The Great Wall of China is a popular tourist stop. Joan and Louis Avioli, M.D., report on sight-seeing and science in China with new friends and old. (Photo by Herb Weitman, 1979)
# Outlook Magazine

## Winter 1982

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**On the cover:**
One of the massive sculptures along the Sacred Way in China. Joan and Louis Avioli, M.D., write of their scientific exchange tour with other WUMS scientists, beginning on page 8.

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**Winter 1982**

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Adam Bernstein was born with remarkable eyes. A vivid, sparkling blue, they seemed to focus on the good things in life.

Adam was only eight years old when he died. In his lifetime he was cherished, surrounded by warmth and love. His parents, Marla and Don Bernstein, were in anguish when he died last June after an automobile accident in St. Louis.

The weekend their son died was one of numbness and almost unbearable sorrow, but somehow the Bernsteins came to understand that Adam's eyes were his legacy. When they knew there was no hope, the Bernsteins decided to donate his corneas to the St. Louis Eye Bank, located at Washington University School of Medicine.

Their grief and desolation is lightened because they know that somewhere two people — the recipients of Adam's corneas — treasure their ability to see, the Bernsteins say.

"Adam had gorgeous blue eyes that danced," Marla remembered. "They had the thickest, darkest, longest eyelashes. When we were asked to donate his corneas, it seemed practical and especially appropriate because he had such insight and saw so deeply into other people."

Just eight days after Adam's death, Marla wrote a letter explaining her and her husband's decision to permit the corneal transplant.

"We did not allow the transplant to be done because we wanted praise or gratitude from anyone," she wrote. "We did it because it was our only way of making sure that part of our very special son lived on in a beneficial and tangible way. It was actually a comfort for us to do this, and our hope is that the two people who now have the ability to see would possibly have a new and deeper outlook on life."

The story of the Bernsteins and their son Adam is one of tragedy, but at the same time, one of hope. The story, or a variation of it, is repeated during corneal transplants some 250 times a year at Washington University Medical Center and 20,000 times a year elsewhere in the United States.

Corneal transplant operations have been conducted successfully for 20 years, but there's still a great need to increase public awareness of the urgent demand for donors, according to Stephen Waltman, M.D., professor of ophthalmology at the School of Medicine and medical director of the St. Louis Eye Bank.

The eye bank, a non-profit agency which provides eyes to surgeons for corneal transplants, research and teaching, constantly works to overcome the critical tissue shortage. The organization maintains a waiting list at all times of at least 50 patients who need transplants, according to administrative director Michelle Bowman.

Because of that shortage, the eye bank asks doctors, nurses and other health care professionals to help in acquiring tissue. That's not an easy undertaking, Bowman said, but it's essential for restoring sight to others.
"We ask nurses or doctors on the floor to approach the family, which is grief-stricken, and ask a very difficult question," she said. "We have found, though, that most families are appreciative if we ask, ‘Have you thought about donating corneas to help someone else see?’” Many times families offer to donate corneas before a staff member makes the request, she added.

If a family consents to the donation, a technician or resident is sent within six hours to remove the eyes, Bowman explained. Euculation, or total eye removal, is the best method for removing tissue because it limits the danger of corneal damage and ensures safer delivery to the eye bank, she said. The procedure takes from 5-10 minutes, and does not cause any disfigurement to the donor.

She stressed that almost anyone can be a donor, regardless of age, race, color of eyes, or degree of myopia or farsightedness or astigmatism. Even people who take medicine for high blood pressure or diabetes may donate their eyes. However, the eye bank cannot use tissue from patients who died with sepsisemia, acute leukemia, such viral infections as infectious hepatitis or rabies, and Creuzfeld-Jakob disease, severe chemical burns.

Donations to the St. Louis Eye Bank are made sporadically, Bowman commented. “Sometimes, we get three or four pairs of eyes a week, and then other times we’ll go for two weeks with no donations.” Donors to the medical center agency come from throughout Missouri and southern Illinois, she said. The eye bank is aided in its efforts by the Southern Illinois Lions, a civic organization which has trained enucleators throughout the state, as well as volunteers who transport the eyes to St. Louis. The eye bank stores donated eyes until they are needed for a transplant operation, which is usually scheduled within 48 hours.

Several ophthalmologists on the Washington University faculty perform corneal transplants. There is a 90 percent success rate in transplant operations at the medical center, said Waltman, who is on the staff of Barnes and Children’s hospitals. Rejections account for the other 10 percent. “Even so,” Waltman said, “the operation can be repeated after an appropriate recuperation time.”

He estimated that 20 percent of the operations restore productive lives to young people. The remainder, he said, help older patients become independent again.

During the cornea transplant operation, the patient is usually sedated and given a local anesthetic, Waltman explained. For the hour-long procedure, the physician is seated, peering into a microscope that magnifies the eye 15-20 times. An eight-centimeter section of the central cornea is removed with the trephine, a round blade similar to a cookie cutter, and replaced with the donor’s cornea. The new cornea, .52 millimeters thick, or one-fifth of an inch, is sewn in with about 30 stitches of suture material the thickness of three red blood cells.

Waltman said that, after the operation, the cornea recipient remains hospitalized for three to four days until the bandages are removed. For the next three to six months, the patient must be very cautious not to disturb the suture, and must use cortisone eye drops to prevent rejection.

That’s a small price to pay for the gift of vision, a priceless gift given out of a spirit of generosity, a motivation to help others. That generous spirit is especially visible in families like the Bernsteins who lose a loved one, but are still able to think of improving the lives of people they will never know.

Marla Bernstein, months after her son’s death, reflected, “Now I want to do the good things Adam would have done. That’s the best tribute. I want to reach out and help others as much as I can, because it’s not only helping them, it’s helping me. I want to make the pain constructive, not destructive.”

It helps to talk, she said, and to get involved in causes. That’s one of the reasons she volunteered to encourage others to donate corneas to the St. Louis Eye Bank. She told her story in a special St. Louis television series on corneal transplants. She participated in an in-service training program for staff members at DePaul Community Health Center in St. Louis, stressing the importance of donating corneas or other vital organs. She and her husband, Don, also found comfort in Compassionate Friends, a non-denominational support group for parents who have lost children. Today, she is a volunteer with Lifeline, a Red Cross agency supporting organ donation.

The Bernsteins have started a memorial fund with contributions made in Adam’s memory at St. Louis Children’s Hospital, part of the Washington University Medical Center. The funds will be used for the Infant Learning Project, which conducts research in learning disabilities.

Also, the couple has pledged to contribute to a playroom in the new Children’s Hospital, which is scheduled for completion in the spring of 1984. When he was living, Adam enjoyed playing in Adamsville, a little city he had made with his toys; the Bernsteins plan to get new versions of the same toys from the Fisher-Price Company to donate to the playroom.

Gradually, the Bernsteins are resuming their normal daily activities, learning to go on with their lives as they grieve for their son. They and their three children miss Adam very much, but still wish the best for the two people they were able to help through the cornea donation.

“May these two people see with their hearts along with their minds, as Adam always did. He was so sensitive to everyone, and lived his life as though there would never be another tomorrow. May these two individuals be able to have the perception and appreciation that Adam had. God bless them with all of the beautiful things in life.”
Theodore Munns, Ph.D., points out some of the components of the Gene Machine. The five small bottles contain nucleotides from which the machine's computer draws the required combination. The larger black-topped bottles contain a wash. The technician keys in the sequence of bases and reaction needed, and the computer controls the flow of nucleotides together and through washings, and then the subsequent sequence of bases and reagents.
They've dubbed it "The Gene Machine." Yet instead of churning out the Jordache or Calvin Klein variety, it can artificially produce DNA, the genetic material of living cells.

Molecular biology at WUMS came of age last spring when the Gene Machine arrived, without fanfare or fuss. Researchers believe that this new technological tool may revolutionize the study of molecular biology and the molecular pathogenesis of certain diseases.

What does the Gene Machine do to merit this fervid excitement in the scientific community? With as little as a few hours of training, a technician can program the apparatus to produce automatically at least 50 mg (micrograms) of a gene segment in only a day. Before the Gene Machine, it took several months for a skilled organic chemist and several technicians to synthesize the same sequence in a hundred-fold smaller quantity.

A compact, desk-top conglomerate of electronics and tubing, the Gene Machine can build chains up to 20 nucleotides long. Longer sequences can be made by constructing separate units and joining them together with enzymes called "ligases." After uniting, they can be spliced into the DNA of living organisms using recombinant DNA technology. In the growth environment of a bacterial cell, the gene can become active and direct the synthesis of the protein it encodes.

Washington U. researchers are also utilizing a Protein Sequencer in tandem with the Gene Machine. This instrument can delineate the exact amino acid sequence of any protein, providing the investigators with a dual-edged investigative probe. First, the amino acid sequence of a protein is determined. Then, the Gene Machine can be programmed to synthesize the gene for that protein. Splicing the gene into bacteria can provide virtually unlimited quantities of the protein for therapy or research. The newly made protein can also be analyzed in the Protein Sequencer to verify its authenticity.

Even though gene production and verification is automated, gene therapy is not in the immediate future. "With the current state of the art, we're limited to making small gene segments," noted Theodore W. Munns, Ph.D., assistant research professor of medicine. Munns, who spearheaded the effort to obtain the Gene Machine (officially named the Oligonucleotide Synthesizer by its maker, Bio Logicals of Canada), points out that the 46 chromosomes of each human cell contain an estimated 3.2 billion pairs of nucleotides. "Even though it is primordial at this point, the Gene Machine could have important, immediate ramifications for many areas of research," Munns said.

In collaboration with Bevra Hahn, M.D., associate professor of medicine, Munns plans to use the Gene Machine to construct small DNA sequences to study autoimmune disorders such as systemic lupus erythematosus. SLE, as it is called, is a disease in which the body becomes engaged in a sort of civil war against itself. Antibodies, which normally fight foreign invaders such as microbes or chemicals, begin assaulting one's own body. When these pathologic antibodies begin attacking the patient's DNA, bulky conglomerations of DNA bound by antibody enter the blood stream and circulate to many organs and systems, eventually clogging the kidneys and leading to renal failure.

"The question is," said Munns, "what is there in the DNA that makes antibodies bind to it? By using the Gene Machine to construct known nucleic acid sequences, we may be able to determine if these antibodies are binding a particular nucleotide sequence of DNA or a particular structure of the DNA. With this knowledge, it may be possible to develop extremely sensitive diagnostic tests as well as to isolate and purify the antibodies involved in the disease." Consequently, a new therapeutic treatment for SLE could result by artificially making a second antibody, called an anti-idiotypic antibody. When injected into a lupus patient, it could neutralize the pathologic antibodies and, more important, "kill" those cells responsible for their synthesis.

Other ways in which researchers are utilizing the Gene Machine is in studying the structure, regulation and genetic origins of proteins. To understand this application, one must review molecular genetics which dictates that the natural flow of information progresses from DNA to protein. Despite the diversity of living matter, only four nucleotides compose DNA: adenine (A), guanine (G), cytosine (C), and thymine (T). A unique combination of three of these nucleotides specifies an amino acid on a protein chain. For example, G-C-C is the code for alanine, and A-A-A for lysine, and so on for all of the 20 amino acids which compose protein. From the ordering of the nucleotide triplets, a gene for a specific protein is created.

Yet, before a protein appears, several events must occur. A "messenger" nucleic acid (messenger ribonucleic acid, or mRNA) forms in a specific manner along the gene which encodes the protein. This mRNA then detaches, leaves the nucleus and, in the cell cytoplasm, joins protein-making "machinery" to allow "translation" of its message into the specific protein.

The most direct way to study a protein and its significance in a cell is to isolate it biochemically and purify it. However, in many cases, this cannot be done because of exceedingly low concentrations or other factors.

