Outlook Magazine, Summer 1984
Medical Care Today: Two Sides of the World
A Rite of Spring
Match Day 1984

Match Day is an annual rite of spring at the School of Medicine. All but one of this year's graduating class took residencies, and 79 percent matched with one of their top three choices. Here, a group of students are shown looking for their written "match" from among those stacked on the stage in Cori Auditorium. See story, page 24.
On The Cover:

Medical care worldwide is undeniably influenced by the availability of funds. In this issue, Virginia Welton describes the financial problems affecting academic medical centers in the U.S., and Robert Herr recounts his experiences of constraints on medical care in Africa, both cultural and financial.

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PURLOINED GENES

THE CANCER CONNECTION

by Suzanne Hagan

There has always been that mysterious lapse between ordinary events and discovery, that leap from the known to the new. The history of science and medicine is replete with such events. For example, Semmelweis correlated the lethal epidemic of puerperal fever raging through the obstetrics ward of his Vienna hospital with the unwashed hands of the examining doctors; Kekule dreamt of snakes biting their tails, then hypothesized the structure of the benzene ring.

Some would say that those ordinary events of a scientist's life that lead to great discoveries are gone forever in today's high tech era, but they are wrong. Instead, technology has advanced to the point where scientific advances only seem to be dehumanized.

One powerful technological tool is the minicomputer. By programming it with the amino acid sequence of a known protein, a scientist can compare the amino acid composition of another protein in order to detect similarities pointing to a common origin.

Last year, in London's Imperial Cancer Research Fund, Michael Waterfield sat down at his computer and fed it the amino acid sequence of a protein obtained from blood platelets. The protein had been sent to him from America by Thomas F. Deuel, M.D., professor of medicine and biological chemistry at Washington University School of Medicine. Waterfield entered his sequence determination of 104 of the protein's amino acids in their proper order, and the computer compared that list with other proteins' amino acid sequences programmed into its memory. One can only imagine the emotion that must have enfolded Waterfield as he surveyed the results: Deuel's protein displayed 92% similarity to a protein found in cancerous cells.

This discovery provided the first direct link between a normal cellular product and a protein that transforms normal cells to cancerous ones.

"PDGF (Platelet-Derived Growth Factor) is the first normal physiological product reported that is similar to a substance found in cells transformed by oncogenic (cancer-causing) viruses."

False Leads

For years, researchers searched for the elusive connection between viruses and human cancer. Early in this century, Peyton Rous found that a tumor in chickens — avian sarcoma — was caused by a filtrable agent, later identified as a virus. This tumor virus belongs to the retroviruses, whose genome consists of RNA, not DNA. By means of an unusual enzyme, called "reverse transcriptase," the Rous sarcoma virus weaves its genes into those of the chicken's connective tissue cells, transforming them into hapless slaves that display the unlimited reproductive capacity that is characteristic of cancer cells.

Many tumors in plants and animals — even mammals such as the great apes, humans' closest phylogenetic relatives — are caused by viruses. These viruses are said to be oncogenic because they transform normal cells into malignant ones. It seemed unlikely that Homo sapiens would be spared the effects of oncogenic viruses, but the virus-to-human cancer connection would not yield to discovery.

Promising leads popped up like cros­cuses. Immunological evidence provided an indirect link — viral antigens could be detected in human cancer cells. Then, in the early 1970s, the discovery of reverse transcriptase in cancer cells was heralded as the long-sought connection. But hope dimmed when the enzyme was also found in non-cancerous cells. The Epstein-Barr virus, discovered in cells of black children with Burkitt's lymphoma, was also hailed as a breakthrough. But later, E.B. virus was also found in the cells of white teenagers who had infectious mononucleosis—a benign, self-limiting infection. It was obvious that a virus connection to human cancers existed, but when would the direct evidence appear?

Old Blood, New Insights

One of the first connections came from boxes of outdated human blood platelets — cell fragments responsible for blood clotting — stored in Deuel's freezer at Jewish Hospital, where he is director of the hospital's division of hematology/oncology and the Marilyn Fixman Cancer Center. Deuel's team — Junghans, Ph.D., research assistant professor of medicine, and Shuan Shian Huang, Ph.D., research instructor of medicine — succeeded in purifying a few milligrams of platederived growth factor (PDGF). PDGF is stored in platelets and freed when they congregate at the site of injury. Released
in circulating blood, PDGF binds to an injured blood vessel and lures white cells to the area. Later, it also attracts fibroblasts that will form scar tissue. Unbound PDGF is cleared from blood by alpha-2-macroglobulin, a protein made by the liver. And in tissue culture, PDGF acts as a mitogen, stimulating fibroblast growth. But the way PDGF exerts these effects remains unknown.

PDGF was discovered in 1971, when researchers found that normal serum (but not plasma) gave cultured fibroblasts a property that only cancer cells have—the ability to be propagated indefinitely in vitro. This discovery suggested a connection between cancer and an unknown substance contained in serum. But the connection didn't gel until over a decade later.

"PDGF is the first normal physiological product reported that is similar to a substance found in cells transformed by oncopgenic viruses," says Lung Huang. He points out that, to date, all oncogene products are intracellular, unlike PDGF which is destined to be released from its "home" in platelets. This growth factor, normally manufactured only in megakaryocytes (the parent cells of platelets), is released into the blood when injury occurs. Once cells can manufacture PDGF and other mitogenic substances for themselves, they appear to stimulate their own cycle of cell division indefinitely.

"The gene for PDGF is supposed to be turned on only in the megakaryocyte," reflects Lung Huang. "When the megakaryocyte makes platelets, PDGF is stored in platelets' alpha granules, not squirted into the bloodstream. Platelets release it only under specific conditions, and PDGF acts like a 'repairing hormone.' But when the gene coding for PDGF is turned on in a smooth muscle..."
cell or a fibroblast, those cells are transformed into tumor cells.

When malignant human smooth muscle cells or fibroblasts begin manufacturing PDGF for themselves, they are remarkably similar to cancer cells from great apes infected with simian sarcoma virus (SSV). SSV-infected cells produce a protein to which PDGF shows great similarity.

One of the unusual characteristics of PDGF (and a protein manufactured by an SSV oncogene called sis) is its receptor in the cell membrane. At least a portion of the receptor is a kinase — an enzyme that adds a phosphate molecule to its substrate. Normally, most membrane kinases add phosphate to serine or threonine. But the kinase on the receptor for sis product/PDGF phosphorylates tyrosine. Since phosphorylation is a key step initiating many metabolically important biochemical reactions, this unusual specificity might point to the mechanism by which the virus causes and/or maintains the cancerous transformation.

So far, Deuel's team has found two classes of molecules — PDGF-1 and PDGF-2. Both classes of PDGF are each composed of two chains, A and B. The A chain is the one that shows the most similarity to the virus protein. "PDGF-1 is the larger of the two molecules," explains Deuel. "Its molecular weight is around 31,000 daltons, which is slightly larger than that of PDGF-2. We think that the difference (in weight) is in the degree of glycosylation of the two forms: PDGF-2 has less carbohydrate than PDGF-1. And it's possible that the amino acid sequence of the A and B chains of both forms will turn out to be identical to each other. We just don't know yet."

"What is the function of the B chain?" muses Jung Huang. "We only know that the A chain is physiologically active — it's mitogenic for fibroblasts and smooth muscle cells. Maybe the B chain is where the carbohydrate is attached, which in turn will 'direct' the A chain where to go. In other words, the B chain could carry the 'address' where the A chain is supposed to carry out its enzymatic activity."

