CCRF began as the Kosmas Leukemia Research Fund in 1957, following the death of Peter and Marguerite Kosmas's 4-year-old son, George.

Peter and Marguerite wanted to help conquer acute leukemia as well as other childhood cancers, and were spurred on by George's physician, Dr. William Krivit.

Fundraising began with the construction of a wishing well at the Kosmas's Park Terrace restaurant on Wayzata Boulevard. All the pennies and change were brought to the University of Minnesota Hospitals. Fundraising continued on a small scale with bake sales, craft fairs, and benefits in schools and area auditoriums.

Inspired by Diana and Norm Hageboeck, CCRF has blossomed over the last seven years. Following the death of their 13-year-old daughter, Katie, the Hageboecks had a dream — a dream that, one day, there would be a cure for childhood cancers. To realize this dream, Diana and Norm knew they needed something unprecedented. They suggested that CCRF put on a benefit at the Carlton Celebrity Room.

The first "Dawn of a Dream" benefit was held at the Carlton in 1981 starring Paul Anka, with CCRF making more than \$40,000. This event was followed by others starring Lou Rawls and Marilyn McCoo, Neil Sedaka, Burt Bacharach and Carole Bayer Sager, and Dionne Warwick.

With the "Dawn of a Dream" benefits, the growing list of CCRF volunteers, and the advent of other CCRF events, the metropolitan community is becoming involved on an increasingly greater scale, joining the parents and the researchers in a common goal — finding a cure for children's cancer.

strong basis for a comprehensive evaluation of the different causes of childhood leukemia.

This year we have also begun to aggressively address one of the most devastating types of childhood cancers, pediatric neuroblastoma. Hoping early detection might improve present treatment modalities for this tumor, Dr. Woods has set up feasibility studies screening newborn and young infants for early signs of this tumor. Also, by detecting substances in the urine, it is hoped that neuroblastoma can be identified before the disease becomes clinically apparent, therefore making the tumor more easily cured. These screening studies have been ongoing in hospitals in the Twin Cities area as a basis for a larger study to screen 300,000 children born during a three-year period.

With the launching of these new studies, our section continues its leadership role in national trials that treat childhood malignancies in the United States. As a member of the Children's Cancer Study Group, a 32-institutional cooperative, we plan treatment given to a large number of the children diagnosed with cancer in the United States and Canada each year. Dr. William Woods became principal investigator in 1987. Dr. Mark Nesbit continues in the position of vice-chairman of the group's activities.

Members of our section serve on 32 committees of this group and Drs. Woods, Ramsay, and Kersey are chairpersons of several frontline studies that include treatment of acute nonlymphoblastic leukemia, neuroblastoma, and lymphoma respectively. Dr. Bruce Bostrom and Dr. William Krivit are members of the important New Agents Committee piloting newer therapies that are being studied to treat resistant and relapsed patients. Dr. Arthur chairs the important Cytogenetics Committee of the group that is integrating newer genetic discoveries into the clinical trial program to better help us treat different childhood cancers. Our section is well represented in the many epidemiology studies and Dr. Robison chairs many of these committees.

Other members of our division have also received well-deserved recognition. In April all fellows from the Department of Pediatrics at the University of Minnesota presented research talks to the faculty. Dr. John Perentesis, a fellow from Pediatric Hematology/Oncology, was awarded the outstanding research paper.



CCRF President Jan Humphrey and Mary Freeman, benefit chair, with Gladys Knight.

In addition, Dr. Donna Patten, who completed her Pediatric Hematology/Oncology fellowship this past year, has recently been awarded a faculty position at St. Jude's Research Hospital in Memphis, Tennessee.

This was an important year as we prepared our bone marrow transplant grant for competitive renewal. Following submission of the grant, 19 national experts spent a day at the University of Minnesota evaluating our program. We were awarded the highest score in the current grant cycle and look forward to continued funding of our program.

The yearly award from this grant is approximately \$1,500,000. It supports the major part of the bone marrow transplant research program which includes pediatrics, medicine, laboratory medicine, pathology, and radiation therapy. All 12 projects in the grant received approval which signifies the quality of each of the projects. The co-investigators of the grant, Drs. John Kersey and Norma Ramsay, spent a large portion of this past year in preparation of this grant.

Individual Research Projects

Biometric Support Facility —

Dr. Anne Goldman

Studies of Acute Lymphoblastic Leukemia with Monoclonal Antibodies —

Dr. Tucker LeBien

Immunotoxins Against Leukemic Progenitor Cells in Acute Lymphoblastic Leukemia —

Dr. Fatih Uckun

Acute Lymphoblastic Leukemia: Autologous and Allogeneic Transplantation

— Dr. Norma Ramsay

Lymphoma/Peripheral Blood Stem Cells

— Dr. David Hurd

Bone Marrow Transplantation for Chronic Myelogenous Leukemia —

Dr. Phillip McGlave

Prevention and Treatment of Graft-vs-Host Disease —

Dr. Lisa Filipovich

Usage of Recombinant Growth Factors in Bone Marrow Transplantation: Pre-clinical Studies —

Dr. Bruce Blazar

Pharmacodynamics of Cyclophosphamide Therapy —

Dr. Norman Sladek

Bone Marrow Transplantation for Inborn Errors of Metabolism —

Dr. William Krivit

Cytomegalovirus Infection in Marrow Transplantation —

Dr. Colin Jordan

Endocrine Function Following Bone Marrow Transplantation for Childhood Acute Non-Lymphoblastic Leukemia

— Dr. Leslie Robison



Students from Willow River High School raised \$2,501 for CCRF.

Students stay awake to help kids with cancer

Photo and story by Annette Keller

Seeing a bus at the University of Minnesota Hospital and Clinic isn't an unusual sight — city buses arrive at the 'U' every 20 minutes. But seeing a yellow school bus from Willow River, Minnesota, is a different story.

On November 18, the entire eighth grade class of Willow River High School — all 20 students — visited University Hospital. The students came to learn more about a hospital setting, but of importance on this trip was their desire to give \$2,501.90 to the Children's Cancer Research Fund.

The students earned the money during a recent "stay-awake-a-thon." Locked in their high school from 8 p.m. to 8 a.m. on Halloween night, the students received monetary pledges from the community to stay awake. It was these local earnings and a check matched by the local Lion's Club that the students and their teachers brought to University Hospital.

The students took part in the fundraising effort as part of their lessons in a class called Quest. The class is also sponsored by the local Lion's Club.

"Quest is a class designed to teach the kids to relate to other people and to make them feel good about themselves," said Sandi Bohaty, one of the teachers for the class (the other teacher is Bob Paulson). "It's also supposed to help them stay away from drugs and alcohol."

The Quest curriculum calls for the students to work together to help the community and the school. Donating money to the University was the students' way of reaching out to their community.

Although Willow River is nearly 100 miles from Minneapolis, the students weren't necessarily helping a geographic community, but rather a community of kids.

"I think what all of you have done is spectacular," said Norma Ramsay, M.D., professor of pediatric oncology. "It's very special that you did something for someone else."

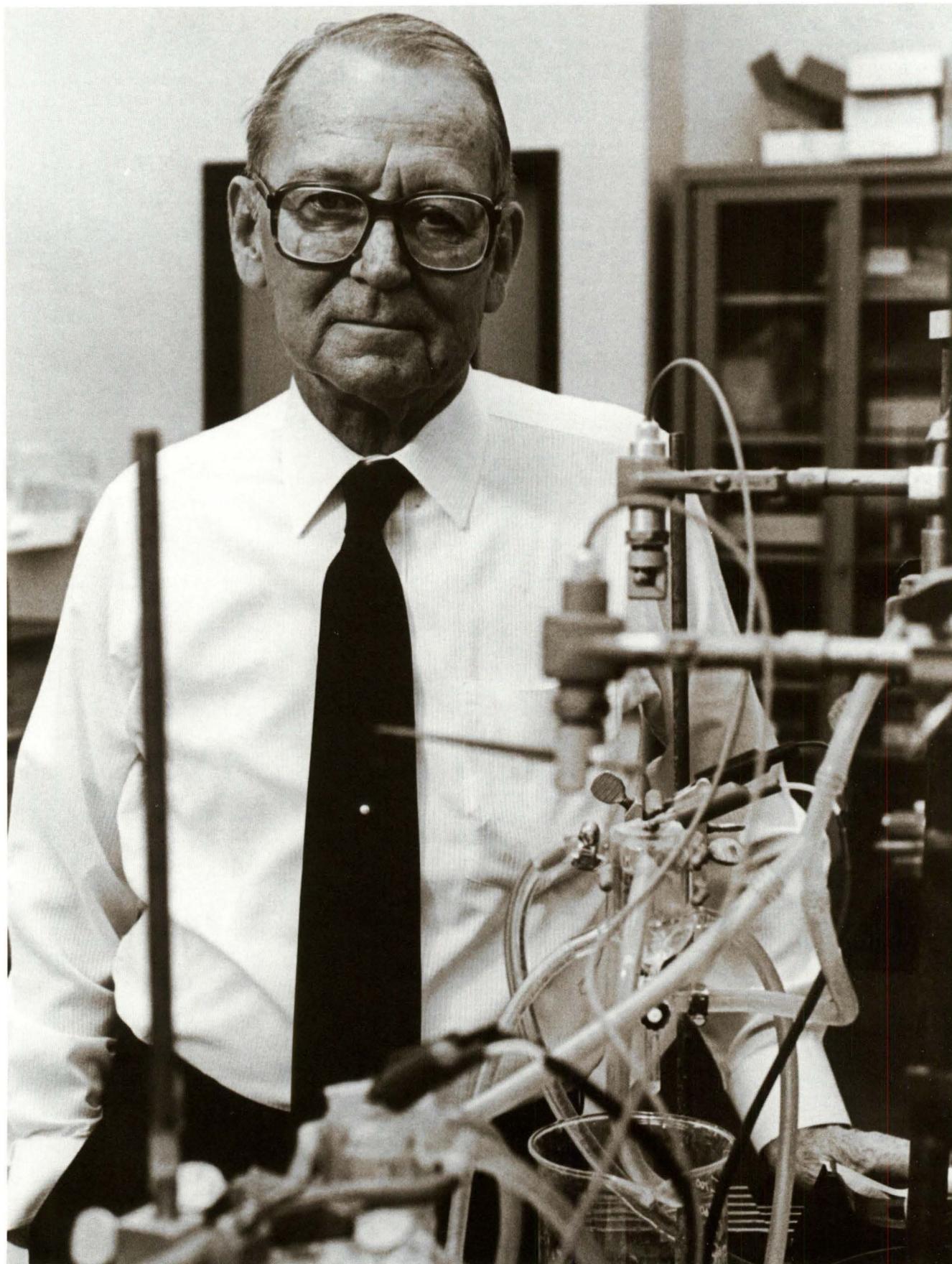
The students were given lunch in the hospital cafeteria, which, unlike the Hinckley Hardee's, is located on the hospital's eighth floor, overlooking the Mississippi River.