Studying just such "finicky" proteins are Jeffrey Gordon, M.D., assistant professor of medicine and biological chemistry; Arnold Strauss, M.D., associate professor of pediatrics and biological chemistry; and David Alpers, M.D., professor of medicine and director of the gastroenterology division of the department of medicine.
The Gene Machine

This machine sequences individual proteins by removing one amino acid at a time from one end of the chain. Gregory Grant, Ph.D., checks notes on progress. Grant is director of the protein chemistry facility and assistant professor of biochemistry in medicine.

One group of “finicky” proteins, called apolipoproteins, associate with lipids to form lipoprotein particles which are the principle carriers of cholesterol, triglycerides and phospholipids in the blood. Disorders in the metabolism of these lipoproteins are associated with the development of coronary artery disease and atherosclerosis.

Because the intestine is a major site of apolipoprotein synthesis, Gordon hopes that “by studying the metabolism of these proteins in normal and abnormal states, we can gain insight into the role of the intestine in the development of these diseases.” In the past, however, a major stumbling block was the inability to measure apolipoprotein levels in the intestine because these same substances are present in the vascular and lymphatic systems which surround the gut. “So, as soon as you disrupt the intestinal tissues, you get contamination of apolipoproteins from lymph and blood, Gordon explained.

Now, enter the Gene Machine.

“Because it is difficult to measure intestinal apolipoprotein levels directly, we’ve been forced to utilize molecular biological techniques,” Gordon added, “essentially to come in the back door.” He continued, “If you can’t isolate and quantify a desired protein, another approach is to examine the specific messenger RNA responsible for the synthesis of the protein. Therefore, quantifying the levels of apolipoprotein “message” allows us to look indirectly for changes in the level of the protein itself.”

Cells make hundreds to thousands of different proteins, and thus different “messages,” so how can only the desired one be isolated?

Based upon the genetic code for the amino acid sequence of the protein (in this case, apolipoprotein Al or apo-AI), the Gene Machine can be programmed to generate the appropriate nucleotide sequence. After further modifications, this is utilized to bind and isolate from the entire population of intestinal cellular “messages” the one type that produced apo-AI. Measuring “message” levels to quantify apo-AI concentration can also answer some other intriguing question about how and when intestinal genes turn “off” or “on” within the cell. That is because of the unique anatomy of the intestinal cells, which are called enterocytes.

The intestine is lined internally with microscopic projections called villi which reach into the gut lumen like the pile on a shag carpet. The enterocytes which comprise the villi differ in their levels of maturity. Undifferentiated at the base, they’ve essentially gone to the head of the class near the tip and have become fully specialized cells. This cellular evolution proceeds rapidly and continuously such that every two to three days, the human small intestine completely regenerates its lining, according to Gordon.

By following the appearance and accumulation of apo-AI “message” in the enterocytes, Gordon and his associates may be able to correlate the expression of this gene with “maturation” of the intestinal lining cells. This eventually could provide important answers as to how the intestine may be involved in coronary artery disease and atherosclerosis.

“In a general sense,” Gordon said, “we can utilize the Gene Machine technology to help understand the molecular pathology of many diseases to determine if abnormalities occur in the structure of certain proteins and the genes encoding those proteins.”

If defective disease-causing genes are pinpointed, can the illness be cured simply by using gene replacement therapy?

Gene replacement therapy will be used in the foreseeable future,” Gordon said, “especially in treating genetic defects that are now very well understood and described in the literature.” Correct genetic function depends on inserting the correctly made gene into the exact location on the chromosome. Therefore, the chromosome must be correctly mapped and the tissue into which the correctly made gene is to be inserted must be accessible. For example, to treat sickle-cell anemia, gene replacement therapy could be applied to bone marrow. But in hemophilia, the therapy may not be able to be used until the exact location of Clotting Factor VIII synthesis is determined. Other diseases which could be subject to gene replacement therapy include cystic fibrosis, perhaps muscular dystrophy, and thalassemia.

In fact, in 1980 there was a controversial attempt to apply gene replacement therapy to patients in California who suffered from thalassemia, an anemia caused by insufficient synthesis of the beta globin protein in the blood. The researcher had tried the methods unsuccessfully in mice. It was unsuccessful in the humans, and the attempt raised considerable discussion of the ethics of human experimentation. “It seems that man’s technical advances exceed ethical and moral advances,” Gordon said. He added that the medical profession would have to develop criteria for patient selection and guidelines for monitoring the success of the therapy, and conduct thorough risk-factor analysis before clinical applications of gene-replacement therapy could become a reality. “As gene replacement therapy develops, important ethical questions will arise about conducting it in an embryo in the early stage of development,” Gordon said.

The Gene Machine, today’s technological marvel linking up short chains of nucleotides, will someday be referred to as “an early primitive tool” in the quest for cures of inherited diseases.
The HPLC, or High Pressure Liquid Chromatograph, verifies the size of the nucleotide chain produced by the Gene Machine.

Part of the "guts" of the Gene Machine.

These two printouts illustrate how the HPLC quickly separates a complex mixture of amino acids.
China Revisited

by Joan Avioli and Louis Avioli, M.D.

About the authors:
Louis Avioli, M.D., is the Sydney M. and Stella H. Shoenberg Professor of Medicine and director of the Bone and Mineral Metabolism division at the Jewish Hospital of St. Louis.
Joan Avioli is chairperson of the English Department and a teacher at McCluer North High School in suburban St. Louis.

They first toured China in 1979 as part of the Orthopedic, Science and Bioengineering Group (OSBG). The group of American physicians, surgeons and bioengineers lectured on medical and endocrinological aspects of bone and mineral metabolism. They spoke at hospitals and medical schools in Guangzhou, Beijing (formerly Canton and Peking), and Chengdu in Szechuan Province.

The Aviolis were invited in 1981 to return to China, with Dr. Avioli leading a delegation of physicians and nurses on an academic exchange. The group’s host was the Chinese Academy of Medical Science, a multidiscipline institution founded in 1956 to foster excellence in medical research and education, and in-patient care, under the auspices of the Ministry of Health of the People’s Republic of China. In 1957, the Peking Union Medical College was incorporated into the Academy. Presently, the Academy consists of 24 institutions, and numbers in its ranks 339 professors and associate professors; 878 research associates instructors and visiting physicians; 1,430 research assistants and residents; and 2,908 technicians and nurses.

Avioli planned and led a cultural exchange tour which took place in the spring of 1982. The group included 17 physicians and basic scientists from North Carolina, South Carolina, Wisconsin, Missouri, California, and Washington. Spouses, and in the Aviolis’ case, son Greg, were included in the group, more than half of whom were affiliated with Washington University School of Medicine. The tour was arranged in conjunction with the Sino-American Technology Exchange Council, an agent for China’s Ministry of Health, which is registered with the United States Department of Justice.

It was a world-traveled group that was set down on the windy, dark and dusty plain of Beijing last April. Members had traveled throughout Europe, some to Africa and several to Australia, New Zealand, Japan, South America, Algeria, Israel and Egypt. All had traveled throughout the United States.

We came laden with guide books, history texts and cameras. We came with our individual interests in the fine arts, horticulture, calligraphy, athletics, literature and politics. Yet, who can ever be truly prepared for China? It is an enigmatic, frustrating and, almost simultaneously, delightful place.

For Americans, so accustomed to ordering and controlling their lives with a considerable degree of independence, the China experience is both mind-expanding in new perspectives and very restricting in the limitations set down. We were, for instance, keenly disappointed to learn in Beijing that we would not visit Xian as prearranged. Planning for this visit, as for the previous one, had taken months and required reams of correspondence with medical schools, travel agents, the China travel services, the Department of State, the Internal Revenue Service and the individual lecturers. In China, we were under the direction and guidance of CAST, the China Association for Science and Technology. No degree of planning, however, guaranteed the itinerary. Thus, the trip we took became quite a different adventure from the trip we planned.

The first visit to China is bound to be an emotional one.
On our second tour, we were able to note changes or the lack of them; to make realistic observations. The size of this “sleeping giant” must be emphasized. China has an estimated one billion inhabitants on approximately 970 million hectares (3.7 million square miles), exceeding the land mass of the continental U.S. by nearly 25 percent. Every day, China averages 40,000 births and 16,000 deaths—a pattern which, by the year 2000, will increase the number of Chinese by 300 million!

As we approached Beijing by air at night, we were flying over a vast population, a nation with a great ancient culture and a 20th century atomic bomb. The night was clear, yet little of Beijing was visible. We landed in a major city almost dark except for a lighted hallway which led from the airport. We were not witnessing a planned blackout for defense purposes. China is poor in electric power; arriving at night emphasizes this fact.

Our accommodations were arranged in a government house known as the “state Guest House,” outside the city. The furniture in all hotels and guest houses in China seems to date back to the 1930s or earlier. In summer, upholstered chairs are covered with white slipcovers, and doilies dress tabletops. The bed linens were clean and the bathrooms more hygienic than we remembered in 1979. Still, in a nation struggling to employ its citizens on the one hand and develop tourism on the other, the Chinese have not yet applied good management techniques and employee training to organize their hotels into clean, efficient places. Carpets everywhere are stained and dirty; curtains sag and windows may be cracked.

And in the newer hotels, such as the resort in Wuxi, wall-to-wall carpeting had been cut too large for the room and was bent at the corners, allowed to creep, fray, and up the walls. So much could be done, not to make China elegant in any decadent sense, but to make things function well, according to their purpose and design. There had been little evidence of such management in 1979, and not much more in 1982. However, courtesy and concern for our comfort, as best it could be provided, was met everywhere. As our son Greg pointed out, the hotels were so much more comfortable than the apartments we saw in communes as to seem lavish by comparison.

The people seemed to be more aware of modern conveniences and materials which could brighten and enrich their lives. Department stores displayed fewer Mao suits, and more choices of color and print patterns in fabrics. The average men and women crowding the streets still wear blue or khaki, but there are now choices if they can afford them. (Near the end of our journey, seven men in our group wore Mao jackets to the banquets, although fewer of our hosts did, choosing instead Western-cut, single-breasted suits.)

Radios, electric fans, and television sets draw crowds of window shoppers and seem to be more plentiful in the people’s stores than in 1979, although it takes the savings of every working member of a rather extended family to buy just one appliance.

Beijing seemed to be undergoing notable changes. Although new construction had been underway in 1979, we witnessed many more stacks of bricks, piles of sand, and mounds of stones along the streets this time. Actual building, however, seemed underway in only a few places. Whole streets, such as Liu Li Chang, the ancient alleyway of antique shops, were closed off for complete renovation. While the bicycle is still the principle vehicle everywhere in China, more buses and trucks were in evidence. Cars remain rare; old Packards and 1950s-vintage Russian sedans still cruise the streets as taxis or government cars.

The massive campaign to plant thousands of young trees along the streets of Beijing promises the greening of this otherwise rather barren capital. The trees are needed to control soil erosion caused by the powerful Karabuan winds that tear across the Northeastern Horquin and Ortindag Sahdi deserts, causing what are sometimes called “black storms.”

Scientists at the Lanshou Institute of Desert Research of the Chinese Academy of Sciences have determined that 50,000 square kilometers of formerly productive land in China have become desert within the past 50 years because of the misuse of land.

Great numbers of pedestrians and cyclists everywhere in Beijing cover their heads and faces with sheer scarves to protect their eyes and filter out some of the swirling grit. Eventually several members of the group began to wear the surgical masks they had been advised to carry.

Tiananmen Square stands in the heart of Beijing, so vast that a million people can gather there at any one time. Massive government buildings flank it stolidly.

Most of the group on the scientific exchange trip posed in Shanghai in front of a building, once part of the British Concession and now offices of the scientific exchange committee.
Mao's tomb is there but is now closed to the public. It is a monument to concentrated effort because it was constructed completely in one year following Mao's death. We heard different explanations for the closing: It was too dusty at this time of year; the hermetic seal on Mao's coffin was no longer tight - a grizzly possibility. Clearly, Mao's godly position of past decades has diminished; while he is still honored as a successful leader of the people's revolution, he is roundly criticized for faulty governing. Not only is his tomb closed, but statues and portraits have been removed. The mighty has fallen out of view as well as out of favor, at least temporarily.