Research Areas Converge

Growth factors, oncogenes and receptors were the focus of the First Annual Washington University Symposium on Molecular Basis of Disease held in January. Among conference participants were Deuel, Luis Glaser, Stanley Cohen, and Edwin Krebs. They summarized what is known to date of oncogene products and growth factors. Other oncogene products share remarkable similarities with growth factors like PDGF: some are structurally similar to a growth factor; others are tyrosine protein kinases — components of growth factors' receptors in the cell membrane.

"What's the best way to transform a cell?" poses Jung Huang. "You cause it to make too much of a normal product, or you increase the cell's responsiveness to normal substances in one of two ways:
causing it to make either too many receptor molecules for that substance, or an altered receptor that is self-activating. Either way, the net effect is the same."

And either way, the key to transformation seems to be linked to the cell membrane. The cell membrane contains receptors for many kinds of substances that signal the cell to divide or to begin manufacturing a new protein. And it's the cell membrane that is changed by transformation. Tumor cells, unlike normal cells, lose the property known as contact inhibition. In culture, cancer cells don't grow in the normal, sheet-like fashion. Instead, they pile against and atop one another, helter skelter. And cancer cells will grow in soft agar; normal cells won't.

Luis Glaser, Ph.D., head of biochemistry at the School of Medicine, thinks that growth factors initiate events at the cell membrane, not necessarily within the cytoplasm or nucleus, that may be crucial to transformation: "Maybe the reason cancer cells normally grow flat, on the surface of the culture dish, is that they need to be stretched out like a fried egg, but that by attaching to the surface, they keep a receptor occupied, so to speak. But if that receptor is occupied by a growth factor, the cells will then grow in soft agar."

\[\text{From Bench to Bedside}\]

\[\text{Why would viruses like ssv cause host cells to produce a normal physiological product? Because oncogenic viruses "picked up" normal cellular genes, called proto-oncogenes, back in their evolutionary history.}\]

For example, the ssv oncogene \textit{sis} is thought to be derived from cells of the woolly monkey. Once these viruses incorporated mammalian genes into their genomes (and possibly, duplicated or altered those genes in the process), the viruses lost some of their original genes — and changed some of their functions.

Instead of merely directing host cells to produce viral progeny, the viruses caused host cells to express, inappropriately, these pilfered proto-oncogenes. Expression of viral oncogenes transforms host cells into cancerous cells.

Viruses besides simian sarcoma virus carry oncogenes. And many human cancers — osteosarcoma, glioblastoma, and T-cell leukemia — produce the ssv protein. These similarities suggest that the mechanism by which the cancerous state is caused and/or maintained may turn out to be identical among those types of cancers.

There are several ways by which oncogenic viruses may transform cells, says Jung Huang. "It's possible that the oncogene a virus carries may be directly responsible for the transformation. But it's also possible that the virus may not need to carry an oncogene. It may simply carry a promoter (genes which "turn on" the activity of other genes) which it inserts close to a cell's (own) proto-oncogene. This new genetic arrangement may be the cause of the cell receiving an inappropriate message to divide.

"Many hepatoma patients have had hepatitis," continues Jung Huang. "When the virus infects a person's liver, maybe it turns on a proto-oncogene."

This theory could also explain why breast cancer or other types of cancers, like Wilms' tumor or retinoblastoma, seem to have some genetic component. Perhaps a virus needs "the right kind" of gene assortment in its host cell in order to transform that cell into a malignant one. Also, the ssv protein has been detected in several types of human connective tissue tumors, but not epithelial cancers, thus lending support to this idea. Furthermore, patients with Burkitt's lymphoma display an oncogene (\textit{myc}) in a new chromosomal location.

An oncogene in the \textit{myc} family is under scrutiny here at the medical center. Garrett M. Brodeur, M.D., assistant professor of pediatrics, has collaborated on the study of 63 neuroblastomas. He and his collaborators found that nearly half the tumors showed extra copies of \textit{N-myc}, a phenomenon known as gene amplification. Brodeur, a staff member at Children's and Barnes hospitals, and his colleagues were also able to correlate the presence of gene amplification with the tumors' stage. This suggests a mechanism for tumor progression in those tumors in which additional copies of \textit{N-myc} (or other oncogenes) are present. And it has important implications regarding prognosis for the patient.

In addition, even a single nucleotide substitution (point mutation) in a gene has been shown to be important in certain human carcinomas. The oncogene \textit{ras}, cloned by recombinant DNA technology, differs from the normal gene at that location by a single base change. Interestingly enough, only tumor cells — not normal cells from the same patient — display the altered \textit{ras}.

All the pieces of the puzzle — oncogene products, normal physiological products, and the cell membrane receptors for these ligands — must fall into an orderly arrangement before the mechanism for cancer causation and/or maintenance can be deduced. Recent research demonstrates that two different oncogenes acting in concert — or an oncogene plus a chemical carcinogen — seem to be sufficient to transform normal cells. And since PDGF is greatly similar to (if not identical with) the ssv protein, the puzzle pieces may all fall into place at once.

"Increased activity of protein tyrosine kinase has something to do with the transformation," says Jung Huang. "We are trying very hard to understand the connection between protein tyrosine kinase activity and DNA synthesis." But the cellular process initiated by PDGF/ssv protein remains to be identified, and no one can predict how long that will take. However, once cellular biology catches up with molecular biology, diagnosing human cancers will become more specific, treatment more effective, and prevention more plausible.

Research technicians Donald Chang and Barbara Kennedy aided in the isolation, purification and characterization of PDGF, as did post-doctoral associates Richard Proffitt and Junju Nishimura.
New Treatment Halts Heart Attacks

Fast, safe and effective. Few are the occasions when a medical researcher can say unequivocally that his work has provided a fast, safe and effective therapy that ultimately could save thousands of lives every year.

A small group of researchers at Washington University in St. Louis are enjoying just such a rare occasion. Their experimental-work-turned-therapy is a chemical called t-PA, tissue plasminogen activator. In six out of seven patients, t-PA quickly and safely stopped a heart attack midstream by dissolving the life-threatening blood clot blocking a coronary artery.

"We believe this is a genuine advance in therapy," states Burton E. Sobel, M.D., author of a recent New England Journal of Medicine article reporting the results of the seven-patient pilot study. "It dissolves naturally. The biggest problem with the traditional agents, streptokinase and urokinase," continues Bergmann, "is that they not only dissolve the troublesome blood clots in the coronary arteries, they also cause what's called a "systemic lytic state." They break down many of the normal coagulation factors in the blood and really put a person at risk of systemic bleeding.

"The clot began to dissolve in as little as 20 minutes after the drug was given, and none took longer than one hour to disappear," says Sobel. "This was just a small, pilot study, but it is the beginning of what should be a major area of research.

Several problems surrounding the use of traditional clot-dissolving (thrombolytic) agents have encouraged Sobel and other cardiologists to search for alternatives. The two drugs in current general use are streptokinase and urokinase. In comparison with these two agents, t-PA earns its billing as faster, safer and more effective.

"Streptokinase is a bacterial product, not a physiological substance," Sobel explains. "Since we all make antibodies against streptokinase, it's very difficult to define an appropriate dose. Some of the drug will be bound up by antibody and therefore be ineffective."

By contrast, t-PA is a protein natural to the human body. "When you have a bruise — which is just a blood clot outside a vessel — it doesn't stay there forever," says Sobel's co-worker, Steven Bergmann, Ph.D. "It dissolves naturally. Current thinking is that t-PA is the physiological agent that dissolves clots under normal circumstances. Because t-PA is a normal human protein, it is unlikely to be compromised by antibody-binding or allergic reactions.