After lunch, the students were able to question Ramsay as she took them through a pediatric cancer area. The questions ranged from "Why does their hair fall out?" to "Do they have to go to school when they are in the hospital?" and "Aren't they depressed?"

"The children know very much what is going on," said Ramsay. "We don't lie about their illness. But they aren't depressed all the time either. They have a lot of hope, and so do we, that they will get better."

It's with the help of physicians, researchers, and generous individuals like the Willow River eighth graders that progress is made to help the 6,000 children who will get cancer each year.

Much to the surprise of the eighth grade students, children in the hospital do go to school. "When they are feeling well enough, we have teachers come in and give them their lessons," said Ramsay.



Dr. Frederick E. Shideman was head of the Department of Pharmacology for 25 years.

PHARMACOLOGY

An End and a Beginning

As the 25-year Shideman era draws to a close, the Department of Pharmacology continues to expand its role in medical education and research.

By Jean Murray

The recently announced Frederick E. Shideman-Sterling Drug Visiting Professor Program — established to promote the interchange of knowledge between colleges and universities in the field of pharmacology — is the latest in a series of developments which continue to attest to the vital role played by the Department of Pharmacology at the University of Minnesota Medical School.

At a retirement dinner for Frederick E. Shideman, M.D., Ph.D. — chairman of the Department of Pharmacology from 1962 to 1987 — Dr. Larry Chakrin announced that Sterling Drug was donating \$50,000 to a special fund to support an annual visiting professorship at the department. Chakrin is president of Sterling Research Group and an alumnus of the department, having studied under Shideman.

The Visiting Professor Program will bring to the University scholars of superior distinction in disciplines of interest and significance to students and faculty at the University of Minnesota. Recipients will deliver a major lecture to the faculty and students during their period of residence, and will participate in seminars and workshops.

"There is no doubt the Visiting Professor Program will have an enriching influence on both faculty and students," says Shideman.

The Department of Pharmacology — through the Minnesota Medical Foundation — has also established an F.E. Shideman fund, with the objective of using the investment income to support other research and training functions. If sufficient funds are accumulated, the establishment of an endowed chair is a distinct possibility.

During his 25 years as head of pharmacology, Shideman has seen remarkable growth in the department, much of which can be attributed to his skills in

recruiting talented faculty members to the University. The department has grown from only three members at the time of Shideman's arrival to one of the largest in the country, with a broad array of teaching and research capabilities in basic pharmacology and toxicology, as well as a Division of Clinical Pharmacology.

Members of the Clinical Pharmacology Division have joint appointments in pharmacology and clinical departments in the Medical School. Research activity in the division is varied, including investigation into problem areas such as: atherosclerosis, including studies of the effectiveness of various drugs in lowering blood cholesterol and lipids; kidney disease, including drug problems of kidney transplant patients; treatment and cause of childhood hypertension; long-term study of neural tumors in childhood; and the appropriate use of antibiotics.

The study of pharmacology and toxicology — the science of how chemical substances interact with biosystems — uses the techniques of the basic sciences to investigate drugs and toxic substances. The ultimate goal is to elucidate fundamental mechanisms of action, that is, to determine the biological bases for the therapeutic action of drugs, the way in which the body metabolizes and/or excretes drugs and chemicals, and the reason for toxic side effects of therapeutic agents or toxicity of environmental pollutants, from the subcellular to organismal level of analysis.

Members of the department teach undergraduate medical, dental, nursing, pharmacy, and dental hygiene students. A very significant portion of the teaching mission is also devoted to the training of graduate students and post-doctoral fellows.

The Department of Pharmacology at the University of Minnesota is one of the

top-ranked in the country in training graduate students, due to faculty expertise in all areas of the field. Graduates of the department are successfully heading and staffing other departments of pharmacology in universities around the country, as well as serving in government and industry.

Dr. Fred Shideman assisted in the formation of the University of Minnesota Department of Pharmacology Alumni Association (UMDPAA) in 1983, another important event for the department. Assisted by the staff of the Minnesota Medical Foundation, UMDPAA focuses on maintaining and improving communication between alumni, faculty, and students, and enriching the educational experience of students currently in graduate training at the University.

Drs. N.E. Sladek and A.E. Takemori have also recently completed an informative history of the department, titled *Pharmacology At Minnesota, The First Eighty Years (1906-1986): A Historical Perspective*. In addition to a presentation of the Minnesota years, the volume details the fascinating history of the science of pharmacology from antiquity to the present.

Dr. Horace Loh, the newly named department head of pharmacology, will soon join the department. The Medical School administration's commitment to maintaining the department's preeminence can be attested to by the projected expansion of its research and educational missions by adding several new junior and senior faculty members. The new faculty will bring expertise that will complement the existing faculty's interests and strengthen areas related to molecular biology and neuroscience, employing techniques which are now being used to address problems related to chronic disease states, such as carcinogenesis, mutagenesis, drug dependence, and senility. ☞

MEDICAL SCHOOL NEWSBRIEFS

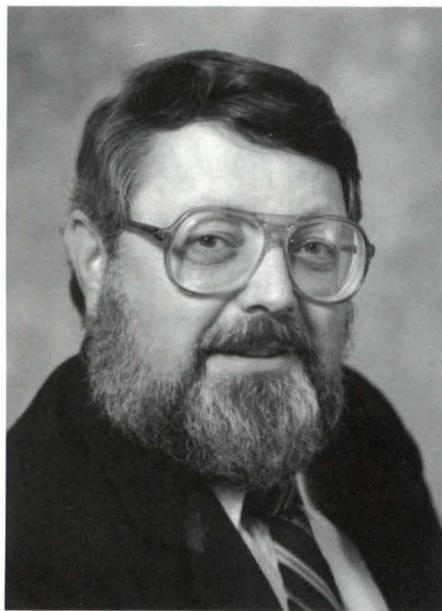
Dr. Boulger appointed interim dean of UMD School of Medicine

Dr. James G. Boulger has been named interim dean of the University of Minnesota, Duluth (UMD) School of Medicine, succeeding Paul Royce who resigned as dean effective September 30.

Boulger is associate dean for administration and student affairs at the UMD School of Medicine. He has served as interim dean twice before, once in 1975 and again in 1980.

During his tenure as acting dean, Boulger will continue his responsibilities in administration and student affairs. He will also continue to direct the Family Practice Preceptorship, a program which gives students first-hand exposure to family medicine.

Boulger joined the School of Medicine in 1974 as associate dean and associate professor of behavioral sciences. He was previously on staff at the Medical College of Ohio in Toledo. Boulger holds a Ph.D. in psychology from the University of Minnesota. □



Dr. James G. Boulger



The new Veterans Administration Medical Center

Dedication held for new Veterans Administration Hospital

The recently completed Minneapolis Veterans Administration Medical Center was dedicated in September, officially opening the \$200 million replacement hospital.

Designed to meet the health care needs of the 750,000 veterans in the Upper Midwest, the medical center contains 845 hospital beds, 18 state-of-the-art operating rooms, three atriums, auditoriums, a

chapel, and a cafeteria. At 1.5 million square feet, the new hospital is one of the largest VA health care facilities in the nation.

The VA Medical Center and the University of Minnesota Medical School have been affiliated for more than 40 years. The new facility will continue to be a base for medical research and education. □

University receives osteoarthritis research grant

A \$3 million grant to study osteoarthritis causes and treatments has been awarded to the University of Minnesota's orthopedic surgery department by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS).

Researchers, including members of the mechanical engineering, laboratory medicine and pathology, and physical medicine and rehabilitation departments, will focus on four basic projects: threshold injury in joints that are not fractured to see if damage can be reversed; spinal arthritis; the role of knee joint looseness

following ligament damages and the subsequent development of arthritis; and the role of joint damage in creating a loss of control over other limb muscles.