Facing Tiananmen Square is The Forbidden City, so named because ordinary people were forbidden to be even near it before the 1911 revolution. It is still a major tourist sight, although the guides point out that Chiang Kai Shek and the Kuomintang completed the razing of its art treasurers begun by "foreign aggressors" by carting away 2,000 crates now to be found, apparently, in Taiwan. The entry gate at Tiananmen Square is the Gate of Heavenly Peace. The Halls of Harmony — Supreme, Complete and Persevering — the Halls of Heavenly Purity, Union and Mental Cultivation, all may be visited by passing through a series of gates. Carved marble ramps displaying the Dragon and Phoenix, symbols of the Emperor and Empress, are to be seen, as are the fine golden Fu dogs, a nine-dragon ceramic wall, and the Jade Hill, a solid carved piece of jade weighing five tons. The screen from behind which the Empress Cixi whispered orders to the child Emperor as he held court is still there, as well as ten sedan chairs in which the Emperor was carried from hall to hall.

Some of the warrior figures and marvelous life-sized horses excavated from the tomb at Xian are displayed, too.

The Forbidden City is now known as the "Palace Museum." On one wall of the outer gate, a hand-written sign, hastily painted over, proclaimed "never forget the bitterness of the past." Further along, "the wisdom of the people is unlimited" leached through fresh paint.

On April 7, we made the first of our visits to the Chinese hospitals. They have students only through the second year because medical education was terminated during the 1976-1977 cultural revolution, setting the medical teaching and educational program back at least ten years. The Capital Hospital is affiliated with The Chinese Medical Association. It has 550 beds, 410 physicians, 430 nurses, and 90 operating rooms. Each day, more than 3,000 patients are treated in its clinics — some by traditional Chinese doctors and others by western doctors.

While part of our group visited Peking, East District, and Shi Tse-Po kindergarten, the medical contingent convened with the Capital Hospital medical staff for the traditional morning tea ceremony. We listened attentively to a series of presentations designed to familiarize us with the history and goals of the medical research programs. We gave them a number of textbooks, teaching manuals, and hand-held computers which they desperately needed. Subsequently, we were escorted to the wards and were kept very busy analyzing case histories, laboratory data, and X-rays.

Following a sumptuous two-hour luncheon at the Five Dragons Pavilion in Bei Hai Park, we returned to the hospital and delivered a series of lectures dealing with diabetes, prosta-

gland metabolism, bone disease and the differential diagnosis of endocrine abnormalities. The amphitheaters were crowded with physicians, nurses, and medical students who, although they listened attentively to our assigned interpreters, seemed reluctant to question us. Questioning appeared to be a privilege reserved for professors and leading medical statesmen. Although exhausted by our hectic schedule and heavy noon meal, we continued for four hours in the afternoon and were pleased to have made a notable impact on our most eager audience.

Because of our hosts' emphasis on their country's progress, much of the touring offered in Beijing consisted of visits to factories, hospitals, schools and parks. We also were taken to the reconstructed Pata Ling (formerly BaPa Ling) Gate of the Great Wall. The Great Wall, the only man-made object visible from earth orbit, is 10,000 Li long. That equals 5,000 kilometers or 3,100 miles. At Pata Ling, the wall is 27-feet high and 19-feet wide. It is a monument to the tortured efforts of thousands of slaves. While beautiful to behold as it twists and winds around the mountain terrain, it is hard to imagine it, even in its prime, as anything but a white elephant - remarkable, but not very useful. Tourists can climb the Great Wall section of Wan Li Chang Cheng. Climbing its severely vertical incline from one watchtower to another, which qualified us as heroes according to our guide, provided a stern form of exercise. Lest we permitted ourselves to become proud, however, we were frequently met by Chinese climbers in their 70s, or an ancient lady supported by a younger relative, mounting the steep steps on her "Golden Lilies" or tiny, bound feet. At the top of one tower, we were delighted to meet a navy sailor scampering along with an outsized radio mounted on his shoulder — a machismo posture with which many urban Americans can readily identify.

En route back to Beijing along the Sacred Way, we stopped at the Ming Tombs. The Sacred Way is a wide avenue flanked by pairs of huge, handsome statues of real animals such as elephants and camels, mythical gorgons, and imposing generals and mandarins. The Sacred Way is a photographer's delight; usually dignified visitors scramble over the backs of statues and pose atop them.

Buried in the hills at the end of the Sacred Way are tombs of 13 Ming Dynasty Emperors. Only the tomb of the 14th Ming Emperor, Wan Li, has been specifically located and excavated. Deep in the bowels of the earth, we wended our way through marble halls and white marble arches, past magnificent porcelain oil jars and some fine chairs, to the burial chamber. There, the dilapidated and decayed coffins of the Emperor, his Empress and his number one concubine are grouped. Above them on each wall are recently painted messages detailing the cost of constructing the tomb, and data defining the hundreds of thousands of bowls of rice such an expenditure could have bought for the starving people of the times. In China, opportunities for propaganda are seldom missed.

We also visited the extensive park surrounding the Empress' summer palace in the outskirts of Beijing. The main attraction was the giant white marble boat built with funds the empress had embezzled from the naval treasury, in lieu of developing a functioning navy!

On April 9, we departed for Nanjing in a China Airlines jet — Russian made in the days...
The Great Wall. (Photo by Herb Weitman, 1979)

Along the Sacred Way. (Photo by Herb Weitman, 1979)
of cooperative relations with the country the Chinese now refer to as The Big Bear, or even, The Ugly Bear. While this was modern travel, there were aspects reminiscent of simpler times. Our guide, Mr. Yang, carried on board, with the help of some in our group, great packets of lunch boxes tied together, and cases of warm Chinese beer. We shared the cabin with several army officers who came aboard without lunch. Mr. Yang handed out the robust lunches later — slabs of cold cooked beef, several eggs, potted meat, heavy bread, and a duck leg each. Embarrassed to have food while others around us did not, and overwhelmed by the abundance, some of us tried to have food while others around us did not, and overwhelmed by the abundance, some of us tried to share lunch with the officers. They seemed to feel obliged to accept our offerings, but disinclined to eat the westernized cuisine. Considerable nodding, smiling, and vacant staring out of windows followed.

In Nanjing, we boarded a bus to the Shuang Men Lo, formerly the British consulate and now a hotel. The streets were lined with tall apartment buildings designed in the unimaginative style of the 1950s — grey, rectangular, plain, and influenced by the Russian presence at that time. Living quarters tend to be allocated according to the professions or occupations of the families; building where teachers dwell or electronics workers live were pointed out to us. Much of Nanjing is devoted to industry — production of Panda Brand radios, motor vehicles, and petrochemicals. Of the population of 2 million, 1.4 million are industrial workers. An active and highly respected university is there, and several members of our group requested a visit. The immediate plan, however, was to show us the museum, a primary school and the medical facilities of the Chinese Medical Association. We were to stop at the Friendship Store — there is one in each major city, open only to tourists, for the sale of elegant silks, porcelain, jewelry and rugs. The morning lectures at the Chinese Medical Association were delivered by Drs. Marion Levin, David Kipnis and Edward Biglieri (of the University of California, San Francisco). Drs. Stanley Birge and William Daughaday gave the afternoon lectures to a “packed house” with inquisitive faces awaiting each and every pearl of endocrinological wisdom. Even though the audience’s applause reflected only polite courtesy, we were later told that the interpreters had conveyed the lectures well and that the audience was, in fact, more than satisfied with the information given.

Both the Nanjing museum and the Sun Yat Sen tomb were impressive. A city with a 2,400-year history, Nanjing reveals a wealth of art treasures. With the founding of the Ming Dynasty by Zhed en Chong, the only peasant to become emperor after a peasant uprising, ancient Nanjing had been the nation’s capital until the fourth son moved the capital to Beijing. It is to Sun Yat Sen, though, that Nanjing looks with reverence. “This is Sun Yat Sen’s capital,” the local guide announced. The revolutionary leader and former physician had founded the Chinese Communist Party in Shanghai in 1921, but Nanjing was his home and base until Chiang Kai Shek’s “betrayal of the revolution” wrested power from him. A handsome memorial high on a hill pays tribute to him. In the museum we also saw a series of lithographs of the interiors of warehouses belonging to the East China British Trading Company. Warehouse walls were lined with stacks and stacks of opium pots, mute evidence of the source of much of the bitterness leading to the Opium Wars. A photo of the post-World War I meeting at Versailles in 1919, at which land taken in China by the Japanese was ceded to Japan, indicated the betrayal felt by Chinese, who had considered themselves allies only to lose their land to strangers once again. The event precipitated the protest in which Mao Tse Tung and other students took to the streets in opposition.

Easter Sunday afforded several of us our most touching experience in China. We had read in the English Language Daily that churches were opening again, and that more and more Buddhist Temples were functioning not as museums, but as places of worship. Edward and Beverly Biglieri asked our guide if Catholic Mass would be said, and one of our physician guides offered to investigate. Sunday morning in the tour bus, Dr. Hsu announced that he had two cabs available for people wanting to go to church. Eventually, eight of us chose to attend: Gloria White, wife of Michael White, W.U. assistant professor of medicine and pediatrics; Ann Green, wife of professor William Green from the University of Washington in Seattle (and formerly from Washington U.); the Biglieris; Justin and Persis Van Wyk of the University of North Carolina at Chapel Hill; Joan Avroli, and our guide, Zhang, who had never been in a church.

We became part of a dense crowd entering an already full church. Smiling ushers handed us programs and directed us to a choir loft with several rows of pews. The altar below was bare, with only a crucifix, two candles, two small vases of calla lilies in front of three Gothic windows of solid green glass. Worshippers greeted us and offered English/Chinese copies of the New Testament. At 9 o’clock, a man in a black robe announced a hymn. The congregation of usually reticent Chinese, almost all dressed in Mao blue or khaki, rose and burst into song. The voices raised in joyous song and the size and enthusiasm of the congregation were totally unexpected. It was an emotionally charged experience for us.

Gradually, those of us familiar with Catholic rituals began to question what we thought were variations from the usual mass. Finally, Persis Van Wyk whispered, “This is a vintage Presbyterian service!”

To the Chinese, one church is apparently like any other. While we hadn’t reached a Catholic Church, we had celebrated Easter in what is now known as The Christian Church of China, an amalgam of several sects of Protestantism joined together to assist one another and to share the existing churches. Our minister greeted us afterward and told us that the building was a Methodist Church originally, and the service of the day was, indeed, Presbyterian. Known as the Mocho Road Church, it had been reopened for just two years and counted a congregation of 3,000. Services were held on Saturdays and Sundays to accommodate the Chinese policy of alternating days off.

Perhaps because Nanjing is St. Louis’ “Sister City,” our guides made many efforts to accommodate our requests to vary from the established itinerary. We had almost resigned ourselves to not visiting the university when, an hour before we were to leave for the train, Mr. Yang directed our bus driver to Nanjing University. We found 35 English language students, from the Foreign Languages Department, waiting to
guide us. English, Japanese and Russian are taught at the University. The English class was held in a tiny, barren room with "Knowledge is Power" on the wall above the blackboard. One of the students' favorite instructors had come from the University of Wisconsin in Madison.

It was the intellectual power and sustained protest of the University of Nanjing that had been instrumental in the demise of the "Cultural Revolution. It is one of the country's major universities, and only the best students are admitted. Each year in China, there are six or seven million high school graduates, and nearly five million apply for college. Only the best are accepted to the major universities — Peking, Fudan, Quinhua and Nanjing. The remainder of those accepted for higher education programs are distributed among normal schools, provincial universities and other institutions. The openness of the students at Nanjing University, and their willingness to touch upon controversial subjects with us, confirmed our feelings that at least a modicum of academic freedom might be kept alive in such a place as this.