"The biggest problem with the traditional agents, streptokinase and urokinase," continues Bergmann, "is that they not only dissolve the troublesome blood clots in the coronary arteries, they also cause what's called a "systemic lytic state," They break down many of the normal coagulation factors in the blood and really put a person at risk of systemic bleeding."

Most clots consist of the protein fibrin. To break apart a clot, the fibrin network must be dissolved. This is accomplished by plasmin, a fibrolytic enzyme formed by the activation of its precursor, plasminogen. But the conversion of plasminogen to plasmin takes place system-wide in the presence of streptokinase and urokinase. This systemic action puts the patient at risk of developing hemorrhage, as well as risking depletion of the supply of plasminogen before the intracoronary clot is dissolved.

In contrast to streptokinase and urokinase, t-PA apparently binds first to the clots' fibrin meshwork. Then, the fibrin/t-PA complex converts plasminogen to plasmin. This conversion takes place locally, at the clot, not system-wide. Fibrin must be present for t-PA to work.

"Therefore, the advantage of t-PA is that it acts — not on all clotting factors everywhere in the system — but only at the site of an existing blood clot," adds Bergmann.

Appropriate doses seem so safe that Sobel predicts "we may see paramedics or perhaps patients themselves administer the drug as soon as they suspect they are dealing with a heart attack." Even after a patient arrives at a hospital, a coronary clot might be dissolved faster with t-PA because it can be given as a simple intravenous injection. Streptokinase and urokinase, however, are often administered directly to the clot through a long catheter that has been snaked through the circulatory system and into the coronary artery. Coronary catheterization is a relatively safe but slow technique. Not all hospitals have catheterization laboratories, and where they do exist, they're very busy.

"Obviously, treating without the need for catheterization — as we expect we will be able to do with t-PA — is a tremendous advantage," says Bergmann. "Generally, the faster the clot is dissolved, the more heart tissue is preserved."

Sobelsays each year approximately 300,000 heart attack victims die after they reach a hospital. "If t-PA is as effective as we hope it will be in salvaging heart muscle, it's likely that a substantial fraction of them could be saved," he says.

Many of the patients in the initial trial were examined with positron emission tomography (PET) both before and after t-PA therapy. The color PET scans (back cover) strikingly confirm that rapid restoration of bloodflow can preserve metabolic function in infarcted heart tissue.

"You'll hear people say t-PA is a panacea," Sobel continues. "It's not. The coronary arteries where these clots occur are abnormal to start with. Remember, the clots generally form where the vessel is narrowed. We're still going to have
Edward M. Geltman, M.D., assistant professor of medicine and radiology, with a patient whose PET scan will show if administration of t-PA has been effective in restoring blood flow in infarcted heart muscle. The scanner picture above will soon be replaced by a more advanced model also to be used in t-PA-related research. (See inside-back cover)

to deal with the long-term widening or repair of these arteries. Coronary artery by-pass surgery and balloon angioplasty are among the techniques currently used to correct coronary artery stenosis.

Basic Research Precedes Breakthrough

As is the case with most new therapies, the development of t-PA began in the basic research laboratory. More than 20 years ago, biochemical studies of the complicated human coagulation mechanism predicted the existence of an "activator factor," a turn-key protein molecule that engages the thrombolysis system.

After learning of the work of a Belgian biochemist, Desire Collen, who isolated and purified the natural protein, Sobel immediately realized that t-PA might be a thrombolytic agent suitable for use in myocardial infarct. Subsequent meetings between Sobel and Collen, of Belgium's University of Leuven, resulted in collaborative, fast-paced and very successful work. Collen discovered that, for reasons unknown, human cancer cells produce large amounts of t-PA. He devised a way to isolate t-PA from cell cultures of melanoma. (Use of t-PA does not lead to cancer in the heart patient.)

The Sobel-Collen collaboration was a natural. The Washington University Medical Center studies would have been impossible without the t-PA from the Belgian biochemist. Collen's group had mastered t-PA production and purification, while Sobel's group had extensive experience with other thrombolytic agents and a very polished technique for evaluating thrombolysis in experimental animals.

Bergmann's evaluation of t-PA in dogs was a key experiment. It demonstrated that clots would begin to dissolve as quickly as seven minutes after administration of t-PA. "But the most significant part of that study," Sobel stresses, "was that we were able to demonstrate that the experimental animals were not put at risk of bleeding systemically."

The successful animal study provided Sobel and his colleague, Philip A. Ludbrook, M.D., with the evidence they needed to apply to the FDA for an Investigational New Drug permit. With FDA approval, they began the recently published clinical trials involving seven heart attack patients at Barnes Hospital.

Collen's technique was suitable for producing the small amounts of t-PA needed for such a pilot study, although harvesting enough of the melanoma-produced substance for a single dose takes a full-time technician three to four weeks. The Washington University team obviously had to pursue less costly techniques to produce the t-PA needed for the larger clinical trials that always follow successful pilot studies.

On February 21, Genentech, Inc., the San Francisco-based genetic engineering firm, announced that it would use recombinant DNA technology to produce t-PA for trials at three universities, among them a Washington University group under the direction of Alan J. Tiefenbrunn, M.D. Genentech was encouraged by animal studies conducted with the recombinant t-PA, showing that it works exactly like the t-PA first isolated by Collen.

"Using the recombinant technology," says Sobel, "it's possible to make large amounts of t-PA, and to do it in a cost-effective manner." Each of the three universities involved in the Genentech collaboration will test the recombinant t-PA on 15 patients. The results of this 45-patient trial should be released in the next four to six months.

Genentech's readily available t-PA also opens the door for extensive laboratory tests that may finally reveal the mechanics of coagulation. "Some of the research we're interested in now," says Bergmann, "is trying to induce people's own levels of t-PA to be higher. You know, it's much better to develop a prevention than a treatment."

In the meantime, other physicians and pharmaceutical companies interested in t-PA are inundating Sobel with calls. Members of the Washington University t-PA research team have drawn standing-room-only crowds at recent medical meetings. "The excitement this has engendered is really tremendous," says Sobel. "We are all hopeful that the long-term results will be equally as exciting."

Results of Sobel's t-PA therapy in heart attack victims were published in the New England Journal of Medicine, March 8, 1984 issue.

Bergmann's experimental evaluation of t-PA in dogs was published in Science, June 10, 1983 issue.
Changing Perspectives in Medicine:

Out of the Temple and Into the Marketplace

by Virginia V. Weldon, M.D.

For the past ten years, gifted women have been able to pursue graduate studies at Washington University through the Spencer T. and Ann W. Olin Fellowship Program for Women. Currently, 25 women engage in study in a wide variety of fields: business and economics, languages, fine arts, history and social work, science, law, and medicine.

The Monticello College Foundation of Alton recently transferred $1 million in assets to the university so that the Olin Fellowships could be sustained. The gift "permanently assures the continuation of an extremely valued and successful program at Washington University," said Chancellor William H. Danforth.

Mrs. Olin, for whom the Fellowship is named, was a trustee for Monticello College in Godfrey, Illinois, before it closed in 1971. In 1974, Chancellor Danforth accepted an offer from the Monticello College Foundation trustees to establish a program at Washington University that would carry on the tradition established by Monticello’s founder, Captain Benjamin Godfrey.

Katherine White Drescher, a 1983 Globe-Democrat Woman of Achievement, has coordinated the university’s Olin Fellowship Program since 1977. Traditionally, an annual conference has been one of the program’s highlights; she and a committee are planning a 10th Anniversary Olin Conference for Fall 1984. "Out of the Temple and Into the Marketplace" is an adaptation of the Ninth Annual Olin Lecture by Virginia V. Weldon, M.D., Deputy Vice Chancellor for Medical Affairs.