Joint and connective tissue disorders affect approximately 36 million Americans; 16 million people in this country suffer from osteoarthritis, the most common form of arthritis.

The grant is a Specialized Center of Research grant that will be distributed over five years and is one of three that were given to U.S. medical centers for osteoarthritis research. □

University and Medtronic to participate in research partnership

The University of Minnesota Medical School and Medtronic have agreed on a partnership to promote research and development in cardiovascular technology.

Medtronic will make a single \$195,000 gift to the University for physical assets necessary for research. Medtronic will also provide financial support of \$125,000 each for up to three University Medical School postdoctoral researchers — one in cardiac surgery and two in cardiovascular medicine — for at least a year. Additionally, up to six Medtronic research employees will be housed at the University for at least a year. All aspects of the agreement except the single financial gift are subject to renewal after a year.

"The University and Medtronic and the sciences of cardiovascular medicine and biomedical engineering will benefit

from this unique and exciting relationship," says David M. Brown, M.D., dean of the University's Medical School. "The translation of science into the creation of innovative products that will benefit health will be enhanced by this program. This agreement will be a signpost for the development of University-industry relations."

The partnership formally began on November 1 and will be up for renewal next November. "Medtronic is pleased to expand our long and productive relationship with the University with such a mutually beneficial undertaking," says Winston R. Wallin, chair and chief executive officer of Medtronic. "We are enthusiastic about the promise this partnership holds for the development of opportunities in cardiovascular therapies." □

Dr. Fenderson serves on selection committee

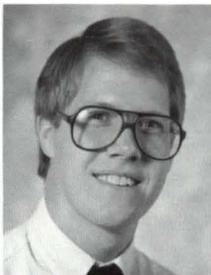
Dr. Douglas Fenderson, professor of family practice and community health and associate coordinator of research at the University of Minnesota Medical School, served as one of four judges who selected the country's most outstanding programs in rehabilitation and vocational services.

Fenderson and his colleagues selected four vocational facilities to receive the \$20,000 awards which are sponsored by the J.M. Foundation. The winners were: Vocational Guidance Services in Cleveland, Ohio; Rural Minnesota CEP in Detroit Lakes, Minnesota; Washington County Mental Health Services, Inc. in Barre, Vermont; and Goodwill Industries of Colorado Springs, Inc. in Colorado Springs, Colorado.

Fenderson has for many years been a leader in the field of rehabilitation. He recently served as director of the National Institute for Disability and Rehabilitation Research. □



Paul Eikens



Kent Johnson



Jonathan Neufeld



Peggy Latchaw



Ann Martin

UMD School of Medicine announces Tilderquist Scholars

Five second-year students at the University of Minnesota, Duluth (UMD) School of Medicine were named recipients of the David L. Tilderquist Memorial Library Scholarship.

John Sanford, president of the David L. Tilderquist Memorial Library, presented the \$1,000 awards to Paul Eikens, Kent Johnson, Jonathan Neufeld, Peggy Latchaw, and Ann Martin.

The scholarship fund was established in 1974 by the board of directors of the David L. Tilderquist Memorial Library. Tilderquist, who died in 1948, was a specialist in eye, ear, nose, and throat medicine and a prominent physician in Duluth. He served as chief-of-staff at St. Luke's Hospital in 1928 and as chief of eye, ear, nose, and throat at St. Mary's Hospital from 1938 to 1939. □

NIH celebrates centennial

The National Institutes of Health (NIH), which supports research in more than 1,300 universities, medical schools, hospitals, and research facilities, is celebrating its 100th anniversary this year.

The NIH originated in 1887 in an attic laboratory on Staten Island. It was part of the Marine Hospital Service, located in New York Harbor to screen immigrants for communicable disease. Government appropriations that year to the laboratory totaled \$300. Today, the NIH is one of five health agencies in the Public Health Service, and is comprised of 12 institutes with a total budget of about \$6 billion.

The University of Minnesota is a major recipient of NIH funds. In 1986, the University's surgery department received more funding than the other 88 surgery departments that received NIH funding nationwide. This makes the University first in the discipline of surgery among both private and public institutions. □

Art exhibit planned

An art exhibition featuring the work of the faculty and alumni of the University of Minnesota Medical School is being planned as part of the Medical School Centennial observance next year. Anyone interested in displaying a piece of their work or in creating a special piece for the event should contact the Anniversary Committee office at (612) 626-1987. □



Dr. Joanne M. Black

Dr. Joanne Black named acting director for Center of American Indian and Minority Health

Helping as many American Indian and minority students as possible graduate into science and math professions is the long-term goal of Dr. Joanne M. Black, newly appointed acting director for the Center of American Indian and Minority Health at the University of Minnesota, Duluth (UMD) School of Medicine.

The Center, which will focus on research, education, and service, brings together under one administration the School of Medicine's four existing American Indian Programs: American Indians into Marine Sciences; Native Americans

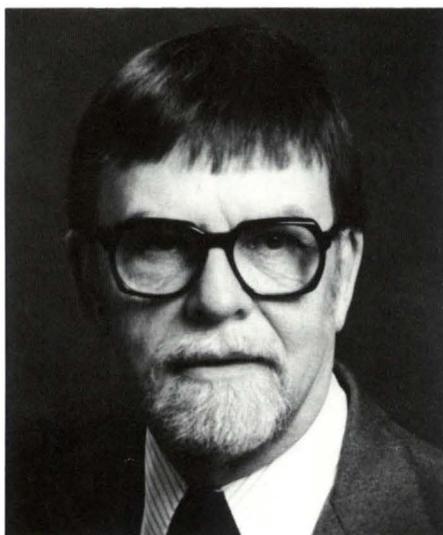
into Medicine; Indians into Research Careers; and the Howard Rockefeller program for high school students.

Black, who is half Chippewa and the first in her family to attain a high school and college education, brings to the position an understanding of the American Indian culture.

"I will be dealing with American Indian students who are problem students in that they perceive things differently, solve problems differently, and for whom English is not a first language," Black says. "I hope to meet their needs in everything from filling out paper work and understanding the bureaucracy, to learning the system."

Black believes the Center's programs will provide continuity that will assist minority students throughout their education — from high school through graduate school. She also hopes she can serve as role model to show American Indian students that they don't have to leave their own culture behind to succeed in a "majority culture."

Black was born in Canada and grew up in the Brainerd and Nisswa area. She recently received her Ph.D. in social welfare and preventive medicine/epidemiology from the University of Wisconsin in Madison. She holds a master's of social work and bachelor's of social work, with minors in preventive medicine/epidemiology, both from UMD. □



Dr. Paul E. Meehl

Dr. Meehl elected to NAS

Dr. Paul E. Meehl, regents' professor of psychology and professor of psychiatry at the University of Minnesota, was recently elected to the National Academy of Sciences (NAS).

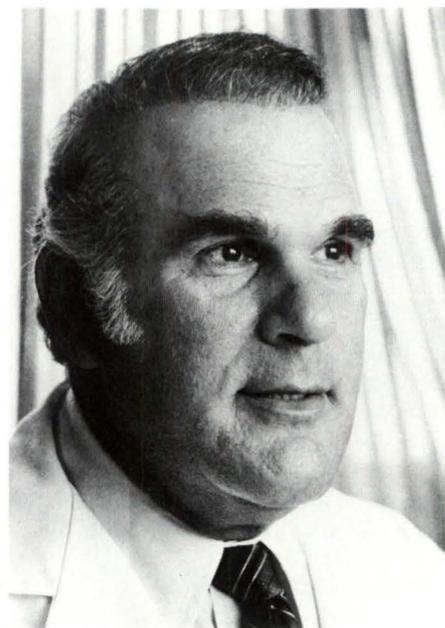
The NAS is a select group, with less than 10 percent of its membership coming from the behavioral sciences such as psychology, economics, political science, anthropology, and psychiatry. □

Dr. Najarian named honorary fellow in Royal College of Surgeons

Dr. John S. Najarian, chief of surgery at the University of Minnesota, was named an honorary fellow in England's Royal College of Surgeons November 12 in London. Najarian holds the Jay Phillips Chair in Surgery and is a University of Minnesota regents' professor.

Honorary fellowship in the Royal College is reserved for those who have demonstrated outstanding ability in surgery or allied subjects, or who have been of great service to the college. The number of living honorary fellows is limited to 150.

The college has been one of the world's most prestigious medical societies since its founding in the late 18th century. □



Dr. John Najarian

MMF REPORT

MMF approves \$174,400 in research grants

The Minnesota Medical Foundation Board of Trustees approved \$174,400 in research grants at its summer quarterly meeting. The amount includes \$83,400 in faculty research grants, \$12,000 in student research grants, and \$79,000 in special grants for research equipment and salary support.