The atmosphere at Nanjing U. reminded us of the feisty individuality we had seen when the OSBG visited Szechuan Medical College in 1979. Our hostess, Madame Ma Junzhi, president of the Szechuan Medical College told us of the numbers of students, types of programs and size of faculty. In discussing changes in the program, she spoke of the destruction of the "Gang of Four." We asked about the type of destruction. Had property been destroyed? People injured? Faculties disbursed?
With surprising animation, she answered almost too quickly for the interpreter to keep pace. It was a psychological and intellectual destruction, she told us. Education was given the lowest of priorities and the educated, especially professors, were suspect. Students were indoctrinated to disrespect teachers. By official edict, a six-year medical degree was a professor of pediatrics wore the scars of the Cultural Revolution and gave hesitant testimony. She was promptly served a spoon and a can of sliced pineapple with its lid removed.

We visited one of Wuxi's convalescent hospitals, a converted mansion with an elegant roof and multilevel gardens overlooking the lake. A briefing by hospital administrators revealed the hospital's close relationship with industry and "the party." The hospital chief of staff delighted in displaying a number of techniques for soothing the tired bodies of the convalescent workers. We saw mud baths used for muscle relaxation, and patients

Despite their scarcity, motorized vehicles have the right of way; pedestrians, cyclists and cart-pullers must move. Frequently, they are reluctant. Our bus driver sometimes seemed more intent on honking the horn to clear the road than on any other aspect of the job.

Wuxi today is famous for silk, tea production and fisheries. It is, in fact, a "land of fish and rice," according to our guide, connoting the same sense of abundance and contentment as does the phrase, "the land of milk and honey." Wuxi boasts 600 factories, eight city hospitals, and four convalescent hospitals. The many communes surrounding the city raise three crops a year — two of rice and one of wheat. Commune brigades also attend mulberry orchards essential to silk worms and breed the worms from May to October in five successive lots.

In Wuxi, we stayed at a resort on the former estate of a "capitalist." It overlooked Li Hu Lake and was surrounded by graceful gardens. The place boasted a discotheque where "balls" were held. Several of us visited one, one night. The room was empty at 9 PM, except for our party. Records, probably from Hong Kong, were played in a room lighted with strings of multi-colored Christmas tree lights. Beer and orange soda were available, and there was a small menu of snacks. Marilyn Teitelbaum, attorney and wife of WU pathology professor Steven Teitelbaum, ordered pineapple.

On this trip, Zhang told us what he and other young people had learned in the "May school movement" of the Cultural Revolution: never to be so gullible or so easily lead again.

Hsu Shih How, another of our guides throughout the trip, wore the scars of the Cultural Revolution and gave hesitant testimony of his torment. The son of a distinguished family, Dr. Hsu was a professor of pediatrics early banished to menial labor and dreadful living conditions in a remote corner of the countryside. He spent more than 10 years in exile, separated from his wife. His teeth are badly decayed now, and he seems frail. We had the sense that his career was irreparably damaged, too, although he remained mild and cheerful. They were all clearly delighted to have the Cultural Revolution behind them.

After our surprise visit to the university, we were back in the bus and on the road to Wuxi. Our guide continued briefing us as the driver incessantly honked the horn. On this day, as on any other, the roads were cramped with people carrying, pushing, and pulling great loads of goods. A small boy trotting behind a hay wagon carried bunches of garlic gathered into large wheel-shaped clusters and tied at either end of a bamboo pole. The wagon, a typical rectangular affair nearly three-feet wide and from six-to-eight feet long, was drawn by one man hitched to it by a leather strap slung over one shoulder and across his chest. The effort to move the wagon bent the man into a right angle, so that he inched forward staring at the ground beneath his feet.

A cart pulled by two women passed by, loaded with rag mops made of hundreds of strips of variously colored cotton rags hand-bound to broom sticks. Around a bend in the road, we beheld a small woman pushing a wheelbarrow full of bricks, on top of which a man lounged placidly.

Wending our way into Wuxi, we looked down on dirt-packed or stone sidewalks where string beans, slender eggplants, bitter greens, and small green pears were displayed for purchase — sometimes heaped in baskets, but most often simply spread in the street. People are now permitted to dabble in free enterprise, selling produce from their kitchen gardens. Fresh produce supplements the rice diet — fish and meat are scarce. Each person is entitled to 13 kilos of rice per month, or approximately 30 pounds. Rice, cotton and clothes made from it are rationed. Wuxi, a city of 780,000, is set in a lovely landscape. The translation of its name is "No Tin," and therein lies a legend dating back to the Bronze Age. Tin, the highly prized metal essential in making the alloy, bronze, was discovered nearby, and the subsequent development of a mine brought down upon the town's people endless attacks by jealous warring factions. When the tin ran out and the mine closed, the people happily returned to peace with the declaration of their uselessness to Bronze Age warriors in the name of their city, "no tin."

receiving ionizing radiation of the head and shoulders, Chinese massages, and a specific acupuncture facility.

Acupuncture has been used in China as a regular anesthetic for major surgery since 1958. Usually ten milligrams of morphine is given as a pre-medication, and four volts of pulsating direct current is applied to the acupuncture needle. Patients remain awake throughout the surgical procedure, receiving oxygen intermediately. They follow a specific breathing rhythm, dictated by the cadence of the acupuncturist. In fact, patients are usually admitted at least a week before the operation in order to become familiar with the diaphragmatic breathing procedures similar to those we use for natural childbirth.

Less arduous forms of acupuncture, using smaller needles and without applied current, are used for specifically referred pain syndromes. We witnessed a number of patients who were actively engaged in acupuncture procedures with, according to the staff doctors, complete success.

In order to understand Chinese medicine, one must recognize and appreciate its heritage. It has developed over two millennia, and is the product of extensive clinical observation, testing, and critical thinking. It is not the hocus-pocus, pin-sticking primitive medicine that most westerners assume. We must recognize that the modern western approach to medical care does not offer the only answer to patient comfort. We see only the “tip of the iceberg” of acupuncture techniques in the West. The essence of this procedure is deeply rooted in the heritage of a civilization which is still an enigma for the westerner.

On April 13, we left Wuxi in fog and light rain by a new tour boat for a five-hour trip across Tai Hu, a vast, shallow lake, to Huzhou where much of our luggage became mired in mud as we awaited yet another bus.

While in Hangzhou, we lectured in the Auditorium of Science and visited a variety of national shrines. We were also fortunate to visit a tea brigade commune which was one of the 50,000 communes on the Chinese mainland. While we watched the methodical efficiency of the tea pickers and sorters, we listened to the annual production figures and were impressed with the ability of the Chinese people to produce food for more than 900 million people on only 20 percent of their total available land.

On April 16, we took the train to Shanghai and settled in at the Jing Jiang Hotel in the old French “concession,” or district. The building had formerly been known as the Cathay Mansions and housed French diplomats and businessmen in elegant apartments with high ceilings, lovely woodwork, marble bathrooms, and parquet floors. Now, its furnishings are rather dismal, and evidence of housekeeping is scarce. Still, the view of the landscaped courtyards and flower gardens is pleasant.

Shanghai is a great city governed directly by the national government, much as Washington, D.C. Its harbor is not on the sea, but on the Huangpu River, a 112-kilometer waterway emptying into the East China Sea. The Wuson entrance is clogged with junks, tankers, ferries, gunboats and submarines. This city, like Hangzhou, shows the clear marks of Western influence:

These convalescent hospital patients participate in a daily exercise regimen.
Elegant, modern bank and commerce buildings rise above the main avenue along the water. Formerly called the Bund; it is now Zhongshan Road which memorializes Sun Zhongshan, or Sun Yat-Sen. All construction of the former colonials, who at one time controlled Shanghai as an international city state with its own army, now functions in some other capacity. The bank of Hong Kong and Shanghai is now the city hall of the Municipal People’s Government. The colonials are gone, but the number and variety of shops and the host of restaurants offering a variety of cuisines still proclaim it as a world city with less regionalism than elsewhere.

Shanghai is the largest city in China, with more than 11 million people and more than 8,000 factories. In 1979, it produced one-eighth of the industrial output of China, valued at 39 billion dollars. As a seaport, Shanghai handles more than 80 million tons of cargo annually.

Shanghai is a shopper’s delight. Anyone interested in leaving some money in China can do so by purchasing a variety of cotton clothing, bolts of silk, unglazed clayware, rosewood furniture, jade carvings, fine ink scrolls, cut-paper designs, rugs, hats, carved chests and marvelously intricate baskets. There is also a superb selection of items along the Nanjing Road, where millions of Chinese shop on their free days.

Our final lecture series was scheduled for the physicians and research staff of the Rui-Jin Hospital, a general hospital affiliated with the Shanghai Second Medical College. The hospital has 1,120 beds, 20 clinical departments including a burn unit, and ten subsidiary departments such as radiology, pharmacy, clinical pathology and anesthesia. The outpatient and emergency room receive more than 3,000 patients daily! There are 78 chief and vice-chief physicians and surgeons, 175 visiting nurses, and 79 head and vice-head nurses. The first division of the faculty of medicine of the Shanghai Second Medical College is located at this hospital, staffing 11 clinical teaching departments. The medical school curriculum spans five years. As of 1981, a new six-year college and medical program was also established there. The hospital also has 15 research labs and institutes in endocrinology, cardiovascular and orthopedic surgery.

We were presented with an unbelievable array of endocrine disorders, so we divided our contingent into several groups to perform teaching-diagnostic rounds with the medical students, professors and house staff. We were thoroughly impressed with the sophisticated, brief presentations from interns and medical students alike regarding cases of hyperparathyroidism, hyperthyroidism, primary aldosteronism, and pituitary insufficiency. The group listened attentively as each of the endocrine consultants delivered mini-lectures on the diagnosis and therapy of each of the endocrinopathies, and they noted many comments with envious rapidity. Although the medical supplies and diagnostic equipment were outdated, the diagnostic approach and clinical care appeared more than adequate.

A group spearheaded by Philip Needleman, WU professor and head of pharmacology, also visited the institute of Biochemistry. Researchers there were involved in molecular biology research, including the use of recombinant DNA techniques and the isolation of restrictive enzymes. We were impressed with the esprit de corps and the accomplishments of the researchers using outdated equipment and limited supplies. We observed that the most efficient chemical synthesis of insulin was carried out in this institute. We completed our meetings by distributing textbooks, computers, and teaching aids to our hosts, and, after the ritualistic tea ceremony, we bade farewell to Dr. Chen Jia Lun, vice director of the Endocrinology Institute and deputy chief of the Department of Medicine, and to his devoted staff.

In our final hours in China, there was much to reflect upon. Overpopulation remains a staggering problem. It is easy to be impressed by throngs of people on every street in every city. To realize, though, that these dense crowds represent only 20 percent of the population, and that 80 percent live less noticeably in the countryside, is to begin to know what people congestion means. There are more than a billion people to feed. Feeding people has been so much on leaders’ minds throughout Chinese history, in fact, that the Chinese word for population translates as “people’s mouths.”

Slow, hand labor must...
One small step in nutrition...

eventually become obsolete. More industry and greater use of advanced technology is clearly needed. But automation without creative approaches to maintaining a full labor force will only create massive unemployment. What, then, will be the proper function of all those people?

Notably, the Cultural Revolution has deeply scarred the people. They are now committed to achieving the “Four Modernizations” of agriculture, industry, national defense, and science and technology by the year 2000. It seems that basic engineering and technological aspects of science are foremost in governmental budgets, and that medicine and biomedical research are suffering from a lack of support. Should support in the form of supplies and equipment comparable to levels in the United States ever become a reality, this “sleeping giant” would rank among the best in the world in research productivity and medical education. As David Kipnis, chairman of internal medicine at Washington University, noted, there are undeveloped people and underprivileged people. China is underprivileged; given investment capital, these intelligent and dedicated people could make remarkable progress.