We Americans have always lived by a culture of hope — a belief in a never-ending abundance of resources, a belief that this country has a limitless capacity to lead the world in providing the best of everything for its citizens. We have come to believe that we should have unlimited access to health care as a right for all. Yet the skyrocketing cost of this care forces us to make choices based on the cost of that care and its need or desirability.

In his Pulitzer Prize-winning book entitled The Social Transformation of American Medicine, Paul Starr has described the rise in the sovereignty of the medical profession and the subsequent development of a vast health care industry. His history ends in 1982 with the medical care system, as we know it, at a crossroads. Should the sacred temple of medicine continue to sanctify health care as it traditionally has been practiced? Or should we start recognizing and reacting to new signs and signals?

Americans today have significantly less regard for the practicing physician and the modern hospital than they once had. Third-party payors are challenging sophisticated medical practices and the ensuing costs of health care. For better or worse, these pressures are forcing the once sacred medical profession out of the temple and into a highly competitive marketplace. And in that process, all of us, as consumers of health care, may have to make choices dictated by that marketplace.

Is this good or bad? To answer that question, we must look at several factors.

- Too many doctors.
- Unreasonable consumer expectations.
- A reimbursement system that insulates most consumers from the cost of health care.
- Varying levels of institutional indifference to the cost of that care by insurance companies, corporations and labor unions.
- A medical profession that has cultivated an elite image while shielding consumers from participation in decisions about their own health.
- The technological imperative and scientific advances that now allow the medical profession to prolong life regardless of the quality of that life.
- A rapidly aging population that consumes a disproportionate share of the health care dollar.
- A changing political and economic climate.
- The rise of health maintenance organizations and preferred provider organizations.
- The emergence of investor-owned hospitals.

How did we come to this state of affairs? Let’s begin by examining some

* 1982, Basic Books
In 1982, life expectancy reached a record high of 74.5 years, an increase of more than 50 percent since 1900. Death rates for heart and vascular diseases have declined significantly in the past two decades. In 1982, the U.S. infant mortality rate was the lowest ever recorded.

Americans are living longer and healthier lives than ever before. But the proportion of elderly is increasing faster than other sectors of the general population, and the number of very old Americans — over 85 — is growing even faster. Medical care use increases with age; persons over 65 comprise 11 percent of the population, yet consume 29 percent of the health dollar.

Americans are spending more for medical care than ever before. In 1955, we spent 5.9 percent of our GNP on health care. And in 1982, Americans spent a record $324 billion on health care — a hefty 10.6 percent of the GNP. Many contend this is too much. Some counter it is not enough.

Thus, at a time when we are healthier and living longer, we are also using an ever increasing share of our national resources to do so. Ironically, patients and payors are increasingly dissatisfied with our health care system. Not only are they dissatisfied with the individual performance of their physicians — witness the dramatic increases in malpractice claims — but also with the high costs.

Although organized medicine, through the AMA, had successfully fought previous attempts at a variety of forms of federal health insurance, a series of events (including the assassination of President Kennedy and the election of the liberal, Democrat-dominated 89th Congress) made the passage of Medicare and Medicaid a reality. By concentrating on the elderly and the poor, and by preserving the fee-for-service concept so sacred to the AMA, congressional liberals held the day.

Medicare and Medicaid theoretically provide one class of care for all Americans, regardless of age or ability to pay. Yet these ambitious programs only partly fulfilled the dreams of their congressional sponsors. And last fall, the most substantive change was instituted in Medicare since its initiation in 1965. Henceforth, hospitals no longer will be reimbursed retrospectively for their costs. Rather, they will be paid a lump sum on a per-case basis by diagnosis, regardless of the actual costs incurred. It is far too soon to predict whether this substantive reform in the Medicare system will slow the acceleration in the costs of this program. And changes have not been limited to Medicare. With the “New Federalism” of the Reagan administration, the costs of Medicaid have been increasingly shifted to the states. Many observers believe that these changes in Medicare and Medicaid signal the end of the dream of a single standard of medical care for all Americans, resulting in a reestablishment of two classes of health care. What can we learn from the past in order to prevent this from happening in the future?

Medical Education, Past and Present

In pre-industrial societies, hospitals were principally religious and charitable institutions where the sick and destitute often went to die, not places where one went to be cured. In less than 100 years, a dramatic turnabout has taken place. Hospitals have been transformed into modern edifices, housing the latest in scientific technology and promising cures; the poor and destitute now need a special ticket for admission, and even the middle class needs a financial sponsor.

The rise of the modern hospital can be traced to a number of key developments. But the turning point that spurred the development of modern medicine and medical education was the Flexner Report in 1910.

In the pre-Flexnerian era, medical students in this country obtained their education in proprietary schools, where they paid tuition to a for-profit enterprise. They also paid to become apprentices to individual physicians. There was relatively little in the way of a hospital component to medical education prior to 1910. In fact, there was little that hospitals had to offer patients in the way of scientifically based clinical care.

Enter Abraham Flexner who, after visiting every medical school in the country, wrote a scathing criticism of most of these schools, including our own School of Medicine at Washington University. Out of his study came the demise of many of the substandard schools and the transformation of the rest. Our own was reorganized on the Hopkins model, with full-time hospital-based clinical departments.

American medical education gradually came to be dominated by scientists and researchers with the highest academic standards, while the number of practicing physicians gradually declined. Simultaneously, the modern teaching hospital developed, and dramatic scientific advance occurred. As a consequence, the training period for young physicians became longer and increasingly more specialized — the genesis, indeed, for the rise in health care costs.

The success of the medical profession led to its sovereignty over medical care — a regal position, one might say. Profit-making in medical education, in hospitals, and in medical practice was hardly a priority. God-like power was vested in
the individual practitioner. And his fee was modest.

In the ensuing decades, great scientific advances in medicine occurred — spurred by the growing and powerful medical research capacity that made the American medical system second to none. With these advances came seemingly endless costs far outpacing inflation. And today, it is the cost that has brought the medical care system to the brink of significant structural change. It has brought about demands for major management restraints. It has brought about a mandate that the chosen can no longer dictate the terms on which medicine is practiced.

A gradually increasing concern over the cost of care in the 1960s, coupled with the social programs of the Roosevelt era, gave rise to the development of voluntary health insurance programs, including Blue Cross, Blue Shield, and a variety of commercial indemnity plans.

From these early beginnings, health insurance became a powerful bargaining chip with the growing labor movement in this country. The average labor union member today has the most comprehensive health insurance package available. "First dollar coverage" provides the worker and his family with access to health care at virtually no out-of-pocket cost. But many believe that this insurance intermediary insulates the hospital, the doctor, and the consumer from the true cost of health care. The result: inflation in costs and over-consumption of health services.

Corporations that had previously paid little attention to how these health benefit dollars were spent began to wake up.

Some developed contracts with preferred provider organizations — a hospital and groups of physicians who agree to provide medical care for the corporations' employees at a specific negotiated price. Some are encouraging enrollment in health maintenance organizations with fixed monthly fees. Some have initiated extensive health education programs.

Dramatic changes, decreed by an accumulation of legislation in the three decades following World War II, played a major role in the design and delivery of modern health care. The consolidation and funding of biomedical research gave rise to the National Institutes of Health. The passage of the Hill-Burton Act in 1946 stimulated hospital construction. A series of health manpower acts between 1963 and 1976 resulted in a dramatic increase in the number of practicing physicians. Thus was born the modern academic medical center with teaching hospitals, a medical school, and often, other health professional schools.

Hospitals have been transformed into modern edifices, housing the latest in scientific technology and promising cures; the poor and destitute now need a special ticket for admission, and even the middle class needs a financial sponsor.