Faculty grants include: **Robert Detrick**, medicine, \$4,000 to study gene transfer and expression in hematopoietic progenitors; **Joseph DiCarlo**, pediatrics, \$1,500 to study tracheal mucosal blood flow in cats: effect of endotracheal tube size; **Ronald Edstrom**, biochemistry, \$6,000 to construct a synthetic model of the muscle glycogenolytic complex; **Rayna Grothe**, pediatrics, \$1,900 to study colipase secretion in the rat: effects of dietary fat, cerulein, secretin, protein YY, and pancreatic polypeptide; **Richard S. Kalish**, dermatology, \$10,000 to study the cloning of antigen specific T-cells from patients with allergic contact dermatitis; **Laurel King**, obstetrics and gynecology, \$7,000 to study in vivo regional treatment of ovarian cancer using L6-ricin immunotoxin; **Bruce Lester**, laboratory medicine and pathology, \$5,000 to study signal transduction proteins and metastasis; **Kathleen McCarthy**, dermatology, \$6,000 to study the fungicidal effect of myeloperoxidase on *Trichophyton rubrum*; **Bernard Mirkin**, pharmacology and pediatrics, \$3,000 to study biochemical mechanisms of immunosuppressive drug actions; **Robert O'Dea**, pharmacology, \$6,000 to study post-translational regulation of neuroblastoma proteins; **Stewart Scherer**, microbiology, \$6,000 to study mating-type genes in pathogenic fungi; **John Strong**, medicine, \$4,500 to study thermophysical properties of tissue exposed to laser; **John Winkelmann**, medicine, \$7,000 to study the molecular characterization of human spectrin genes; **William Woods**, pediatrics, \$8,000 for studies of human cell strains exhibiting marked sensitivity to gamma radiation; and **Ben Zimmerman**, pharmacology, \$7,500 to study progressive alpha-adrenoreceptor and structural alterations in renal vasculature in experimental hypertension.

Student grants include: **Patrick Antonelli**, year 4, \$1,200 for experimental

Robert A. Detrick: MMF Grant Recipient

Dr. Robert A. Detrick, a hematology fellow, was one of 15 faculty members approved for a research grant at the Minnesota Medical Foundation's summer meeting of the Board of Trustees. In all, the MMF board allotted nearly \$175,000 in faculty research grants, student research grants, and special grants (see accompanying list).

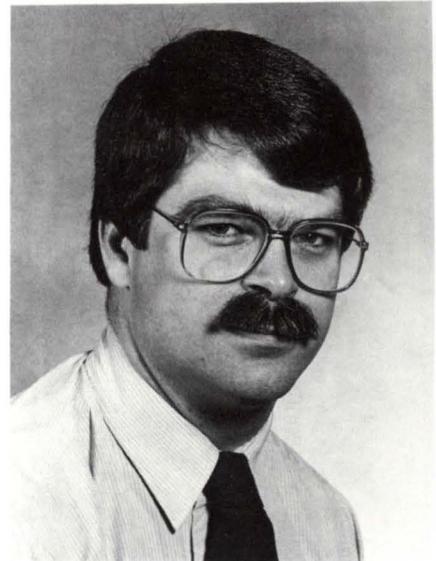
Detrick received \$4,000 for a project to introduce in vitro hematopoietic progenitor assays to the Institute of Human Genetics. The institute, writes Detrick, will "utilize these techniques to investigate the transfer and expression of new genetic information in hematopoietic progenitor cells."

Collaborating with Detrick on his research project are R. Scott McIvor, Ph.D., an assistant professor in the Institute of Human Genetics, and Bruce R. Blazar, M.D., assistant professor of pediatrics.

The formation of blood cells (hematopoiesis) in the human body is a highly ordered and fairly well-defined system. This makes it a good system to study when looking at activity imparted by any manipulations. Initially, Detrick will work at establishing the requisite in vitro clonal hematopoietic techniques using standard tissue culture reagents and methodology.

Subsequent studies will involve the replacement of serum and crude source of growth factors with strictly defined culture components such as reagent grade bovine serum albumin, iron, hemin, transferrin, cholesterol, lecithin, and pure recombinant hematopoietic growth factors. These assays will then be used to analyze the effectiveness of retroviral-mediated gene transfer and expression in murine hematopoietic progenitor cells. Such vectors are of biological interest and may ultimately be valuable clinically. Specific attention will be directed to the expression of retroviral inserted

studies on otitis media with *Pseudomonas aeruginosa*; **Liz Crandall**, year 4, \$1,200 to study the effects of nicotine on human sperm; **Peter Goldschmidt**, year 4, \$1,200 to conduct long term follow-up of closed tibial fractures



Dr. Robert A. Detrick

neomycin resistance and adenosine deaminase (ADA) sequences and the ability of different enhancer elements to improve their expression.

"These studies," concludes Detrick, "will enable us to determine the ability of specific sequences to provide regulated gene expression in the hematopoietic environment, and thus will contribute both to our general knowledge of genetic transfer and regulation and to our technical ability to ultimately integrate these techniques with bone marrow transplantation."

Detrick has been a hematology/oncology fellow at the University of Minnesota Medical School since 1985. He came to Minnesota from the University of California, San Francisco, where he served his medical internship and residency. He received his medical training at the University of Minnesota, after graduating cum laude from Harvard University. As a medical student, Detrick received a student research grant from MMF for a project entitled "Studies of human pluripotent hemopoietic stem cells (CFU-GEMM) in vitro." □

treated with external fixation; **Edgar Goldston Jr.**, year 4, \$1,200 for a lung preservation project: use of oxygen free-radical inhibitors to reduce post-ischemic reperfusion damage and improve donor lung preservation for subsequent trans-

Minnesota Campaign Tally

As of October 1, 1987, the Minnesota Campaign had raised \$281,445,698 in gifts and pledges to support University priorities in the areas of endowed academic chairs, student scholarships, minority programs, and quality academic programs.

University President Kenneth H. Keller announced that one of the major goals of the Minnesota campaign — endowing 100 faculty positions — had been achieved. As of October 1987, 110 chairs and professorships had been established in more than 12 different colleges and schools through private gifts of \$250,000 or more. Most have been matched dollar for dollar by the Permanent University Fund. Nationally, only Harvard and Texas now claim more in total endowments than the University of Minnesota.

"Gifts from the private sector combined with the legislative endorsement — the public/private partnership — have provided the financial commitment necessary to create these chairs that will attract more than 100 outstanding educators," said Russell Bennett, chairman of the campaign executive committee. "Hard work has been done to match appropriate donors with programs that are important to the University's future. The people selected to fill these chairs will give us a big push in the right direction toward becoming one of the nation's top five public universities."

The Medical School continues to be one of the leading academic units in attracting support for chairs and professorships. Currently, the Medical School claims more than 15 of the 110 endowed faculty positions and, with the help of the Minnesota Medical Foundation, continues to seek private funds for endowments in the areas of neurosciences, pediatrics, biomechanics, pediatric dermatology, and thoracic/cardio surgery, among others. □

plantation; **Darla Granger**, year 4, \$1,200 to study the effect of nicotine on flap survival; **Vivanti Jain**, year 3, \$1,200 for data collection for adjustment of the "A" constant used in IOL power calculation prior to cataract surgery; **Jan Nerenberg**, year 4, \$1,200 to study experimental autoimmune encephalitis: animal model of multiple sclerosis; **Margaret Rabaey**, year 4, \$1,200 to study attention deficit disorder and affective disorder; **JoAnne Riley**, year 4, \$1,200 to study murine cytomegalovirus infection of cardiac tissue; and **Muriel Soppelsa**, year 4, \$1,200 to study localization of the tyrosinase gene using RFLP analysis in type 1 oculocutaneous albinism in humans.

Faculty special grants include: **Martin**

Dworkin, microbiology, \$9,000 for the use of monoclonal antibodies to examine contact mediated cell-cell interactions in *Myxococcus xanthus*; **Patricia Faris**, psychiatry, \$10,000 to study the anatomy of the central cholecystokinergic system; **John Lipscomb**, biochemistry, \$7,500 for a low temperature electron paramagnetic resonance spectrometer upgrade; **Bernard Mirkin**, pharmacology; \$20,000 for high pressure liquid chromatography and research program in clinical pharmacology; **Richard Peluso**, microbiology, \$20,000 to study the control of RNA genome replication of a simple animal virus; and **Pamela Schultz**, medicine, \$12,500 to study the interaction of thrombin and PDGF on human mesangial cells. □

Successful Parents' Day held

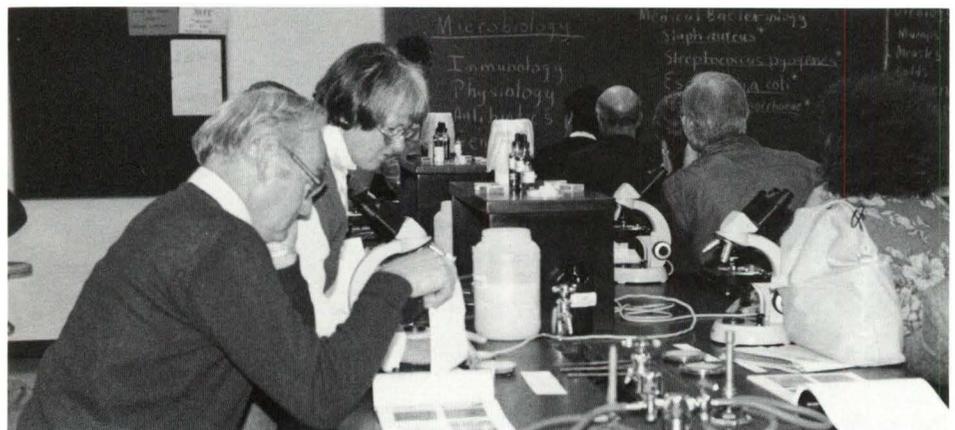
The twelfth annual Parents' Day, held October 17, brought close to 300 parents of first-year medical students to the University campus. The informative program included welcoming talks by Lyle Torguson, president of the Medical Student Council; David Teslow, executive director of MMF; Inge Schwochau, president of the Parents' Committee; and Dr. H. Mead Cavert, associate dean of the Medical School.