But problems are not the only memories we have. There is the school principal in Nanjing who spoke about the five things children are taught to love: homeland, people, science, work, and public property. The three areas of emphasis in education are ideology, physical development and intelligence. The values are clear; the commitment to them, genuine. There is a special quality of Chinese perseverance, too, combining patience and endurance to a remarkable degree. During our 1979 visit, we encountered a 22-year-old woman in Guangzhou Province Hospital, whose x-rays showed severe deterioration of the hip from traumatic arthritis. Knowing that her ability to walk was becoming evermore impaired, and hearing of a fine hospital where she might receive treatment, she had walked more than a thousand miles from her village seeking medical assistance.

Finally, there are the facts that the vast majority of Chinese are far healthier and more secure than ever before. No one starves. Children are no longer sold on the streets. Students now gain entrance to universities based on examination rather than party affiliation. The government has moved from an internally focused policy to one which encourages and invites exchange, trade and international socialization.

The “Farewell Feast” at the Jing Jiang Hotel on April 18 marked our departure from China and, for many of us, from each other. Thirty-two souls had learned to laugh, occasionally cry, complain, discuss, explore, discover, and celebrate together. We had managed to resolve problems, to cooperate, amuse, and inform. Now, we were disbanding.

At the Beijing airport, we bid farewell to Mr. Yang (earlier dubbed “Mr. On-the-bus”) with hugs as well as handshakes, for now appropriate affection may be shown in China. We bid Zhang farewell, not with finality, but with the expressed hope that his plans to study linguistics in the U.S. would come to fruition soon. We boarded the plane, weary, laden with undeveloped film, gifts, and thoughts of returning again to see, finally, Xian Suzhou or any of the sights that were not permitted this time.

China watchers are not born; they are made. It takes only one visit.
Robert E. Shank, M.D., has stepped down as head of the Department of Preventive Medicine and Public Health, a position he has held since 1948. He continues as Danforth Professor of Preventive Medicine and Public Health.

When Shank came to the three-year-old department at WUMS, he replaced the first director, Gurney Clark, M.D., who went to the School of Public Health of Columbia University in New York to be professor of epidemiology. In 1948, the preventive medicine department at WUMS consisted of four full-time faculty members, the student health services, and two small laboratories. Under Shank’s aegis, the department has grown in size and scope, and has developed an international reputation in several important areas of research.

Today, the department is still responsible for student health services, both on the Hilltop campus and at the medical center. Mary Parker, M.D., is director.

The Irene Walter Johnson Institute of Rehabilitation, founded in 1958, is an active and prominent division of the department and occupies its own five-story building. Michael Brooke, M.B., M.Ch., is director of the IWJ, which provides training and patient services in occupational therapy, physical therapy and rehabilitation; houses the Jerry Lewis Muscular Dystrophy Center and its research, patient care and social support services; and includes several research projects dealing with chronic muscular and neurological diseases.

Since its inception in the 1960’s, the Applied Physiology division, directed by John O. Holloszy, M.D., has garnered a national and international reputation for research in the relationship between exercise physiology and biochemistry, especially in the elderly and patients with diabetes and heart and kidney diseases.

The division of Biostatistics was established in the mid-1960’s, with Reimut Wette, D.Sc., as the first director. It is now led by D.C. Rao, Ph.D., internationally recognized for his research in mathematical genetics and genetic epidemiology. His work is important in the development of statistical methods for the study of the inheritance of common diseases.

In the later 1960’s, the Health Care Research division was established, with Gerald Perkhoff, M.D., as director. He developed an HMO, the Medical Care Group (MCG), which is now independent of the school, self-sustaining, and serving the metropolitan St. Louis area. Lee Benham, Ph.D., is now acting director of the division of Health Care Research, and Lawrence Kahn, M.D., is director of MCG.

The Lipid Research Center came into existence in 1972 under Gustav Schonfeld, M.D., and is part of a national research program following the development of lipids and cardiovascular disease relative to the diets of American men.

Shank’s research in nutrition and health, and the work of acting department head Hugh Chaplin, M.D., in immunological factors related to hematology and blood banking, are among the research of international repute.

Shank, a 1939 graduate of WUMS, is the author or co-author of approximately 75 scientific publications dealing with many aspects of nutrition — pregnancy, fetal and infant development; liver biochemistry; world food supply, population, malnutrition and disease; nutrition education, etc.

In addition to leading the growth of his department, Shank has served as a national and international consultant, as well as board member, chairman or director of associations, councils and committees concerned with nutrition, population, public health and preventive medicine. He is a member of AOA, AAAS, a Fellow of the American Public Health Association, a Diplomate of the American Board of Nutrition, and member of many other scientific and professional societies.

After all the growth, the fund raising for construction of the IWJ building and the Wohl Clinic Building, the research and international service, what engenders the greatest feelings of accomplishment and satisfaction?

"The people we have given training and experience," said Shank. "They are in responsible positions in many institutions and universities in the U.S. and abroad. Under the NIH foreign training program in effect from 1955 to 1970, many physicians from around the world came to Shank’s department especially to get research training in nutrition and to learn clinical teaching methods in preventive medicine.

He mentioned such former students as: Ernani Braga, M.D., who went on to direct the medical education office of the World Health Organization and is now in Brazil; Halluk Alp, M.D., chancellor of the University of Istanbul in Turkey; Ulrich Dubach, M.D., who heads the Department of Medicine at the University of Basel in Switzerland; Dejano Sobral, M.D., who heads the Department of Preventive Medicine at the University of Sao Paulo in Brazil; and more than half a dozen others who have become department heads in U.S. medical schools.

Washington University Chancellor William Danforth, M.D., spoke at the unveiling of a portrait of Dr. Shank early in November. "For me, Bob has always been a special person, an individual well endowed with ability and intelligence, who picked a profession and an area within that profession, nutrition, that were important to humankind and gave ample opportunities to relieve suffering and to better the human experience. Bob has always had good judgment," Danforth continued, "and decisions over the years have always hinged on his understanding of the needs of others and of his responsibilities, rather than on personal self interest. All of his friends and his co-workers have recognized this fact. He has been an example and an inspiration to us."
Hugh Chaplin, M.D., (left) who is now acting head of the department, and Dean M. Kenton King, M.D., spoke briefly and unveiled the portrait. King told the assemblage that Shank was responsible for bringing him to Washington University. "I have great admiration and affection for him; I have never known a finer person."

Dean King shares some memories as Chancellor Danforth (behind him), Eleanor Shank and Dr. Shank look on.
Toward Ultrasound Biopsy

by Casey Croy

From left to right, Eric I. Madaras, Ph.D., research associate in physics, Miller, and Lewis Thomas III, graduate research assistant in physics, set up a computerized experiment.
hybridities, such as "what would you get if you crossed an elephant with a rhinoceros," have entertained children for years. Such creative crossing carried into adulthood might well be the thought process of innovators. For example, if you crossed a stethoscope with a microscope in a high-tech atmosphere, you'd get what cardiologist Julio Perez, M.D., and physicist James G. Miller, Ph.D., are working toward now — microscopic echocardiography, or the use of ultrasound to show the physical state of heart tissues. They and their associates at Washington University have been working in conventional echocardiography, intracardiac Doppler echocardiography, and futuristic echocardiography for several years.

Echocardiography employs ultrasound, based on non-ionizing radiation, to produce graphic representations of the heart chambers and valves. A small crystal mounted in a transducer held to the chest of the patient emits a sound wave of from two to five MHz (million cycles per second). In the echocardiographic mode known as "M-mode," for each second that the transducer is activated, it uses one microsecond to emit the sound wave and 999 microseconds to receive and record the wave's reverberations or echoes from the heart. The echoes return to the transducer at various intervals, reflecting the different boundaries of tissue and blood the wave encounters as it passes through different heart walls, valves and chambers. The various signals are translated by computer to a graphic display of lines printed on a paper roll showing the structure of the heart and its chambers moving as the flow of blood traverses them.

Two-dimensional echocardiography, in which several crystals in the transducer fire at specific intervals up to 5,000 times per second, produces tomographic data — multiple geometric planes yielding information longitudinally, cross-sectionally, and apically in the heart. Two-dimensional echocardiography allows visualization of the actual anatomy of each individual heart, and provides information about patterns of heart-wall motion simultaneously in several regions, as well as images of the four heart valves. It greatly facilitates detection of true and false aneurysms of the venetrails and intracardiac clots in patients with large hearts, or who have had heart attacks. Tests in the two-dimensional mode can be video-recorded; physicians can watch clots diminish over time as a result of medication.

For approximately a year, Julio Perez, M.D., Washington University assistant professor of medicine and Barnes Hospital physician, has been testing intracardiac Doppler echocardiography, assisted by Irwin Weinstein, M.D., research associate in cardiology. While Doppler ultrasound has been used for years to determine pulse in peripheral arteries and to monitor fetal hearts, intracardiac Doppler ultrasound, used simultaneously with two-dimensional echocardiography, is just barely a year old. The University of Washington in Seattle has been prominent in developing intracardiac Doppler, and medical researchers in the Scandinavian countries have been responsible for much progress. "In this lab, of the 15 to 20 cardiac diagnostic tests done each day, two or three now are intracardiac Doppler echocardiographs," Perez said.

Fewer than a dozen medical centers in the U.S. are able to employ this technique, which, beginning in January 1983, will be regularly available at Barnes on a clinical, rather than a research, basis.

The Doppler effect is a phenomenon named for the 19th century scientist who defined and described the perceived change in the distance and motion of celestial objects as evaluated by a stationary observer. Commonly used today with reference to sound, "The Doppler Effect" refers to the relationship between perceived pitch and the perceiver's distance from the sound source. For example, if you are on a street corner and hear the siren of an ambulance approaching, you notice that the siren sound becomes higher in pitch as the ambulance gets closer to you. It passes, and the siren sounds lower as the ambulance goes farther away. The siren did not vary the frequency of the sound it produced; you just heard it differently depending on the distance between the ambulance and you.

In Doppler intracardiac echocardiography, erythrocytes, or red blood cells, are the "ambulance." They move in the blood stream and reverberate or reflect back the transducer's sound waves. The transducer, held to the patient's chest, perceives a shift in a sound wave caused by the movement of red blood cells through the heart. While the sound broadcast by the transducer is well above the range of human hearing, the echo can be heard. Thus, the physician conducting the test can hear the shift, the Doppler effect, and simultaneously see the pattern displayed on the video screen.

The test produces quantifiable data — the velocity of blood flow in meters per second — enabling objective diagnoses of such problems as regurgitant valve lesion (loose or leaking heart valves) and stenotic or tight valves.

Auscultation using the
Toward Ultrasound Biopsy

The stethoscope remains as the cornerstone of ethical diagnosis to tell the clinician that a valve is loose or tight. However, sometimes the diagnosis is not apparent by auscultation alone. Furthermore, patients with polyvalvular heart disease may have three or more murmurs that could produce conflicting clinical findings. Doppler intracardiac echocardiography can tell the clinician a reasonable estimate of the severity of valve lesions detected by the stethoscope. Furthermore, the sound and visual display can be recorded on video disks and played back later for comparisons within the same patient or among several patients.

Different physicians listening to the same heart with valvular disease may each have his or her own interpretations of the findings obtained with the stethoscope," said Perez. "But with this equipment, you can quantify the velocity of blood flowing across a valve and standardize the values for normal individuals. Therefore, in patients with abnormal valves, many physicians and researchers can see and hear the flow velocity patterns measured in meters per second, an objective value which is less subject to individual interpretations."

Doppler echocardiography is an important addition to M-mode and two-dimensional echocardiography, which are limited to investigations of the size of the heart, the thickness of its walls, and the general motion pattern of valves as they open and close in the beating heart. "With the combination of these three modalities, we can detect any possible abnormality in any of the four valves — leaking, tightness, degeneration, or the effects of bacterial infection," Perez said.

It is important to point out that these tests are non-invasive and require no radiation whatsoever. So, they can be done painlessly and as frequently as necessary. The added Doppler capabilities enable echocardiography to detect false and true aneurysms of the heart, congenital heart disease including the presence and severity of shunts, and other heart problems.