By 1990, this country will have 242 physicians per 100,000 population, nearly double the 1960 ratio of 144 per 100,000 — one of the largest ratios of physicians to population of any country in the civilized world.

Basic and Clinical Research

Alvin Tarlov, in the 1983 Shattuck Lecture before the Massachusetts Medical Society, described the medical objectives of an era as emanating from two formative influences: the state of the art of medical science, and society's expectations. He named the period between 1800 and 1960 as the Era of Epidemic and Death Prevention. During this period, infectious diseases responsible for deaths of epidemic proportion were either controlled, prevented, or completely eliminated. From 1940 to the present, the medical profession and those engaged in biomedical research have measured and corrected biochemical disturbances, extending the frontiers of science toward an understanding of the molecular basis of human disease.

Biomedical research has indeed been translated into advances in medical care that have been costly but of significant benefit for our citizens. For example, the cost of developing polio vaccine is inconsequential, compared to the cost for care and rehabilitation of polio victims. Open heart surgery for infants born with congenital heart defects is often costly, requires a lengthy hospitalization, and utilizes a team of highly trained specialists: anesthesiologists, perfusionists, surgeons, cardiologists. However, the surgeon can take a tiny heart, reconstruct it and restore the child to a full and healthy life. The CAT scanner is expensive technology, but remarkably cost-effective when one considers the potential morbidity for patients undergoing the old studies which it replaced.

And finally, a very costly area of medicine still in the research phase has potential benefits as yet undetermined. David, the 12-year-old "boy in the bubble" who died last winter, had a disease called SCIDS — Severe Combined Immune Deficiency Syndrome. His body produced none of the cells which are necessary to fight infection. He lived first in a sterile incubator, then in a sterile suit made for him by NASA, and more recently in a room-sized sterile bubble.

He received a bone marrow transplant, only available to him because of a research advance that enabled scientists to treat the bone marrow so that the transplant would not be rejected. Conservatively, many million dollars were invested in David's care over the past 12 years. Despite the fact that the transplant did not enable him to live, scientists learned much about the immune system. They are likely to learn how to treat others like David, as well as patients with AIDS, lupus, or multiple sclerosis. And in the process, they will probably find ways to make this treatment much less costly.
The Future

What, then, is the future for the academic medical center in this rapidly changing environment? How can support — admittedly high and with good reason — be sustained for medical schools and teaching hospitals with their expensive yet essential missions: undergraduate and graduate medical education, biomedical research, and the translation of research advances to patient care through clinical research.

Undergraduate medical education has become increasingly costly. Many students incur large debts despite the use of federally subsidized loan programs. Their clinical education takes place in teaching hospitals; their presence, along with large numbers of interns and residents, may help to explain the added cost of care at these institutions. Third party payors, Blue Cross, commercial insurers, and the Medicare program have traditionally reimbursed teaching hospitals for both the direct and indirect costs of medical education. However, just last fall, the Social Security Advisory Council went on record as stating that the Medicare trust fund should no longer be used to subsidize medical education.

Further, the budget for the National Institutes of Health, the major source of biomedical research funds, has not kept pace with inflation. The budgets of our medical schools depend in a small extent on tuition income and earnings from endowment, but to a greater extent on funds for federally sponsored research, and to an ever increasing extent on the clinical practice earnings from the patient care activities of physicians on the faculty.

In an attempt to find out what we might expect to happen in the next two decades to American medical institutions, and to our academic health centers in particular, I asked 30 leaders of teaching hospitals, medical schools and academic medical centers to respond to a series of questions. Remarkably and gratifying, all 30 responded. In summary, here are their answers:

Medical schools and teaching hospitals may find their budgets seriously constrained. These institutions so vital to our research and education mission will either have to find new sources of support or reduce programs in research and education.

First, each respondent was asked to assume the role of the “strategic planner” for a major investor-owned hospital group:
- Respondents gave no clear prediction on what role investor-owned hospitals would play in medical education or in the amount of tertiary care services these hospitals would offer.
- Over half believed that investor-owned hospitals would price their services to all payors considerably less than teaching hospitals.

Most believed that investor-owned hospitals would not subsidize clinical research to any greater extent.
- Two-thirds believed that the government might intervene if teaching hospitals began to fail in a competitive environment.

Second, each respondent was asked to assume the role of the health care benefits officer for a major United States corporation. Management instructions were to reduce the cost of health benefits by devising incentives for employees to reduce their health expenditures and to maintain themselves and their families in good health.
- Nearly all said they would reduce corporate expense for health care by increasing deductibles and co-payments. That is, by forcing health care consumers to pay a share of their own health care costs.

- Most would include cash benefits to employees who incurred little or no health care expenditures.
- The majority would develop extensive contractual arrangements with preferred provider organizations.
- And they would create “fitness” or “wellness” programs that would be required for employees.

Third, respondents were asked to assume the role of CEO of a large suburban hospital and to devise a strategic plan for that hospital:
- All said they would attempt to position the hospital so it would become a “preferred provider.”
- Nearly all showed a wariness for medical school affiliation by considering such an affiliation only for selected services or not at all.
- Only one indicated a willingness to develop extensive graduate medical education programs.
- All said they would be prepared to move all or part of their hospital services to newer suburbs or more attractive population centers.

Fourth, as federal policy-makers responsible for Medicare:
- Two-thirds would establish a means test for Medicare. That is, the Medicare program would cover only those who could not afford other insurance.
- Two-thirds would establish a policy prohibiting Medicare from paying for the costs of medical education.
- Two-thirds would raise the eligibility age for Medicare.
- Most would restructure the Medicare program so that individuals pay more out of their own pockets for minor illnesses and much less for longer, more catastrophic illnesses.

Finally, respondents were asked to answer a series of questions about their own institutions — the medical schools and teaching hospitals that make up our academic medical centers.
- Over half thought that their own medical school would reduce its class size in the near future.
They were pessimistic about the continued growth of funds for biomedical research and the growth of income derived from the patient care activities of their clinical faculty.

Most believed that some financially marginal medical schools will close soon. They were pessimistic about the continued growth of funds for biomedical research and the growth of income derived from the patient care activities of their clinical faculty.

The majority believed that, in view of the aging of the population and the preponderance of Medicare expenditures for those patients over age 75, some sort of resource rationing would occur in the future.

Overall, respondents believed that the development of preferred provider organizations and establishment of state rate review commissions would be the two factors most likely to reduce the cost of health care in the next two decades. The health care system as we know it is in the process of significant change, they thought. Indeed, the minds of medicine are in an uneasy state. And they are not alone.

Medical schools and teaching hospitals may find their budgets seriously constrained. These institutions so vital to our research and education mission will either have to find new sources of support or reduce programs in research and education. Teaching hospitals may have to become part of a multi-hospital system or develop systems of vertical integration in which they become owners of potentially profitable enterprises such as health promotion centers, ambulatory care centers, satellite diagnostic facilities, rehabilitation facilities, home health care services, and nursing homes.

And what of the young medical student who said to me, "I just want to practice medicine — to care for and help people?" What of individual citizens who want the very best in medical care for themselves and their families?

Those are difficult questions to answer. To the medical student, I have to say that providing the kind of highly specialized care the public has come to expect will necessitate a longer period of training and specialization. To individual citizens, I say that there is no magical percentage of our GNP that should be devoted to health care. When compared to other civilized countries, we are the second lowest in public sector expenditures; only Japan is lower.