Inge Schwochau reviewed the functions of the Parents' Committee in her remarks: to assist the students directly or indirectly in various areas of concern; to cooperate with the Minnesota Medical Foundation and the Student Council in sponsoring several programs during the school year and one annual scholarship fundraising event; and to provide parents

with information about the Medical School.

Associate Dean Sullivan gave a profile of the 1987-88 freshman class, and Associate Dean McCollister explained the Medical School curriculum to the parents. Eldad J. Hadar, president of the freshman class, entertained the guests with a slide show depicting a student's perspective of the first few weeks of Medical School. The financial aid programs were explained by Helene Horwitz of MMF.

The parents were taken on tours of the Medical School facilities, and were offered first-hand explanations of their students' courses by several professors. Following lunch, Assistant Dean Pearl Rosenberg spoke to the parents on "The Care and Feeding of Medical Students." □



Parents enjoy a tour of a Medical School laboratory.

New MMF board members named

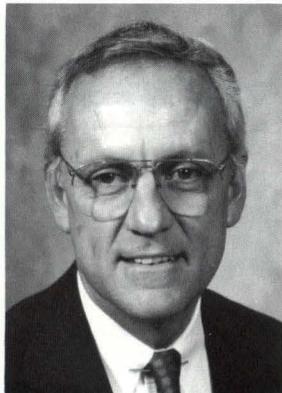
Nine individuals were newly elected and three were re-elected to the board of trustees of the Minnesota Medical Foundation at the annual dinner meeting in October.

MMF's board of trustees is comprised of faculty of the University of Minnesota Medical Schools, leaders in the medical community, and representatives of the corporate community. The board is charged with the overall guidance of MMF in accomplishing its missions of raising and disbursing funds for medical

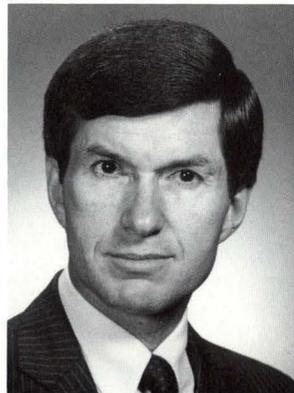
education and research at the University of Minnesota Medical Schools in the Twin Cities and Duluth.

Newly elected to the board were:

William Coyne, Ph.D.: Coyne is group vice president of the Health Care Group at 3M. He holds a Ph.D. in organic chemistry from the University of Virginia. Coyne was a member of the University's biomedical engineering task force, and on the search committee for the director of the Bio-engineering Center.



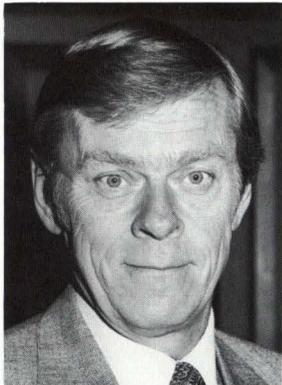
William Coyne, Ph.D.



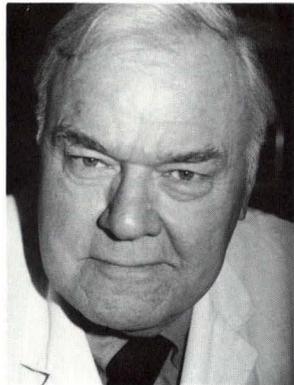
Ronald J. DeSellier



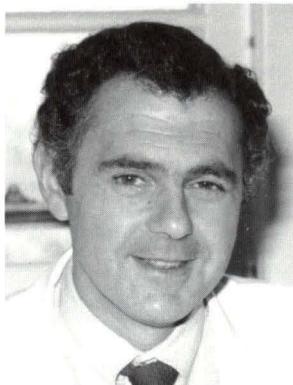
Erwin L. Goldfine



Roger E. Larson



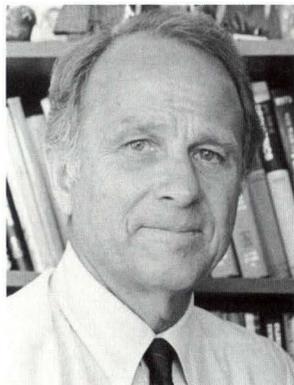
Malcolm A. McCannel



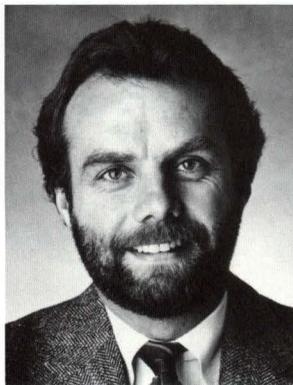
Charles F. Moldow, M.D.



William A. O'Brien, M.D.



Paul G. Quie, M.D.



Steven Sjoblad

Ronald J. DeSellier: DeSellier is a partner of Mairs and Power, Inc., an investment advisory and fund management firm in St. Paul. He holds a degree in business and economics from the University of Minnesota. For the past several years, DeSellier has been an active member of MMF's investment committee.

Erwin L. Goldfine: Goldfine is president of Manley Management Company and vice president of Manley Investment Company. Prior to this, he and his family owned and operated Goldfine's Department Store in Duluth for nearly 40 years. Goldfine has long had an interest in education and medicine. He has served on the Minnesota Higher Education Coordinating Commission, Northern Minnesota Council for Medical Education, and on the University of Minnesota Board of Regents.

Roger E. Larson: Larson previously served as an MMF board member from 1978 to 1986. Currently, he is board treasurer and chairman of the investment committee. An independent consultant in financial management, Larson spent most of his career with Minnesota Mutual Life Insurance. He holds a business degree from the University of Minnesota.

Malcolm A. McCannel, M.D.: McCannel is an ophthalmologist with a private practice in Minneapolis. He is also a clinical professor of ophthalmology at the University of Minnesota. Since 1961, McCannel has volunteered his medical services for Project Hope and Medico, serving in West Pakistan, Indonesia, Peru, Algeria, West Africa, Ceylon, and Brazil, among others. McCannel received his undergraduate training at the University of Minnesota and his medical degree from Temple University School of Medicine in Philadelphia.

Charles F. Moldow, M.D.: Moldow is a professor of medicine at the University of Minnesota and director of the Department of Internal Medicine at the Veterans Administration Medical Center in Minneapolis. Currently, he chairs MMF's research grants committee, which he has been a member of since 1978. Moldow received his medical degree from State University of New York, and served his residency at Bellevue Hospital in New York.

William A. O'Brien, M.D.: O'Brien is a 1945 graduate of the University of Minnesota Medical School. He has been in private practice in Minneapolis since receiving his medical degree. In addition,

O'Brien serves as an adjunct professor of public health and a clinical professor of medicine at the University of Minnesota. For the past several years, he has hosted a call-in health advisory program on WCCO Radio.

Paul G. Quie, M.D.: Quie is currently president of MMF's board of trustees, and was a board member from 1978 to 1986. A professor of pediatrics at the University of Minnesota, Quie has held the prestigious American Heart Research Professorship in pediatrics since 1975. He is past president of the Infectious Diseases Society of America and current president of the American Pediatrics Society. A graduate of Yale Medical School, Quie served his residency at Minneapolis General and the University of Minnesota.

Steven Sjoblad: Sjoblad is president of Fallon McElligott Advertising Agency in Minneapolis. For the past two years, he has been an active member of MMF's community relations committee. He also serves on the board of the Plymouth Music Series.

Reelected to the MMF board of trustees were:

Donald McCarthy, chairman of the board of Northern States Power Company; **Carl R. Pohlad,** president and director of F&M Marquette National Bank; and **James R. Spicola,** president of Cargill, Inc. □

MMF ad campaign launched

Soon television screens, billboards, newspapers, and magazines throughout Minnesota will be carrying the faces of several University of Minnesota Medical School researchers.

The researchers are part of a public service campaign promoting the Minnesota Medical Foundation and its role as benefactor for medical research at the University of Minnesota Medical Schools. Carmichael-Lynch Advertising Agency developed the campaign, donating their time and creative talent. The target date for completion is January 1988.