However, the combined use of M-mode, two-dimensional and Doppler echocardiography does not provide all the answers that ultrasound is potentially able to offer to cardiologists. Since 1973, the cardiovascular group at Barnes and WUMS, and Washington U. physics professor James G. Miller, have been collaborating to develop the use of ultrasound in tissue characterization. In conjunction with electronic engineers and scientists in the Biomedical Computer Laboratory (BCL), they have produced a prototype system, including a special transducer and computer, to record and process the numerical data input by the transducer after the sound has traversed the heart tissue. "The numbers will tell us about proteins in the tissue, or the existence of fibrous tissue structures which occur after a heart attack," Miller said.

Research to develop this "ultrasound biopsy" involves three major tasks — developing and proving a data base relating tissue characteristics to disease stages; developing clinical methods for quantitative ultrasonic measurements; and creating computer programs to receive the ultrasonic information, relate it to the data base, and generate accurate, quantitative images. The culmination of this research?

"We will be able to image the physical state of heart tissues with ultrasound," said Perez.

When it happens, this "ultra" ultrasound will tell physicians that a specific heart disease is present, probably before the appear-

Echocardiogram of a normal heart, an athlete's heart, in fact. The view is from just to the left of the sternum, anterior-posterior position. RV is right ventricle; AO is the aorta; LA is left atrium; MV is the mitral valve; and LV is the left ventricle.

Apical view of the same heart, showing the four chambers. The notation, TV, means tricuspid valve. The valves are open.

Essentially the same view as above. However, the mitral valve and tricuspid valve are closed.
This information combines two-dimensional and Doppler echocardiography. On the right, in the dark panel, is a still frame taken from the video display of two-dimensional imaging of the main pulmonary artery. Just below the arrow is a small square, which indicates the sample volume used in the Doppler test. Flow velocity is measured only for that sample volume. On the left portion is an EKG monitoring done simultaneously with the echocardiography. The spectrum line shows a spectrum analysis of blood velocity in the sample volume area.
Toward Ultrasound Biopsy

Studies to date have primarily focused on heart attacks or ischemic disease in animals. Current research focuses on diseases which occur when the heart is bombarded with adrenaline derivatives. The role of adrenaline and related substances is diverse. The heart has receptors which may act as targets for adrenaline compounds. When it was possible to study the hearts of soldiers treated with adrenaline-related compounds for prolonged periods of time, physicians found diffused areas of damage which could have resulted from the drugs given to support the soldiers' blood pressures until they could be transported to hospitals. Also, some pancreatic tumors produce adrenaline or related products, sometimes leading to high blood pressure, flushed skin, and heart lesions. Various heart-tissue conditions can be induced in experiments, carefully controlled and validated, using adrenaline and related substances. Ultrasound findings about tissue exposed to adrenaline compounds are verified by more conventional laboratory methods as part of this research.

To study the use of ultrasound in characterizing tissue in known diseases, Washington U. researchers have developed and tested a new type of ultrasound receiver which eliminates the wave distortion caused by a phenomenon called phase cancellation. The new receiver is sensitive to energy rather than to pressures along the front of a sound wave. An article in the January 1982 issue of Hospital Practice, written by Miller and Burton E. Sobel, M.D., professor and director of the cardiology division of the department of medicine, describes the problem of phase cancellation and the responses of the new acousto-electric receiver whose semiconductor, cadmium sulfide, measures the net energy in the sound field. The article also describes tests measuring the loss of energy in sound waves moving through tissue (attenuation), and the energy redirected to the transducer as the wave it broadcast moves ahead toward the target (backscatter).

The combination of attenuation and backscatter proved to be reliable in measuring changes in concentrations of collagen in zones of ischemia resulting from occlusion of coronary arteries in experimental animals. Many other tests have been conducted to determine the accuracy of these ultrasonic measurements to predict the amount of various biochemical substances in normal and diseased heart tissues.

As Miller and Sobel wrote in Hospital Practice: "The goal of the studies was to characterize the ability of the technique to relate ultrasonic parameters to particular characteristics of tissue, such as protein composition. It should be pointed out, however, that ultrasonic tissue characterization does not provide the same data as, for example, histologic examination. However, it is anticipated that with further refinement of the technique, it will be possible to differentiate the presence of such tissue constituents as collagen and lipids by the ultrasonic profiles of the tissue interrogated. The initial investigations delineating changes reflecting collagen content of normal and infarcted myocardium point the way toward clinical applications of ultrasonic tissue characterization."

They predict that eventually commercially available ultrasound equipment will include conventional imaging and tissue characterization both in the same piece of equipment. "This will have a considerable clinical impact," said Perez. "The clinician will be able to see the beating heart by conventional echocardiography and, almost simultaneously have an image of the heart based on the physical state of its tissue components."

The age of the non-invasive, painless, radiation-free heart "biopsy" is on the horizon, when ultrasound's state-of-the-art will show the state of the heart from gross to microscopic anatomy.
James G. Miller, professor of physics, at the saline solution tank used for conducting ultrasound tissue studies in vitro.
NewsBriefs:

William E. Stevens, president and chief operating officer at Chromalloy American Corporation of St. Louis, inspects a dialysis unit in the Chromalloy American Kidney Center at WUMS. Stevens toured the facility and presented a check for $100,000 to Herschel Harter, M.D., associate professor of medicine and director of the kidney center. Chromalloy's financial support of the center amounts to more than $1 million since 1969, when it was initiated by Wesley J. Barta, chairman of the Valley Line Co., a Chromalloy subsidiary, and the late Joseph Friedman, former board chairman of Chromalloy. The corporation's support continued through the administration of recently retired president Frank P. Nykiel, and is being continued by Stevens.

There are now 28 dialysis stations at the Chromalloy American Kidney Center, accommodating 145 in-center dialysis patients regularly.

The National Heart, Lung and Blood Institute has renewed its grant to Washington University School of Medicine in St. Louis for a clinical study of nifedipine's ability to protect heart muscle during and after cardiac surgery.

The institute has awarded some $200,000 to continue the nifedipine research another two years, said principal investigator Richard E. Clark, M.D., professor of surgery. In 1980 WUMS received a three-year, $291,000 grant from the institute to begin the nation's only study on use of the drug during cardiac surgery.

Current clinical trials, based on more than six years of animal research, involve infusing the vessels of the heart with a nifedipine solution during cardiac surgery. By stopping the heartbeat and protecting heart muscle, the solution allows surgeons to perform coronary bypass operations as well as intracardiac surgery to correct abnormal heart valves and congenital heart defects.

To date, clinical trials with high-risk patients have indicated that nifedipine decreases severe acute heart failures and heart damage during cardiac surgery, Clark explained. He said additional funding will be used to continue clinical trials of adults with severe cardiovascular disease, and to include in the trials infants with congenital heart defects requiring surgical correction.

Nifedipine is marketed under the trade name Procardia and has been approved by the Federal Drug Administration for use in treatment of chest pain.

The Luehrmann Trust fund, established 30 years ago by the last scion of a prominent St. Louis family, has begun to benefit medical research at WUMS. The university has received the first payments from the Edward H. Luehrmann Trust, the principal amount of which is approximately $3.5 million. Terms of the trust direct that the funds be used for research in diabetes, heart disease and other degenerative diseases. Trustees are Milton Yawitz, Robert A. Wunsch and the Centerre Trust Company.

"The Luehrmann Trust funds will be important in sustaining several of the school's research programs, ultimately benefiting patients of the institutions in which the family had demonstrated a long-standing interest and generous support," said Samuel B. Guze, M.D., vice chancellor for medical affairs.

Edward H. Luehrmann, who died in 1952 at the age of 76, had been a partner in the Charles F. Luehrmann Hardwood Lumber Company, founded by his father in 1888. He and his two brothers sold the firm in 1928.

In the 1940s, various Luehrmann family members made substantial bequests to Central Institute For The Deaf, Barnard Free Skin and Cancer Hospital and Barnes Hospital — now all part of the Washington University Medical Center. The last surviving Luehrmann, Mrs. Alfred D. (Jane) Luehrmann, died in August 1981.
Carolyn Baum, OTR, director of Occupational Therapy Clinical Services at the Irene Walter Johnson Institute of Rehabilitation, recently participated in an occupational therapy lecture tour of the People's Republic of China. She lectured to physicians and nurses on aspects of rehabilitation at hospitals in Shanghai, Nanjing, and Beijing.

Six WUMS faculty members were honored in October at the research award dinner of the American Diabetes Association, Greater St. Louis Affiliate. Grants were awarded to: Paul E. Lacy, M.D., Ph.D., Mallinckrodt Professor and head of the pathology department; Andrew P. Goldberg, M.D., assistant professor of preventive medicine; and John C. Lawrence, Ph.D., assistant professor of pharmacology. Recipients of research fellowships were: Teresa Andreone, Ph.D., research associate in medicine; Anne C. Goldberg, M.D., instructor in medicine; and Donald A. Skor, M.D., Jules and Joyce Pass Fellow in Medicine.

James O. Hepner, Ph.D., director of the Health Administration and Planning Program of WUMS, received the 1982 Health Care Leadership Award of the Hospital Association of Metropolitan St. Louis. In addition to his role at WUMS, Hepner has been vice president, board member and executive committee member of the United Cerebral Palsy Association and helped develop a program to assist victims of the disease to live as fully as possible. Hepner is also a consultant to the Department of Health and Human Services, the surgeon general of the U.S. Air Force, and the publishing firm of C.V. Mosby Company.

Research to Prevent Blindness (RPB) awarded two annual grants totaling $34,000 to Washington U. to assist researchers exploring new concepts in the prevention of blindness. A total of $20,000 will support the work of Robert Miller, M.D., an ophthalmologist whose research centers on interactions between the retina's photoreceptors and nerve cells in the brain. With the refined techniques developed and implemented in his laboratories, Miller has been able to study the electrical and physiological changes that occur inside individual nerve cells that transmit visual stimulation from the retina to the visual center of the brain. "With the additional funds from RPB," said Miller, "we will be able to probe not only electrophysiological changes, but biochemical changes as well. By studying the biochemical language shared by these nerve cells, we can characterize their roles in the overall visual process."

$14,000 of the RPB funds is unrestricted. Bernard Becker, M.D., head of the ophthalmology department, said: "Washington U. has one of the world's largest research programs devoted to ophthalmology and visual science. Research projects include studies of glaucoma, ocular manifestations of diabetes, abnormal retinal biochemistry and other eye diseases. Funds from RPB provide invaluable support for these projects." Since 1960, RPB has contributed a total of $161,000 to ophthalmologic research at WUMS.

The Child Guidance Clinic has named its 1982-83 officers of the advisory council. They are: Robert Rubright, president, president of Rubright, MacDonald & Co. management consultant firm; Susan Wademeyer, vice president, director of public relations at the Bunc Corporation; Sanford Weiss, secretary, president of Weiss and Neuman Shoe Company; and Paul Reinert, treasurer, partner at Arthur Anderson & Company. Also, former council member Marlene Kopman, who has been active with the Retarded Citizen Movement in St. Louis, was named to a three-year term on the advisory council.

St. Louis-area children and families from all ethnic, economic and social backgrounds are treated at the Child Guidance Clinic, which is a United Way agency. The clinic's staff of psychiatrists, psychologists and social workers advises parents about changes in behavior or personality or about other concerns involving children. Staff members evaluate and diagnose the difficulty, then offer practical suggestions for handling the problem.

Ignacio Y. Christlieb, M.D., research associate professor of cardiothoracic surgery, has been elected to Fellowship in the American College of Cardiology. Christlieb is a graduate of the Medical School of the National Autonomous University in Mexico City. The American College of Cardiology is an 11,500-member professional medical society and teaching institution dedicated to optimal care for persons with cardiovascular disease and to the prevention of cardiovascular disease through educational and socioeconomic activities.