Ewe Reinhart, the well-known health economist, has talked about alternatives for slicing up the national pie. Who bakes that pie? Of our current population — 11 percent are "too old to work," 32 percent are "too young to work," 14 percent are persons of working age not engaged in GNP-producing activity, leaving 43 percent as GNP pie bakers. If we follow a market approach, as advocated by Reinhart, the pie bakers should decide how the pie is sliced. I hope that we pie bakers would decide that a reasonable investment in health, including biomedical research and medical education, is a very wise investment indeed. And that we owe this much to the future generation of Americans.

Olin Fellows Grateful for Help

Kathy Maguire and Peggy Mahony have a few things in common: both are Olin Fellows in this year's graduating class at the School of Medicine, and both are pursuing ob/gyn. But Mahony, an Illinois native, will be packing up for Los Angeles come July; California native Maguire will stay at Jewish Hospital for her residency. However, the biggest difference between the two women has been their pre-medical school histories. Mahony, the second oldest of a family of six children, headed straight for medical school upon finishing her undergraduate work at University of Illinois. Maguire's path to medical school was, well, unusual...

"Originally, I worked as an accounting manager for Criticorp," explains the 31-year-old Maguire. "My first exposure to medicine came when my mother was hospitalized for ovarian cancer. At the time, I just felt that there was a need for people (in medicine) who cared about people. Since I had preschool children then, I started with nursing school. I really liked it, but it was frustrating..." So Maguire finished two years of pre-med work in a single year, took her MCATs, and applied to the School of Medicine. She was accepted for the following September, but Maguire was convinced that the interim year would be a waste for her, professionally speaking. So she attended classes in 1980 as an unclassified graduate student, then was given advanced placement into the second year class the following year. The rest, as they say, is history.

Mahony, an avid runner, shared a common need with Maguire: dire financial straits. Both women say that without the Olin Fellowships, a career in medicine would have been impossible. But the biggest "plus," says both, is the chance for the extraordinary experience to mingle with gifted women from all professional fields, something which would have been impossible without the periodic social get-togethers involving all 25 Olin Fellows. "The Olin Fellows have given me the positive feedback that was missing from my medical school experience generally," says Mahony. "The women made me feel that I was special and working hard, doing a good job. I got this feeling from both the Board and the other Fellows."

"You can get tunnel vision studying medicine," points out Maguire, "because you're so wrapped up in what you're doing. But women in the arts or business or music are all as intent on their purpose, and that was very nice to share. It was good to see what we're doing from their perspective, outside of medicine."
The 10-month-old infant of this 16-year-old mother suffers from severe malnourishment due to a deficiency of protein and calories. This common infant affliction, caused by early weaning from mother's milk to a diet of only rice-water, is a frequent cause of infant mortality. This child ultimately died from a combination of malnourishment and pneumonia, a complication of measles. (photo by the author)
Ten-month-old Oldpa Kamara weighed only thirteen pounds, and his ribs stood out like slats on a washboard. Like so many other children, his low birth weight derived from poor maternal nutrition, and early weaning on a diet of only rice-water, or water left over from boiling the rice.

Now, he had caught the measles. Weakened by malnutrition, he had developed a serious measles pneumonia. Oldpa's mother carried her son into ELWA hospital.

ELWA, a 45-bed general hospital, is in the tropical country of Liberia. With the support of the Central Presbyterian Church in Clayton, I was able to spend a two-month senior elective there. ELWA is highly regarded by former students and staff from Washington University who have served there: Janet Walker, MD '82; Steven T. Lacy, MD '80; John T. Oldham, MD '78; David Van Reken, MD (former house staff); and Bo Kennedy, MD (Children's Hospital). ELWA has resources that provide students with a good learning experience in tropical medicine: laboratory, X-ray, well-stocked pharmacy, and talented physicians and ancillary staff.

The hospital's name derives from "Eternal Love Winning Africa" and reflects the lofty goal of its founder and operator, the Sudan Interior Mission. A nucleus of missionaries (mostly Americans) serves as hospital administrator, head laboratory technicians, pharmacist, and two full-time physicians. Assisting them are six Liberian RNs and over 50 aides and other staff. The senior medical student is recognized as a full-fledged physician—directing treatment, writing orders and signing prescriptions without cosignature.

Liberia is on the southwest "bulge" of Africa, six degrees north of the equator. If Africa is shaped like an ice cream cone, Liberia is where you would want to lick it. Per capita income is $500 a year, roughly one-half that of Latin America. It has less than 100 miles of paved road.

Like other developing countries, Liberia is modernizing at an uneven pace. It is commonplace to hear a radio-tape player ringing out from a mud hut. Most Liberians live in villages, in squat homes made of mud bricks, and speak tribal dialects or a pidgin English inherited from the freed American slaves who founded the country in 1820. Liberians have a friendly handshake and warm smile for anyone who visits their village.

Western culture sometimes conflicts with tribal tradition. Nowhere is this clearer than in the slow acceptance of western medicine over the traditional healer.

At the appointed time my Liberian friend took me to see "Oldman" Yonjay, a 64-year old patient. He was very sick with tetanus. The mother had already paid him $3 for the consultation, and it was time for his treatment.

Yonjay reached into a tin can and pulled out a handful of wet leaves that looked like spinach ground into a paste. He held open the baby's eyes and squeezed three drops of green fluid into each eye. The baby began to jerk violently. "That (jerking) means it will live," he told me.

I had expected the mother to be from the village, but she was wearing a pearl necklace, high heels and a wristwatch. Yonjay gave her a ball of dried leaves with instructions for a lengthy ritual of washing the baby with the leaves while repeating the phrase "A mother cannot let her child fall."

ELWA, founded in 1965, has earned respect as an alternative to country doctors. Credit for its reputation goes to its two full-time, U.S.-board-certified physicians. Frank Young, M.D., gave up a thriving surgery practice in Michigan to uproot his family and come to ELWA eight years ago. Steven Befus, M.D., whose parents were missionaries to Puerto Rico, came to ELWA after completing a family practice residency.

Together with Kim Coutts (a resourceful pharmacist from California) and Larry Dick (an engineer-turned-hospital-administrator), they have organized a U.S.-patterned community hospital.

That is, with exceptions. The patients have names like Bendu Passaway, Borbor Karlbayah, and Baby Boy Garbleh. The hospital's one "service" consists of 45 patients. Rounds begin in the pediatric ward and wind through beds of obstetrics, adult male and female wards, and semi-private rooms. Doctors review charts and write orders, but progress notes are not written unless a major change occurs. Malpractice suits are as uncommon as lawyers, so that only the essential medical information needs to be recorded.

Usually one or two patients discharged days ago are still on a bed but not by their choice. The policy is that no one can leave until the bill is paid in full. Although $15 a day does not sound like much, there is no health insurance and people must collect the sum from family and friends to pay what amounts to "bail." Of course, each day delayed is
another $15. Occasionally people have been abandoned — especially old people — who are embarrassed beyond words until ELWA eventually lets them go anyway!

Clinic begins at 10 a.m. and lasts all day. Since the country’s only medical school closed, daily clinic has swollen to over 100 persons. Some have walked for days and tolerated up to a five-hour wait without complaint.

Their inability to distinguish between symptoms and underlying disease leads to bizarre home treatments. For example, infants suffering from diarrhea sport a quarter-sized button of dried dung pasted on the scalp area over the anterior fontanel. The parents recognize that the scalp sinks over the fontanel but do not realize that it’s due to dehydration-caused tissue shrinkage. Africans call this depression an “open mole” and apply dung plasters reputed to raise the skin and thereby heal the progressively more lethargic infant. This proves a costly misconception because fluid replacement often comes too late to reverse the CV collapse.