Ads are being created for television, radio, print media, and outdoor billboards. All feature actual investigators from the University and the field of research they pursue. □

MMF recognizes award winners

Through its scholarship and awards programs, the Minnesota Medical Foundation recognizes outstanding achievement and assists medical students faced with high debt levels. The following scholarships and awards were presented this fall by MMF:

Alpha Omega Alpha Scholarship, a \$1,500 award made possible by a grant from the AOA Honor Society, presented to **Daniel Elieff** in honor of his outstanding achievement during his first year of medical school; *American Cancer Society Scholarship*, \$1,200 awards established with a grant from the Minnesota Division of the American Cancer Society, presented to **Emily Lee** and **Paul Sovell** for demonstrated superior academic achievement and financial need; *Delia Tenille Hobbs Scholarship*, \$1,200 awards made possible through the generosity of John Hobbs, M.D., in honor of his daughter, presented to **William Ayetey** and **George Garcia** for superior academic achievement and financial need; *Nicollet Clinic Founders Scholarship*, \$500 awards given to **Kerry Fox**, **L. Dean Jansen**, **Chris Longbella**, and **David Milbrandt** for superior academic achievement and financial need; *Ruth Boynton Scholarship*, \$1,200 awards given in honor of Dr. Ruth Boynton to **Jessica Nelson** and **Margaret Slakov** for superior academic achievement and financial need; the *Nicolette Norton Scholarship*, a \$600 award given to a medical student planning a career in pediatrics, presented to **Grant Burch** in memory of Nicolette Norton, daughter of Mr. and Mrs. David Norton; the *Parents Scholarship*, \$1,200 awards presented to **Jon Chaffee**, **Steven Hansen**, **Bryan Pucik**, and **Franc Strgar** as a result of funds made available from the Medical Student/Parent Scholarship Benefit held in February; the *William A. O'Brien Scholarship*, \$1,000 awards presented to **Joseph Goswitz** and **Priscilla Porter** in memory of Dr. William A. O'Brien, intended

to reward achievement and encourage excellence in the fields of laboratory medicine and pathology; the *Hulda A. Thelander Scholarship*, \$1,000 awards presented to **Barry Sewall** and **Dennis Peterson** for superior academic achievement and financial need; the *Robert Wood Johnson Scholarship*, a \$1,000 award presented to **Mark Cunningham** by the Medical School Scholarships and Awards Committee for superior achievement and financial need; and the *Medical Student International Study Fellowship*, \$833 awards presented to **Stephanie Hedstrom**, **Susan Kline**, and **Karen Wahmanholm** by Drs. N.L. and Sarah Gault to recognize the positive influence of study abroad.

Additional awards included: the *Roger Dell Memorial Scholarship*, \$1,000 to recipients **Teresa Simonson** and **Charles Taylor**; the *Darnielle Scholarship*, \$1,000 to recipients **Ryan Kelly**, **Greg Mock**, and **Joel Smith**; the *Weaver Scholarship*, \$1,000 to recipients **David Hanson** and **Steven Teynor**; the *Lydia Wetzel Medical Fellowship*, \$1,000 to recipients **Dan Deetz** and **James Mortinson**; and the *Dora Hansen Medical Fellowship*, \$1,000 to recipients **Bob Bonello**, **Blake Carlson**, **Ron Krueger**, **Thomas Rice**, and **Anders Ulland**. □

ALUMNI UPDATE

Dear Colleagues:

Happy New Year to you all! Although January marks the beginning of the calendar year, the Medical Alumni Society (MAS) is already well into a year of activities.

I am happy to report that membership in the MAS over the past year grew to a record 2,139 members. This is an increase of 7 percent from last year. I am delighted to see this growth, and I encourage all of you to join the MAS or renew your membership when the Minnesota Alumni Association sends membership information to you. Your support helps continue the many services provided to alumni.

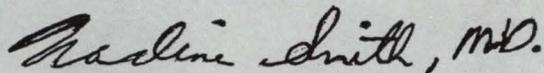
At the last Medical Alumni Society board meeting, we discussed a new program called "Resident Away From Home." This program provides an opportunity for students looking at an out-of-state residency site to stay with an alum living in that area. Dr. Celeste Madrid Taylor, '84, and Margaret Macrae, '78, are heading up the committee. If approved by the MAS, the program should begin matching students with alumni by spring.

It is with great sadness that I report the death of Kris Hagen, '42. Dr. Hagen was well known for his medical missionary work, his practice in Minnesota, and his kind spirit. Most recently he sat on the MAS board as secretary/treasurer. He will be dearly missed by us all.

Thank you for filling out the questionnaire for the Medical Alumni Directory. Over 65 percent of your fellow alums returned the questionnaire! This high return rate will help us produce an accurate directory of lasting value to all alumni.

If you have any questions about the reunions next spring (classes of 1938, 1948, 1958, 1963, 1968, and 1978), the 100th anniversary celebration, or other alumni activities, please don't hesitate to contact me or Robert Burgett at (612) 625-1440.

Sincerely,



Nadine G. Smith, M.D. '52
President
Medical Alumni Society

P.S. Take time to fill out the form in the Class Notes section to keep us — and your classmates — up to date on your activities.

Alumni Profile



Edythmae and Dr. Francis Stutzman

Name: Francis L. Stutzman, M.D.

Class Year: 1945

Home Town: Newport, Minnesota

Current Home: Saratoga, California

Family: Married 43 years to Edythmae Hubbard, a special education teacher; children, Lynn, a nurse; Wayne, an engineer; Janice, a nurse; Steven, a rancher and orchardist.

Position: Retired from thoracic and cardiovascular surgery practice in San Jose, California (practiced with classmate, Newell Wood, for 30 years); presently involved in medicolegal medicine and attending Santa Clara Law School.

Medical Practice History: Introduced vascular and open-heart surgery to San Jose area; started an animal research

laboratory and a heart catheterization laboratory.

Business Involvements: Almond and pistachio ranching (see "Part-Time Venture").

Hobbies: Scuba diving, motorcycling, flying, skiing, tennis, gardening, wood-working, ranching, square dancing.

Advice to Colleagues: The practice of medicine is very serious, but take time out to enjoy some of the other fine things in life, particularly your family and friends. Get out into nature, hike in Yosemite Park, or Glacier, or the Grand Tetons. Take vacations while you are young in body as well as spirit. You only hike this way once so have some fun as well as work.

Part-Time Venture

By Francis L. Stutzman, M.D.

In 1968 I decided to go back to the soil, as it were, as a part-time venture. I had grown up on a farm east of St. Paul, so I was well aware of the crisis-oriented problems of agriculture. No one should become involved in farming or ranching without that form of indoctrination. In farming you are always waiting for the other shoe to fall as the night follows day.

The start consisted of purchasing bare land and planting it in almond trees, considered a very good crop in California in 1968. It proved for many years, however, to be a much better tax shelter than a crop. To diversify, the thought of branching off or going out on a limb with pistachios was appealing. At that time I knew nothing of pistachios other than the fact that they were delicious, costly, came chiefly from Iran, and would probably thrive in Northern California, Chico to be exact.

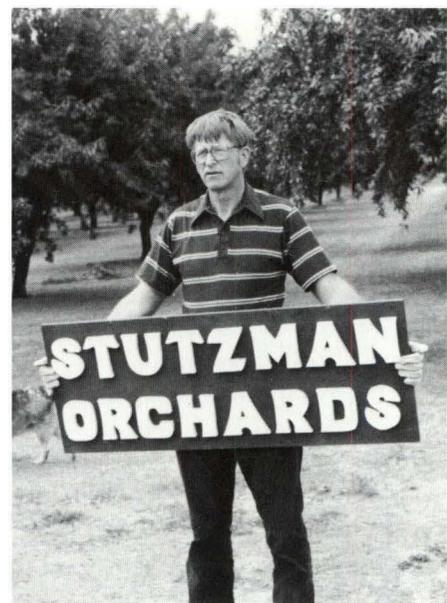
I was able to obtain two pounds of seeds for root stock, built two greenhouses, and planted 50,000 seeds in tiny, peat-moss pots. These all sprouted and after repotting them once into larger pots they were ready for planting in neat rows, 160 to the acre. Thirty-eight thousand were planted, and two years later a crown had to be grafted to the root stock. This is essential as the crown

produced by the root stock does not bear good nuts, and the trees with good crowns have inferior roots.

Many catastrophes happened. Our trees began to die as a result of a herbicide that was drifting over our orchard from adjacent rice fields. It took three years and infinite headaches to solve that problem. It then became evident that pistachios do not begin bearing in 6 or 7 years but in 9 to 10 with good production coming after 15 to 25 years. The bright side of that is that they will bear for 500 years or longer. For the great-grandchildren this will be great; for me it has been a financial black hole in space.

Fortunately, my son-in-law, Daniel Hutfless, graduated from Berkeley in chemistry and business and was talked into managing the ranch. He was a city boy who knew nothing of farming but was bright and dedicated and now has a master's degree in trees and vines and has become head of the research committee of the Pistachio Growers Association of California.

We are going into our own marketing, so we can control our product and put out the very finest pistachios for our customers. It may be interesting to note that pistachios originated in the Middle East, but California varieties are different. The nuts are larger, sweeter, are better split when they come off the trees and have a natural, flesh color. Nuts are dyed red to cover blemishes caused by failure to process them within 12 hours



Dr. Stutzman in his pistachio orchards

after being shaken from the trees.

The nuts after processing and drying will keep well in a tight container for up to three years. The nut is one of the most healthful foods in the world, being the highest in potassium and iron of any nut, fruit, or vegetable. It is also high in calcium, phosphorous, and protein. It contains no saturated fats.

After all these years it is now evident that the ranch will survive providing there are no cyclones, floods, new pests, etc., a condition which I never would have believed many times along the way.

CLASS NOTES

1929

Dr. J. Vincent Sherwood has moved from Florida to Franklin, Indiana, where he is involved in volunteer activities, golf, and pastry cooking. Dr. Sherwood will celebrate his 90th birthday this year.

1935

Dr. Herman Seltz, radiologist for 34 years at the Davis Memorial Hospital in West Virginia, was honored at the annual meeting of the West Virginia State Medical Association for his service of over 50 years in the medical profession. In addition to his work at Davis Memorial, Dr. Seltz has offered consulting services at four area hospitals.