Erika G. Gisel, assistant professor in occupational therapy, and graduate student Debra Flybski, presented a paper, "Sucking and Feeding Behavior of Normal 3-day-old Female Neonates Over a 24-Hour Period," at the October meeting of the International Society for Developmental Psychobiology in Minneapolis. Gisel also organized a workshop on current methods and applications for artificial rearing of rats.

Debra K. Fabian has been named coordinator of medical news and information for Washington University School of Medicine. She is responsible for developing and maintaining media relations with local and regional newspapers, magazines, television and radio stations, and directs the writing, editing and distribution of news releases. She is a 1977 cum laude graduate of Mississippi University for Women and had been assistant director of the news service at the University of Mississippi in Oxford.

Carlos A. Perez, M.D., professor of radiology and director of the radiation oncology division of Mallinckrodt Institute of Radiology, became Chairman of the Board of Directors of the American Society of Therapeutic Radiologists (ASTR) at its annual meeting in Florida. Perez is also radiotherapist at Barnes, St. Luke's and Missouri Baptist hospitals in St. Louis. He is a Fellow of the American College of Radiology and a member of the Board of Scientific Counselors of the National Cancer Institute's Division of Cancer Treatment.
Chancellor William Danforth, M.D., head of the department of Anatomy and Neurobiology, and Urban Bergbauer, trustee of the Whitaker Charitable Foundation, look over new equipment made possible through a contribution from the foundation. The equipment is a Leitz MPV3 microscope photometer, used to detect and quantitate fluorescent molecules in living tissue. In addition to superb optics, the microscope is fully automated and can illuminate the prepared tissue with different light sources in the visible and UV spectrum. The microscope can be joined with a video camera, a computer, and a digital printout device.

Among the projects to which it will be applied is a current study of the distribution of chemoreceptors over the surface of embryonic muscle cells and neurons grown in cell culture. This is a very general question concerning how one cell influences and nurtures another during development and aging.

Hugh R. Waters, M.D., ’45, and clinical instructor in medicine, received the 1982 Special Recognition Award of the American Society of Internal Medicine (ASIM). Waters is a member of the Missouri Society of Internal Medicine. ASIM president Lonnie R. Bristow, M.D., presented the award to Waters at the ASIM annual meeting in September in Chicago. The award recognizes Waters’ “capable and enthusiastic involvement” on state and national levels for the benefit of both societies.

Jonathan Jantz, WUMS III, is one of 41 medical students from the U.S. and Canada to receive a MAP International fellowship to assist missionary doctors in developing countries for eight to 10 weeks. MAP International is a Christian world health organization. The International Fellowship program was begun in 1971 by a grant from the founder of Reader’s Digest.

C. Robert Almli, associate professor in preventive medicine, anatomy and neurobiology, and psychology, with Catherine Kozial and Katerine Burson, graduate students in the occupational therapy program, received a $5,000 grant from the American Occupational Therapy Association. The funds will be used in the analysis of voluntary and involuntary movements of the affected upper extremities of stroke patients in Barnes Hospital. Almli has also recently been appointed an editor of Brain Research Bulletin.

Morton E. Smith, M.D., professor of ophthalmology and pathology, was recently appointed associate secretary of education of the American Academy of Ophthalmology.

Wilfred J.G. Ellis, WUMS IV, has been selected for inclusion in the annual biographical compilation, Outstanding Young Men of America.
The Work-a-Day World

The Medical Center Alumni office is establishing a program to give freshman and sophomore medical students the opportunity to spend a day on the job with a practicing physician in the St. Louis metropolitan area. Morton Smith, M.D., professor of ophthalmology and assistant dean, is the project chairman. He will be writing to St. Louis area alumni, asking them to volunteer to host one student annually.

Arpad Csapo Memorial Fund

An endowed fund has been established in memory of Arpad Csapo, M.D., Professor of Obstetrics and Gynecology at Washington University from 1963 until his death in 1981. Dr. Csapo’s career in reproductive medicine led to an increased understanding of uterine physiology. Among his contributions to the field was the discovery of the progesterone block, which led to the clarification of the luteo-placental shift and ultimately to his “see-saw theory of myometrial function.”

The Alumni Association offers tours of the Medical Center to high school science honors students, most of whom intend to major in science in college and apply for medical schools. A tour of the Anatomy Museum is always one of the most well received features of the tours. Left, Roy Peterson, Ph.D., professor of anatomy, explains one of the exhibits in the museum to a group which toured the medical center in November. Faculty and staff usually join the honors students for lunch, provided by the Alumni Association. Medical students serve as guides.

The fund has been established by Dr. Csapo’s wife, Elise, with many of his colleagues from both the United States and abroad. Income from the Arpad Csapo Memorial Fund will provide financial aid to promising students interested in the field of reproductive medicine.
Lloyd Penn, M.D. '33, was emcee in San Francisco, where the program at the St. Francis Hotel was attended by approximately 90 alumni and guests. Ruth Fleming, M.D. ’39, introduced Dr. Trotter. Carl Goetsch, M.D., former house staff (FHS), introduced Dr. Lacy.

Network Cities Report

Alumni and Development staffer Jean Quinlan, Director of Special Funding Programs, together with Dr. Mildred Trotter, and Dr. and Mrs. Paul Lacy met with alumni groups in Denver, Seattle, and San Francisco during October. Alumni in these three new Network Cities provided warm and enthusiastic receptions for their former teachers. Dr. Trotter addressed each group on important changes at the Medical Center; Dr. Lacy spoke on recent advances in transplantation research in diabetes.

In San Francisco, the Welcoming Committee members joined the touring faculty members for dinner. From the left are: Paul Lacy, M.D., Ph.D., professor and head of the pathology department; Mrs. Paul Lacy; Drs. Carl and Anne Goetsch, M.D. ’41; Dr. Carl Goetsch, Jr., Dr. Ruth Fleming, Dr. Mildred Trotter, and Dr. and Mrs. Paul Gutman, ’27.

Don Kestle, M.D. ’62, was master of ceremonies in Seattle, where approximately 50 alumni attended the program. Members of the Seattle Welcoming Committee were: Betty Hopper, M.D. ’59, F. Peyton Gaunt, M.D. ’72, and J. Findlay Wallace, M.D. ’61.

Dr. Lacy on the left, and Dr. Trotter on the right, enjoy an exchange with Harriet Wallace and Mike Kappelman, M.D. ’80, in Seattle.

Frank Drake, M.D. ’34, and his wife greet Paul Lacy in Denver. In addition to Drake, Welcoming Committee members were Mike and Mimi Glode, both M.D. ’72, and David Talmage, M.D. ’44.

Emcee in Denver was Joel Karlin, M.D. ’68. He opened the program, which was attended by nearly 50 people.

Alumni Support Review

Medical alumni and former house staff are responding generously to the 1982-83 annual fund drive. In the early weeks of the campaign 422 alumni and former house staff contributed $62,115.77. This represents a record level of alumni giving to the annual fund.

All annual fund contributions may be designated for the Medical Teaching Fund or for any department.

The national Medical Annual Fund Committee led by Paul O. Hagemann, M.D. '34, (above), and George Sato, M.D. '47, (right), has a special goal of increasing alumni donations this year. Over 70 volunteers are working in special class solicitations and club membership recruitment.

The medical Eliot Society has added eighteen new members (contributing $1,000 annually) since July 1, the beginning of the annual fund year. The Medical Dean's Committee, chaired by Samuel D. Soule, M.D. '28, above left, and Virgil Loeb, Jr., M.D. '44, above right, are recruiting new members ($500 to $999) to join the Eliot Society.

Frederick D. Peterson, M.D. '57, serves as the President of the Medical Century Club. A total of 91 new members have already joined the club this year. Century Club members contribute $100 to $499 annually.
Letters to Outlook

In his interesting article, “Before Barnes: Washington University Hospital” (Autumn 1982), Dr. Paul Anderson neglects to mention that Kemper College Medical Department (founded in 1840 as “the first school for the training of physicians west of the Mississippi River”) became in 1846 the Medical Department of the University of Missouri —long before there was any connection to Washington University. Until 1856, after the state legislature passed a bill forbidding members of the U. of Missouri faculty to practice any other profession (including medicine) while teaching, the medical degrees at that school in St. Louis were often conferred and always signed by the president of the University of Missouri, and the diplomas bore the seal of the University of Missouri.

James M.A. Weiss, M.D.
Professor and Chairman
Department of Psychiatry
University of Missouri—Columbia

Dr. Anderson responds: “I appreciate Dr. Weiss’ observation that there was a time when one of the predecessors of this school was officially the Medical Department of the University of Missouri. He could also have noted that there was a period of affiliation in the late 1880’s when Missouri Medical College, while remaining fiscally independent, was designated as “Section No. 2” of the University of Missouri. Mention of these two historical episodes was omitted from my article because they did not pertain to the story of Washington University Hospital.”

Paul G. Anderson, Ph.D.
Archivist

. . . I think the article (Transfusion-Enhanced Kidney Transplants) in the Autumn issue was excellent and the picture selection just right. I have heard many favorable comments and appreciate your efforts on behalf of the transplantation service.

Charles B. Anderson, M.D.
Professor of Surgery

Few times have I enjoyed an article as much as I did the one published recently by Dr. Anderson . . . “Before Barnes: Washington University Hospital.”

Carlos A. Perez, M.D.
Director, Division of Radiation Oncology

. . . The complete graduation address of Dr. Helen Caldicott . . . was well worth reading (Summer 1982). I sincerely hope it will be reproduced in other publications.

Bernice Torin, M.D. ’41

OUTLOOK welcomes letters from readers for use in the “Letters” section.
1983 Washington University Medical Center Alumni Association
Annual Clinical Conference
Cancun, Mexico
January 29–February 5

AMA
As an organization accredited for continuing medical education, Washington University designates this continuing medical education offering as meeting the criteria for 12 hours in Category 1 of the Physician’s Recognition Award of the AMA.

AAFP
This program has been reviewed and is acceptable for 12 Prescribed hours by the AAFP.

Faculty
Donald R. Harkness, M.D. ’58 — Love Professor and Chairman, Department of Medicine, University of Wisconsin
James A. Ferrendelli, M.D. — Seay Professor of Clinical Neuropharmacology and Professor of Neurology and Pharmacology, Washington University School of Medicine
R. Eugene Holemon, M.D. ’58 — Assistant Professor of Psychiatry (Clinical), Washington University School of Medicine
Robert Paine, M.D. — Professor of Medicine (Clinical), Washington University School of Medicine; Chief, Department of Medicine, St. Luke’s Hospitals
Benjamin D. Schwartz, M.D., Ph.D. — Associate Professor of Medicine; Investigator, Howard Hughes Institute, Washington University School of Medicine
Robert C. Wray, M.D. ’63 — Professor of Surgery (Plastic and Reconstructive), Washington University School of Medicine

Program Planners
Elmer B. Brown, M.D. ’50 — Professor of Medicine, Associate Dean for Continuing Medical Education, Washington University School of Medicine
Richard Parsons, M.D. ’58 — Assistant Professor of Urologic Surgery (Clinical), Washington University School of Medicine; President, Medical Center Alumni Association

Scientific Program
Monday, January 31
8:15 am  Welcome — Dr. Parsons
8:30  Medical Uses of Monoclonal Antibodies — Dr. Schwartz
9:30  The New Generation of Cardiac Drugs — Dr. Paine
10:30  Coffee Break
11:00  Depression: Management and Treatment — Dr. Holemon
12:00 Noon  Adjourn

Tuesday, February 1
8:30 am  Acquired Hemolytic Anemia — Update 1983 — Dr. Harkness
9:30  Breast Reconstruction after Mastectomy — Dr. Wray
10:30  Coffee Break
11:00  The HLA Complex — Implications for Disease — Dr. Schwartz
12:00 Noon  Spouses are invited — “An Introduction to the Mayan Civilization”’
1:00  Adjourn

Wednesday, February 2 — FREE DAY

Thursday, February 3
8:30 am  Biochemical and Pharmacologic Basis for the Therapy of Movement Disorder — Dr. Ferrendelli
9:30  Personality Disorders: Management in Clinical Practice — Dr. Holemon
10:30  Coffee Break
11:00  Reconstructive Microsurgery — Dr. Wray
12:00 Noon  Adjourn

Friday, February 4
8:30 am  Coronary Bypass Surgery — 1983 — Dr. Paine
9:30  Sickle Cell Disease after a Decade of Concern — Dr. Harkness
10:30  Coffee Break
11:00  Current Concepts in the Treatment of Seizure Disorders — Dr. Ferrendelli
12:00 Noon  Adjourn

An Opportunity for Additional C.M.E.
As you may already be aware, the Continuing Medical Education Department of the Washington University School of Medicine will be presenting a “Care of the Aging Patient” seminar. This will also be held in Cancun, February 5-11 — commencing the very day the Washington University Medical Alumni Association Annual Clinical Conference ends.