The need for beds is always critical. Due to a measles epidemic, the pediatric ward is always full and often overflows to the semiprivate and adults rooms. It is very difficult to tell a mother that her critically ill child cannot be admitted. Often, ELWA is the third or fourth hospital with full beds the mother has visited.

ELWA’s resources are limited in other ways. X-rays and laboratory tests are done by hand, limited to essentials, and not available after 5 p.m. or on Sundays. Consequently, many diagnoses are empirical, based only on the history and physical exam. I learned how to recognize different species of intestinal parasites under the microscope so night-time stomach aches due to parasites could be treated with the appropriate medicine.

At first the diversity and magnitude of disease was bewildering. Soon the medical problems fell into groups: malaria, intestinal parasites, and pelvic inflammatory disease from gonorrhea. Children mostly suffer dehydration from diarrhea, neonatal tetanus, protein-calorie malnutrition, bacterial meningitis, and measles, sometimes with pneumonia, encephalitis, or subcutaneous emphysema. These are typical tropical diseases, I learned.

**Medicine at ELWA**

Unusual cases included Parkinsonism in a man brought in for an unrelated illness. He had spent five years with tremor, slow movements, and difficulty feeding himself. The family was dumfounded when he improved on L-dopa to the point where he could feed himself. Rarer diseases are typhoid fever and the parasitic diseases elephantiasis, onchocerciasis, and schistosomiasis.

One man came to the emergency room with uncontrollable leg tremors. A strange-acting dog had bitten his leg two months previously. After a cautious exam, I diagnosed rabies. The man became delirious and succumbed within hours.

Atherosclerotic heart disease does not exist, even in the few old patients. Geriatric diseases, not surprisingly, are as uncommon as those people of geriatric age in a country where life expectancy is 48 years. Gallbladder disease is unheard of, except in Western missionaries.

The O.R. boasts an electric cautery, suction, and emergency lighting (the Liberian Electric Company would cut power almost nightly). Surgery is done with spinal anesthesia, and the patient remains awake during his appendectomy or hernia repair. Because oxygen is difficult to obtain, general anesthesia is reserved for large cases like an exploratory laparotomy for intestinal obstruction.
Nylon fishline (cheap, strong, and surprisingly infection-resistant after autoclaving) is our suture material. The source: American sporting goods stores.

For a patient with severe bleeding from an ectopic pregnancy, her own blood is suctioned from her abdomen into a bottle, filtered through gauze into another bottle, and given back to her by intravenous infusion — an autotransfusion! But ELWA is not all primitive: it has a fiber optic endoscope purchased in Germany, and a portable X-ray machine can be brought in to check orthopedic pin alignment. (I had been alerted to the chronic shortage of pins before leaving the U.S., and my request from Zimmer, Inc. of St. Louis for a donation was abundantly fulfilled — I arrived in Liberia carrying 35 pounds of pins valued at $1000.)

Life in Liberia

Some Liberians work in fledgling businesses in the capital city, Monrovia, but most work in villages tilling rocky soil to grow the staple, rice. Life is not easy, and the children seem to suffer the most. Infant mortality is 50 percent. Many children are not given names until they reach age two and can be considered as “real” children who will live. Others like “Oldpa” Kamara are given names of old people to mislead the evil spirits who prey upon the babies.

Immunization and education are effective at reducing deaths. Studies show that one-third of all infant deaths are caused by diarrhea and dehydration. Most could be prevented if mothers simply learned to give water with salt and orange juice — all readily available — to the baby. Measles vaccine can eliminate a disease that kills 30 children for every 1000 infections. Most villages lack basic knowledge of disease prevention. For example, drinking water is often taken downstream from the village latrine.

Combatting the ignorance in a village “upcountry” is Joy Crombie, an ex-ELWA nurse, who trains village health workers in the rudiments of sanitation and treatment of diarrhea. I visited her to help immunize children. After a 150-mile taxi ride, the coastal plain had given way to rolling hills and dense forest. Miss Crombie and I drove a pickup to several villages to give vaccines for measles, polio, and DPT.

People come out of their mud huts to shake hands and gawk. The children stare
and some scream and run, because they have been teased: “Watch out or the white man will come get you.” For 50 cents the child bought a growth chart and the entire series of immunizations. After we finished, the sick people lined up to see the “doctor” from ELWA. People complained of three main problems: bad eyesight, cramps from intestinal parasites, and chronic low back pain. Some had open sores, cataracts, and rarely, pneumonia. Most were remarkably free of complaints. At first the clinic was free; later, I had to charge 25 cents because healthy people were coming just to get examined by a doctor. Testimony to the value of this work came when we visited a village decimated by measles last year but due to vaccination had not one case this year.

Villagers are gracious hosts. At meal time, bowls of rice appear along with boiled fish, including the heads, which the natives eat with gusto and which do not taste so bad when one is hungry. Since we were hours from our beds, staying overnight was convenient. At one village the chief offered me his hut, featuring a real mattress instead of the usual straw tick, which that night I found to be infested with rats, bedbugs, and a large spider. The chief later said that the spider was poisonous and could jump. If I had known this before killing it, I gladly would have moved to a less distinguished hut, or to the pickup truck!

At ELWA and “upcountry,” physicians are desperately needed. Personal satisfaction from working in Liberia compensates for inconveniences like drinking only filtered water. Showers are cold, but one feels lucky to get them at all, and they help in coping with the constant, 90-degree heat. The diet of rice can be supplemented with delicious fruit. Personal hygiene has to be excellent to prevent contracting typhoid, hepatitis, TB and the wide gamut of parasitic diseases from patients.

Washington University approves ELWA as a for-credit rotation. And how is ELWA a learning experience? I regret not being able to order more diagnostic tests, because I know we missed diagnoses when a disease did not manifest in a distinctive way. There is talk of getting a coulter (white cell) counter, and this will make a routine CBC with differential a possibility, and a step towards adding more strength to “white man” medicine.

I had an unparalleled opportunity to learn about parasitic disease and the natural history of common disease. I discovered that Liberian people live in a hostile environment replete with pathogenic organisms and lack basic knowledge of disease prevention and treatment. Thus disease, once established, can fulminate and require acute medical care. Nevertheless, most Liberians are basically healthy, even without an extensive health care delivery system, except that most live with intestinal parasites. While ELWA hospital is effective at providing the only health care some Liberians will ever see, its effects are limited without improvements in public health, sanitation, mosquito control and standard of living.

The prohibitive expense of such programs guarantees that hospitals like ELWA will have a prominent role for years to come, and the demand for anyone with medical training is staggering. Liberia has less than 200 physicians for 2 million people; I attended the Liberian equivalent of an AMA meeting and everyone fit into one lecture hall! The experience at ELWA galvanized my interest in international health as a means of responding to this need. I should like to return to Africa after residency training in the United States.

Oldpa Kamara died from his malnutrition and measles, just like his two brothers. But unlike his brothers who died in the jungle, Oldpa died at ELWA hospital where the contributing factors to his death — early weaning and no measles vaccine — were brought out. The nurses explained to his mother the value of continued breast feeding, vaccination, and proper nutrition for herself and her next baby.

There will continue to be Oldpas, but thanks to the dedication of ELWA personnel and the success of “white man” medicine, one tiny corner of the Dark Continent is slowly replacing traditional treatment by more effective medicine. The impact of devastating childhood diseases is lessened by preventive vaccination, and profound medical ignorance is being replaced by a measure of insight into disease prevention and treatment.

The favorite Liberian saying is, “If a fish cries in the ocean, can anybody notice?” ELWA hospital does notice, and there is hope that as many deaths are recognized as unnecessary, there will be fewer tears shed in the country of Liberia.