1939

Dr. Milton Hurwitz, St. Paul, is a recipient of the 1987 "Service to Humanity Award" given by United Hospital of St. Paul. He was chosen for his dedication to the hospital and his contributions toward improving the health and welfare of St. Paul residents. Dr. Hurwitz has been governor for the state chapter of the American College of Cardiology and president of the Minnesota Heart Association and the St. Paul Society of Medicine. In 1976, the University of Minnesota Medical Alumni Society awarded him the Harold Diehl Award for outstanding service in the practice of medicine.

1956

Dr. Walter C. Stolov has been appointed chairman of the Department of Rehabilitation Medicine at the University of Washington School of Medicine. He has also been named recipient of the Distinguished Clinician's Award from the American Academy of Physical Medicine and Rehabilitation, and will assume the duty of president of the American Association of Electromyography and Electrodiagnosis this year.



A special visitor to the Medical School this fall was Dr. Earle D. Quinnell Sr., from Wheatridge, Colorado. Dr. Quinnell received his M.D. from the University of Minnesota Medical School in 1913, and will be 100 years old in June. He served his medical career in the military, part of the time in Bremerhaven, Germany, and has the rank of colonel. Dr. Quinnell has two sons, six grandchildren, and 10 great-grandchildren.

1960

Dr. Sheldon W. Damberg, St. Paul, received special recognition at the annual meeting of the American College of Radiology for his outstanding contributions to the field of radiology. Dr. Damberg was named as one of the 104 fellows by the College's Board of Chancellors. Fellowships are awarded for significant scientific or clinical research in the field of radiology, or significant contributions to its literature.

1961

Dr. Robert D. Hilgers has been named professor and chairman of obstetrics and gynecology at Southern Illinois University School of Medicine. Previously, he

was professor of obstetrics and gynecology at the University of New Mexico, and also served on the faculty of the University of Minnesota Medical School. Dr. Hilgers serves as an editorial consultant to *Obstetrics and Gynecology* and the *American Journal of Obstetrics and Gynecology*, and has authored over 60 medical publications.

1970

Dr. Ares Pasipoularides, San Antonio, Texas, has been elected to Fellowship in the American College of Cardiology. He is currently director of research, cardiology, Brooke Army Medical Center, in Ft. Sam Houston, Texas.

1984

Dr. Susan Marie Ramin is one of 25 doctors nationwide chosen to receive the Berlex Resident Education Award, designed to encourage talented young doctors to pursue research into fertility and reproductive medicine. Dr. Ramin is a resident in obstetrics and gynecology at Parkland Memorial Hospital in Dallas, Texas.

1985

Dr. Michael D. Asbell is currently chief medical officer of the American Refugee Committee's outpatient department at Phanat Nikhom Refugee Camp, Phanat Nikhom, Thailand. The camp is a processing center for Kampuchean, Lao, Hmong, and Vietnamese refugees awaiting resettlement to host countries.

1985

Dr. Deborah Ann Davenport is one of 25 doctors nationwide chosen to receive the Berlex Resident Education Award, designed to encourage talented young doctors to pursue research into fertility and reproductive medicine. Dr. Davenport is a resident in obstetrics and gynecology at the University of Minnesota Hospitals.

REUNION TIME

Reunion time is once again just around the corner, with activities being planned for the classes of 1938, 1948, 1958, 1963, 1968, and 1978. It all begins June 3 with the graduation ceremony for the Medical School class of 1988 and continues through the weekend.

Last year over 500 medical alumni and guests attended their respective class reunions at the new Radisson University Hotel on the Minneapolis campus. Old friendships were renewed with stories and reminiscences of medical school days, and career and personal highlights were shared. A good time was had by all.

A full slate of activities is also planned for this year's reunion weekend. These include:

June 3

- Class of 1938 Luncheon
- Graduation Ceremony
- All-alumni reception
- Individual Class Dinners/Programs (1938, 1948, 1958, 1963, 1968, 1978)

June 4

- New Horizons in Minnesota Medicine (CME seminar)
- Medical Alumni Society Annual Meeting and Luncheon
- Diehl Award presentation
- Individual reunion class activities

One reunion notice has already been sent to members of the reunion classes, and a second from the respective chairpersons is scheduled to be mailed shortly.

1988 Reunion Chairpersons

1938-Eva Jane Larson, M.D.	1958-J.B. Cardle, M.D.	1968-John N. Dunne, M.D.
Brian McGroarty, M.D.	30th Reunion	20th Reunion
50th Reunion	1963-Al Larson, M.D.	1978-Paul Severson, M.D.
1948-Robert Fink, M.D.	25th Reunion	10th Reunion
40th Reunion		

Questions may be directed to class chairpersons or Mark Holman/
Robert Burgett in care of:

Reunions/MMF
Box 193 UMHC
University of Minnesota
Minneapolis, Minnesota 55455
Tel. (612) 625-1440

IN MEMORIAM

Joseph M. Barnett, M.D.,

Class of 1938, died September 2 at age 78. A long-time St. Paul family physician, Dr. Barnett had been living in Berkeley, California, since 1967. He practiced in Cold Spring, Minnesota, after graduation from medical school, and established a clinic in St. Paul in 1945. Dr. Barnett is survived by his wife, Eva, two sons, a daughter, and two grandchildren.

Harold F. Buchstein, M.D.,

Class of 1933, died October 29 at age 78. Dr. Buchstein was a pioneer in neurosurgery in Minneapolis during his medical career. He is survived by his wife, Winnifred, three daughters, and four grandchildren.

Leslie Foker, M.D.,

Class of 1933, died in October at age 80. A resident of Minneapolis, Dr. Foker's specialty was occupational medicine. He is survived by a son, a daughter, and five grandchildren.

Charles D. Freeman, M.D.,

Class of 1941, died November 6 at age 75. Dr. Freeman, a dermatologist, practiced in St. Paul throughout his medical career. He was on the staffs of Miller, St. Joseph's, St. Luke's, and Divine Redeemer hospitals. Dr. Freeman is survived by his wife, Alice, a stepdaughter, and two grandchildren.

Lloyd C. Gilman, M.D.,

Class of 1937, died October 26 at age 74. Dr. Gilman was a physician and surgeon in Willmar, Minnesota, for more than 40 years. He served in the U.S. Army as a division medical inspector, and received the Bronze Star and the European Theater Medal. Dr. Gilman and three colleagues formed the Lakeland Medical Center in Willmar, where he specialized in urology. After his retirement Dr. Gilman volunteered his services in Thailand, teaching urology to a general surgeon. He is survived by his wife, Meyrle, a son, two daughters, and nine grandchildren.

Kristofer Hagen, M.D.,

Class of 1942, died September 30 at age 78. Dr. Hagen was a Twin Cities physician and medical missionary to India, Ethiopia, Taiwan, Vietnam, and Honduras, and was also a pastor at two Twin Cities-area Lutheran churches. Dr. Hagen helped build the Mohulpahri Christian Hospital in Santal Parganas, India, and was one of six U.S. physicians who volunteered to go to Vietnam to treat civilians in Phu Vinh. He wrote several books about his missionary experiences, wrote a health column for the Edina, Minnesota, Sun-Current newspaper, and was a frequent speaker at area churches and community groups. Dr. Hagen was also secretary/treasurer of the University of Minnesota Medical Alumni Society. He is survived by his wife, Bertha, three daughters, and two grandchildren.

Peter J. Hiniker, M.D.,

Class of 1927, died September 11 at age 86. Dr. Hiniker, a resident of LeSueur, Minnesota, is survived by two sons, one daughter, and eight grandchildren.

John A. (Jack) Johnson, M.D.,

Class of 1958, died November 5 at age 63. Dr. Johnson was an internationally known professor of physiology at the University of Minnesota Medical School. He was in demand as an advisor to students doing post-graduate work in physiology, and had an international reputation for outstanding research. Dr. Johnson was a visiting professor and/or fellow at the University of Copenhagen, Harvard Medical School, the Weizman Institute in Israel, and the University of Chile. He is survived by his wife, Edith, three daughters, one son, and two grandchildren.

Ronald A. Moss, M.D.,

Class of 1960, died May 12 at age 66. He had been a pathologist and laboratory director at Central Michigan Community Hospital, Mt. Pleasant, Michigan. Dr. Moss received his Ph.D. in plant physiology at Iowa State University and did research at Johns Hopkins and the Argonne Laboratories. He was an officer in the Navy during World War II. Dr. Moss is survived by his wife, Eugenia, a brother and a sister.

A. Eugene Muller, M.D.,

Class of 1939, died in September at age 72. Dr. Muller, a resident of North St. Paul, Minnesota, was a family practice physician. He is survived by his mother, two sons, two daughters, and nine grandchildren.

Carl J. Potthoff, M.D.,

Class of 1932, died August 18 at age 83. A resident of Sun City, Arizona, Dr. Potthoff was a nationally recognized expert in public health and preventive medicine and former faculty member of the University of Minnesota. He was associate medical director of the American Red Cross in Washington, D.C., and author of the American Red Cross First Aid textbook. Dr. Potthoff spent a year as medical director for the Bureau of Indian Affairs in Albuquerque, New Mexico, and was regional medical consultant for the National Foundation for Infantile Paralysis in Rochester, Minnesota, where he helped coordinate early field trials for the polio vaccine. Dr. Potthoff is survived by his wife, Mercedes, two stepsons, and a stepdaughter.

We have also received notice of the following death:

Stanley Dagley,

Regents professor of biochemistry at the University of Minnesota, died October 31 at age 71. Dagley was a leading researcher on bacteria and pollutants, and a pioneer in his field of study. Dagley is survived by his wife, Alice, a son, three daughters, nine grandchildren, and two great-grandchildren.