If your time allows, this can provide you the opportunity for TWO continuous stimulating weeks of accredited CME in the warm and delightful atmosphere of Cancun (for only one round-trip air fare). Use the travel agency’s toll-free number (800) 255-6969 to call for details.

— Ground Arrangements Cost — Cancun, Mexico — $569.00 Per Person
Continuing Medical Education
Calendar For 1983

January 9-14  Practical Management of Infectious Diseases (at Keystone, Colorado)
January 29-February 5  WUMC Alumni Annual Clinical Conference (at Cancun, Mexico)
February 5-11  Care of the Aging Patient (at Cancun, Mexico)

Courses at the School of Medicine:
February 25-26  Restoration Following Hand Injuries
March 19  Management of Craniofacial Disorders
March 24-25  Rheumatology for the Practicing Physician
April 7-8  Tenth Annual Symposium on Ob-Gyn
May 5-7  WUMC Alumni Reunion
May 6-14  Fifth Annual Current Concepts in Radiology and Orthopedics
May 23-27  Diagnostic Interview Schedule Training
October 10-14  Diagnostic Interview Schedule Training
November 3-5  Current Concepts in Cancer Therapy

All seminars have Category I AMA approval. Please call the CME office, 314-454-3853, for information about AAFP, AOA and other accreditation or for additional information.

'40s

Ewald W. Busse, M.D. 42, a pioneer in the study of aging and dean emeritus for medical and allied health education at Duke University Medical Center, received the 1982 Brookdale Award in Bio-Medicine from the Brookdale Foundation of New York. The award includes $20,000, a silver medallion and a certificate. Busse was honored in November at the 35th annual meeting of the Gerontological Society of America, in Boston. Among his distinguished contributions to the field of gerontology are: his role in establishing the nation’s first Center for the Study of Aging and Human Development, at Duke in 1957, and his 13-year directorship of the Center; his leadership of a 25-year study of physical and mental changes in 260 men and women followed for 25 years; and his general record of scholarship, publication, and leadership of several societies and committees concerned with gerontology.

John W. Payne, MD ’44, retired from the active practice of obstetrics and gynecology in January 1982. He wrote that he plans “to spend time between Marco Island, Florida, and Three Lakes, Wisconsin.”

'50s

Alfred Markowitz, M.D. ’52, presented a paper about long-term follow up of patients who have had islet-cell tumors. He went to Tokyo to deliver the paper at the International Society for Surgery of the Gastrointestinal Tract.

Richard B. Windsor, M.D. ’52, was elected president-elect of the Wisconsin Surgical Society last spring. He had served the society as secretary-treasurer since 1978, and was on its council from 1975 to 1978.

Lucy J. King, M.D. ’58, has recently gone into solo private practice of psychiatry in Manassas, Virginia, near Washington, D.C. She is also on the clinical faculty at George Washington University and hopes to attend the 25th reunion of her class at WUMS.

Paul H. DeBruine, M.D. ’59, was elected to the board of trustees of Elmhurst College in Illinois. His first term on the board was from 1974 to 1979, and he is a 1955 graduate of the school. His late father was professor and head of Elmhurst’s biology department. DeBruine, of Associated Anesthesiologists in Decatur, Ill., is also director of Decatur Memorial Hospital’s School for Nurse Anesthetists and is an on-site visitor of the Council on Accreditation of Nurse Anesthesia Schools.
'60s

Ronald W. Barnet, M.D. '63, has been named adjunct assistant professor of surgery at the University of Arizona School of Medicine. He continues in private practice in Sun City, Phoenix, and Mesa, Arizona.

Robert H. Waldman, M.D. '63, is acting dean of the School of Medicine at West Virginia University in Morgantown. He is also chairman of the department of medicine. Waldman succeeds former dean John E. Jones, who became WVU vice-president for health sciences.

Andrea C. Tongue, M.D. '66, is the 1982-83 president of the Oregon Academy of Ophthalmology. She is clinical associate professor of Ophthalmology at the University of Oregon Health Sciences Center and a member of the program advisory committee of the American Academy of Ophthalmology.

William Ellis, M.D. '68, was recently promoted to Clinical Assistant Professor of Ophthalmology at UC-San Francisco medical school. He is also an advisor to the Cataract Foundation, a charitable trust headquartered in the Bahamas, which funds medical research and clinical work in ophthalmology throughout the world.

Donald R. Kirks, M.D. '68, was recently promoted to Professor of Radiology and Pediatrics at Duke University Medical Center in Durham, North Carolina. He joined the staff there in 1978 as an associate professor of radiology and pediatrics. Kirks is particularly interested in the application and integration of new imaging modalities, such as ultrasound, computed tomography, nuclear magnetic resonance, and digital radiography, in diagnosis of pediatric disease. He has published more than 110 original papers, review articles, and textbook chapters in his specialty. A resident of Chapel Hill, he and wife Jan are the parents of John, age 13, and Julie, age 10.

David Zopf, M.D. '69, was appointed chief of the Biochemical Pathology Section in the Laboratory of Pathology, National Cancer Institute. He lives in Chevy Chase, Maryland.

'70s

Anthony J. Weisenberger, M.D. '71, is director of the Intensive Service Unit at Appalachian Hall, a 100-bed private psychiatric hospital in Asheville, North Carolina. Before moving to Asheville in September 1981, he was assistant clinical professor at Southern Illinois U. medical school, teaching in the family practice residency in Carbondale, and was also on the staff of the community mental health center and in private practice.

Larry J. Shapiro, M.D. '71, received the 1982 E. Mead Johnson Research Award, given by the American Academy of Pediatrics. Shapiro is associate professor of pediatrics at UCLA, specializing in genetics. He served his internship and residency at St. Louis Children’s Hospital.

J. Michael Condit, M.D. '73, is now a rheumatologist with the Kelsey-Seybold Clinic in Houston and is clinical assistant professor of medicine at Baylor College of Medicine. Condit is also president of the Texas Rheumatism Association, president-elect of the Texas Society of Internal Medicine, chairman of the medical and scientific committee for the Texas Gulf Coast Chapter of the Arthritis Foundation, and vice-chairman for the medical program for that chapter. He is looking forward to the class’ 10-year reunion in May.

Thomas Namey, M.D. '73, of Toledo, Ohio, has been elected to Fellowship in the American College of Physicians. He specializes in rheumatology and nuclear medicine.

John William Hubert, M.D. '75, has been elected to Fellowship in the American College of Cardiology. He is in private practice in St. Louis, Mo.

Barry Anthony Mills, M.D. '75, of Melbourne, Florida, is in private practice with a large group of internists. He specializes in gastroenterology and is vice chairman of the department of medicine at Holmes Regional Medical Center.

Sterling H. Baumwell, M.D. '76, has been certified by the American Board of Obstetrics and Gynecology. He is in private practice in Sterling, Illinois, and is medical director of family planning at Whiteside County Health Department in Morrison.

Larry Siegel, M.D., Ph.D. '77, was appointed assistant professor of pediatrics, section of allergy and clinical immunology, at the U. of South Florida College of Medicine in Tampa.

Former House Staff

Felix F. LaRocca, M.D., of St. Louis, who specializes in Child Psychiatry, is the founder of Bulemia Anorexia Self Help, known as B.A.S.H.

J. George Ritch, M.D., of St. Petersburg, Florida, is chairman of the ophthalmology sections at Bayfront Medical Center and the Edward White Memorial Hospital in St. Petersburg.

Max Robinowitz, M.D., of Bethesda, Maryland, has been elected to Fellowship in the American College of Cardiology. He is currently a clinical associate professor of pathology at George-town University School of Medicine in Washington, D.C., and the Uniformed Services University of the Health Sciences in Bethesda. He is chief of the division of diagnosis in the department of cardiovascular pathology, Armed Forces Institute of Pathology, Washington, D.C.
OUTLOOK will begin to report news of HAPP graduates similar to "Class Notes," if enough graduates send information. Black-and-white glossy photos, 5 x 7 or 8 x 10, can also be sent to the magazine, Box 8065, WUMS, 660 S. Euclid, St. Louis, Mo., 63110.

The first HAPP Century-Plus Club breakfast was held in October at the Chase-Park Plaza Hotel in St. Louis. Approximately 30 HAPP alumni and guests attended and heard Darwin Schlag, CPA, National Health Care Partner, Laventhol and Horwath, discuss strategic planning. He called his address "Strategic Planning for Today — Based on the Memoirs of the Captain of the Titanic." J.J. Purvis, '70, is president of the Century-Plus Club.

Raymond F. Crerand, '73, is now senior associate administrator — operations, for St. Joseph Medical Center in Burbank, California. A native of Ireland, he earned his B.S. degree in biochemistry at City University of New York and worked in research before entering the HAP Program. He served his residency at Good Samaritan Hospital and Medical Center in Portland, Oregon. Before going to St. Joseph in Burbank, he was associate administrator of Providence Medical Center in Portland.

Jere D. Palazzolo has been named assistant administrator at Arcadia Valley Hospital near Springfield, Mo. He will be responsible for the laboratory, dietary, medical records, radiology, pharmacy and physical therapy departments, and will oversee housekeeping and linen service, engineering and maintenance, and security. He was previously supervisor of radiology at Incarnate Word Hospital in St. Louis, and is a certified radiologic technologist.

The HAP Program dedicated the Ted Bowen Classroom in the building at 724 S. Euclid, formerly Shriner's Hospital, in October. The dedication honors the ranking member of the first graduate class to complete Washington U.'s program in hospital administration. Bowen received his MHA degree in 1948. He has been president and chief executive officer of the Methodist Hospital in Houston, Texas, for more than 30 years.

He has been credited with leading the Methodist Hospital into the age of multi-hospital systems, and currently is president of the Methodist Hospital Health Care System, Inc. He also created many innovative programs including the Neurosensory Center, an interdisciplinary research and clinical center; the Fondren Orthopedic Clinical and Research Center; the Brown Cardiovascular Clinical and Research Center, and the Total Health Care Center.

Among the honors bestowed upon Bowen through his distinguished career are the Texas Hospital Association’s Collier Award for Distinguished Hospital Administrators, the Washington U. Distinguished Alumni Award, the Distinguished Service Award from Baylor College of Medicine, and induction into the Stephen F. Austin University Hall of Fame.

The Methodist Hospital and the Methodist Hospital Health Care System, Inc., currently employ 14 MHA graduates of Washington U.'s HAP Program. These alumni have been active and generous in support of the program and at the Bowen Classroom dedication, a check for $13,000 was presented to support the Program’s scholarship funds.
Concluding this year's back cover series on the rise of the Clinical Sciences Research Building are these two views taken late in November. Brick work proceeds on lower levels as the top floors are constructed. The 382,000-square-foot building will solve severe space shortages for several departments and accommodate future growth. Half of the costs of the much-needed facility are financed from savings accumulated by the dean and the departments of the school throughout the past 10 years. A series of elevated pedestrian ways will link the building with Barnes Hospital through the Wohl buildings, and with the new St. Louis Children's Hospital and Jewish Hospital, physically uniting the entire medical center complex for the first time. The building is scheduled to open in 1984.