You are invited to
OPERATION '88
Medical School Fun and Follies

a benefit variety show

by University of Minnesota medical students

Saturday, February 27, 1988 ■ 6:00 p.m.
St. Paul Student Center – St. Paul Campus

Proceeds will go to the Parents Medical Student Scholarship Endowment Fund

WHAT: A benefit showcasing the singing, dancing and comedic talents of the students of the University of Minnesota Medical School. Proceeds will go to the Parents Medical Student Scholarship Endowment Fund to provide financial assistance to scholastically deserving yet needy medical students at the University of Minnesota.

WHEN: Saturday, February 27, 1988
Reception: 6–7 p.m.
Dinner: 7–8 p.m. (Catered by LeeAnn Chin)
Show: 8–10 p.m. (During intermission, students will be serving home-made baked goods, provided by the Medical Student Partners Group.)

WHERE: St. Paul Student Center
(Dinner in Northstar Ballroom, Show in Theater)
University of Minnesota – St. Paul Campus
2017 Buford Avenue
Saint Paul, MN 55108

COST: Tickets are \$30.00 (\$20.00 is tax deductible).
However, your generosity in supporting the scholarship fund above the cost of the ticket is greatly needed and deeply appreciated. Please see the giving categories listed below. Contributors will be listed in the evening's program.

SPONSORS: University of Minnesota Medical Student Parents Committee, Medical Student Council, and the Minnesota Medical Foundation.

For further information call the Minnesota Medical Foundation at 625-1440.
(You may use the envelope in the center of the magazine for your response.)

Ticket Deadline: February 19, 1988

Tickets will be mailed

Name _____

Address _____ City _____ State _____

Zip _____ Phone number _____

I would like _____ ticket(s) at \$30.00 each and also include a contribution to the scholarship fund as follows:

Benefactor – \$500 or above

Donor – up to \$100

Sorry, I am unable to attend but
am pleased to enclose a donation

Sponsor – \$100 to \$499

Ticket(s) only at \$30.00 each

Total enclosed _____ of \$ _____

Groups of eight may be
seated together upon request.

Make checks payable to Minnesota Medical Foundation

Box 193 UMHC
University of Minnesota
Minneapolis, MN 55455

Have You Ever Heard of Jessie Beney? Probably Not . . .

Jessie Beney was probably not on anyone's list of Who's Who in the Twin Cities. However, in her will, Jessie left four charitable organizations \$1,000,000 each.

The Minnesota Medical Foundation is fortunate to be one of the organizations receiving \$1,000,000. It was Jessie's wish that the money be used for cancer research. The generous bequest is a significant contribution to medical science and the ongoing fight against cancer; it is a contribution that may ultimately benefit all of humanity.

Jessie Beney was a career secretary who never married. She lived with her brother for over 50 years, living a conservative lifestyle in a modest home in St. Paul.

As a young woman she came to Minnesota from Canada seeking work. She found a secretarial position with one of St. Paul's leading businessmen. His encouragement led her to invest some of her savings in stocks. It was discovered that Jessie had a special ability to know what and when to buy and sell.

In addition to her own, Jessie Beney also managed her brother's investments. In time, her boss also turned over his personal investments to Jessie for her management. They all became multi-millionaires.

It was one of those classic cases where only her stock broker knew the extent of her estate. Friends and neighbors had always considered Jessie and her brother to be humble persons of modest means.

Only a few people share Jessie's ability to convert modest investments into millions. However, everyone can include something in their wills for those charitable causes that are important to them.

The Minnesota Medical Foundation supports medical research, scholarship, and educational programs at the University of Minnesota Medical Schools. Like Jessie, we hope you will consider a bequest that will contribute to future medical research and education at the University of Minnesota.

____ I have included the Minnesota Medical Foundation in my will.

____ I plan to include the Minnesota Medical Foundation in my will.

____ I would like information about wills and the Minnesota Medical Foundation.

Name _____

Address _____

City/State/Zip _____

Return to: Minnesota Medical Foundation
Gary G. Hargroves
Box 193 UMHC
University of Minnesota
Minneapolis, MN 55455

HISTORICAL PERSPECTIVE

Parks Ritchie, the Second Dean

By Leonard G. Wilson, Ph.D.

Following the death of Dean Perry Millard in February 1897, the University of Minnesota Board of Regents appointed Parks Ritchie as dean of the College of Medicine and Surgery. Then 52, Dr. Ritchie was a leading obstetrician in St. Paul. He had been professor of obstetrics in the medical college since its founding in 1888, and before that had taught obstetrics in the St. Paul Medical College. Courteous and kind-hearted, Parks Ritchie was one of the pioneer physicians of the Midwest, his polished manner and distinguished appearance revealing few traces of the varied experiences and early hardships he had endured.

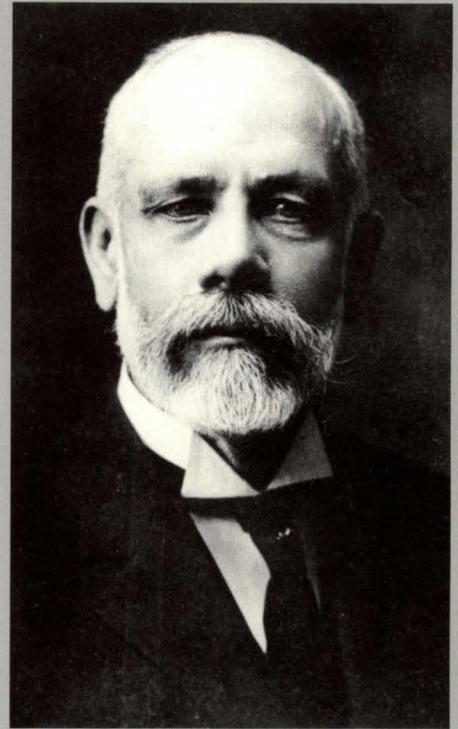
Born December 15, 1845, in Bainbridge, Indiana, Parks Ritchie was educated in local schools and at the Franklin Academy in Franklin, Indiana. As a youth he worked variously as a clerk in the post office, as a school teacher, and as a plant collector for a botanical drug business. For a time he operated his own grocery business. In 1864, at the age of 18, he enlisted in the 132nd Indiana Volunteers, and served in the U.S. Army during the final years of the Civil War.

In 1868 Ritchie began to study medicine, and in 1870 received his M.D. degree from the Medical College of Ohio in Cincinnati. After practicing medicine for several years in Petersburg, Indiana, he spent the winter of 1880-81 in post-graduate medical study in New York City. In 1882, he moved to St. Paul where he built up a large practice, acquiring many friends both among his fellow physicians and his patients.

As dean from 1897 to 1906, Parks Ritchie guided the College of Medicine and Surgery through a period of rapid development, with its accompanying difficulties. Dean Ritchie dealt with the practical problems of implementing the four-year medical course. During his tenure the admission requirements were increased from those of merely high school graduation to two years of college education, and the combined six-year B.Sc.-M.D. course was introduced.

By 1906, the College of Medicine and Surgery had added three substantial buildings, one of which — the splendid new Institute of Public Health and Pathology — was now the largest among the five medical buildings on the campus. The Anatomy Building, completed in 1900, had burnt in 1902 with heavy loss of equipment and anatomical preparations, and had been rebuilt. The college had established a dispensary or outpatient clinic for clinical teaching in a new building erected in 1900 at Seven Corners in Minneapolis. The faculty had grown from 46 to 87 in number.

Dean Ritchie presided over the conflicts and tensions that inevitably accompany so much accomplishment, retaining throughout the respect and affection of his colleagues. After his resignation as dean, he continued as professor and chief of obstetrics until his sudden death from a stroke on February 2, 1913.



Dr. Parks Ritchie



Minnesota Medical Foundation

Box 193 UMHC, University of Minnesota
Minneapolis, MN 55455
(612) 625-1440

Nonprofit Org.
U.S. Postage
P A I D
Minneapolis, MN
Permit No. 155

CALENDAR OF EVENTS

Current Concepts in Perinatal Medicine

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

February 18-19

Topics in Geriatric Medicine: Drug Therapy Symposium IX

Radisson University Hotel, Minneapolis
CME (612) 626-5525

February 24-25

Managing Unstable Angina, MI, Lipids

Hyatt Regency, Minneapolis
CME (612) 626-5525

February 26-27

Sixth Annual Critical Care Conference

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

March 2-4

Family Practice Today

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

March 17-18

Geriatric Medicine Review

Health Sciences Center, University of Minnesota, Minneapolis
CME (612) 626-5525

March 21-25

Cost Effective Approaches to Common GI Problems

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

March 25

ENT Update, St. Joseph's Hospital

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

March 25

Ninth Annual Occupational Medicine Update

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

March 25

Pulmonary Function Testing Workshop

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

April 6-8

46th Annual Course in Allergy and Clinical Immunology

Mayo Auditorium, University of Minnesota, Minneapolis
CME (612) 626-5525

April 7-8

Annual Obstetrics & Gynecology Update

St. Paul-Ramsey Medical Center, Ramsey Clinic, St. Paul
CME (612) 221-3992

April 7-8

Annual Ophthalmology Course: Medical Retinal Update

Holiday Inn Downtown, Minneapolis
CME (612) 626-5525

April 11-12