... children seem to suffer the most. Infant mortality is 50 percent. Many children are not given names until they reach age two and can be considered as “real” children who will live. Others ... are given names of old people to mislead the evil spirits who prey upon the babies.
The MCAT — the common name for the Medical College Admission Test — is an abbreviation for terror, at least in the hearts and minds of premedical students in this country. The conventional wisdom is that the MCAT is a necessary evil we must live with. But is it necessary? Is it evil? And must we live with it? A glance at the recent medical education literature reveals a number of articles and essays about the MCAT — both pro and con, but mostly con.

The February 9, 1984 issue of the New England Journal of Medicine contains three such articles. The gist of one of the essays, written by Norman Anderson, M.D., Assistant Dean for Admissions, Johns Hopkins University School of Medicine, is:

• No data correlate performance on the MCAT with achievement in the clinical sciences or future success in a medical career.
• The new MCAT is more narrow in scope than the old MCAT or the SAT.
• According to designers of the test, the MCAT score determines only a minimal threshold for probable academic success; students who score well below the mean are more likely to fail in medical school than those with average or better scores. Thus, the test does not differentiate between good and excellent students.
• The effects of the MCAT on undergraduate education have never been studied. Many students may distort the real purpose of their education by striving to excel on a standardized test of dubious merit.

In another article in the same NEJM issue, James Erdmann, M.D., of the Association of American Medical Colleges (AAMC administers the MCAT) attempts to show by statistical means that the MCAT may indeed have some “predictive value.” But this is arguable, and the question of “predictive value” will probably persist forever.

I believe that the MCAT may be harming our undergraduates by turning them into test taking drones. Steven Muller, Ph.D., president of Johns Hopkins University, has said: “They (undergraduates) study not to learn but to be tested. They regard testing not as an internalized process that challenges them to do their best but as an external competition for grades that pits them against each other.”

In a recent personal letter, J. Donald Hare, M.D., Associate Dean and Chairman of the Committee on Admissions of the University of Rochester Medical Center, tells me that the MCAT has not been required at the University of Rochester for many years, despite the revision of the MCAT. Furthermore, a significant number of applicants who have not taken the MCAT are accepted to the class. The University of Rochester admissions committee thinks that applications and interviews yield sufficient information to assess candidates’ abilities; performance on a standardized exam fails to add significant new data. Has the University of Rochester suffered in any way from that decision? They don’t think so, and neither do I. Lewis Thomas has said, “The best thing (for the admissions process) would be to get rid of the MCAT, once and for all. and rely instead, wholly on the judgment of the college faculties.”

I am not advocating that tomorrow morning, Washington University summarily dismiss the MCAT as a requirement for admission. But I agree with Anderson: We urgently need to reassess the predictive value of the MCAT in the selection of medical students. Furthermore, this examination’s value is tempered by the degree to which it contributes to the “premed syndrome.”

The MCAT may only be the tip of the iceberg. It is time we took a long, hard look at the entire selection process.

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Professor of Ophthalmology and Pathology
Assistant Dean
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This is the opinion of the author, not necessarily shared by Washington University, Washington University School of Medicine, Washington University Medical Center, or the policy of any of these entities. Outlook welcomes replies to this editorial and invites contributions from its readers on other subjects.
John Stone knows, as well as any man can know, the lonely anguish of the dying. He shares, as much as any man is permitted to share, the quiet exuberance of the recovery room when the crisis is past and healing begun. This knowledge, the bittersweet harvest of a doctor’s daily rounds, he stores away in the privacy of his own thought. Later, it emerges, not in statistics as sterile and lifeless as a surgical mask, but in syllables and sentences and stanzas with heartbeats and bloodstreams of their own.

The genial Georgian, 1962 graduate of the Washington University School of Medicine, is a physician and poet, member of an ancient and unique scientific fraternity, the literati of the laboratory. At 48, he has become so distinguished in medical science and the arts that he is invited to address prestigious writers’ conferences as well as major medical meetings. A physician who sees patients, associate dean and professor of cardiology and community health at Emory University of Medicine, he is the author of two books of poetry, The Smell of Matches and In All This Rain.

He has been published in periodicals and anthologies, and has lectured on medicine and literature at major American universities; this summer he is teaching a six-week course in literature and medicine at Oxford University in England. And in 1983, Emory presented him with the Thomas Jefferson Award for distinguished service, citing his “graceful integration of his lives as cardiologist and poet.”

As he blends the therapeutic and the artistic, he has a distinguished coterie of role models. He joins John Keats, Albert Schweitzer, Somerset Maugham, William Carlos Williams and Anton Chekhov in witnessing the drama of life and death in a theater criss-crossed by corridors and peopled by pain. To Stone as to them, medicine and literature blend in a natural, harmonious marriage.

There are “commonalities” between the two, he said in the 1982 Ralph White lecture in memory of a respected colleague: “There are resonances between the word and the laying on of hands. . . . Both the doctor and the writer are trained
in observation, trained to see and touch, hear and taste and smell with precision, to watch with what Emily Dickinson might have called "furnished eyes."

"... The subjects of medicine and those of great writing are, finally, the same: Death, Pain, Love, Loss, Nakedness, Fear, Courage, Joy... the subject matter comes from the same source: a human being, a person who is, or becomes, his or her own art. In short, the practice of medicine is the practice of life."
Hutchison (a teacher) designated something I wrote as a "pretty good poem." I took that as support and encouragement and became editor of the literary magazine.

"I remember we had a contest and I took the fiction entries to the home of one of the judges. She opened the door herself. It was Eudora Welty.

For Stone, the distinguished Welty has remained an important role model. They met again at Millsaps College when he returned in 1977 to accept the Alumnus of the Year Award.

He had enrolled at Millsaps to remain at home with his widowed mother and his younger brother and sister. As the nephew and grandson of doctors, he dreamed early of a medical career, and his interest was nourished by visiting medical school recruiters. With his excellent grade record, the pre-med chemistry major was eagerly sought by several, but the offer of a full tuition scholarship tipped the scale for Washington University.

But even with that financial aid, he and his wife Lu, an elementary school teacher, didn't find the living easy. During one summer vacation, he sold Bibles door to door in North Carolina. To the neophyte medic, the venture brought little money and less satisfaction. Many of those on whom he called, he said, "needed food and clothing more than a Bible."

The Stones' basement apartment close to the School of Medicine, he later wrote, "was about as large in toto as a respectable ordinary living room. There followed four years of feet passing by the windows and dust sifting in from the St. Louis air."

But there were happier times. "It was during rounds that we first learned what clinical skill really means, how to handle difficult moments with a patient; in short, how it SHOULD be done," he wrote in the book, My Medical School. "Dr. Carl Moore, chairman of the Department of Internal Medicine, served us as a perfect professor to emulate. One young woman, about my age and terribly ill with cystic fibrosis, a respiratory ailment sure to be fatal, stood out in my memory of rounds with Dr. Moore.

"He took a careful history from the girl, performed an exemplary physical examination, all the time keeping the patient completely at ease. Afterwards... Dr. Moore called our attention to a vase of flowers on the patient's bedside table. 'Someone must love you very much to send you those beautiful flowers.' I realized, in that instant, that such a sensitive comment from a physician can be an absolutely vital part of whatever healing there is to be done."

The doctor-patient relationship "is very special," he said, recalling one who inspired his poem, "He Makes a House Call." "Writing gives me new insights by bringing thoughts into focus and putting them on paper. My definition of health — 'whatever works and for as long' — came out of an experience when a woman patient needed to have a heart valve replaced. 'They became good friends and after her recovery, she invited him to her home to pick figs. The "house call" inspired the poem which reads, in part:

Six, seven years ago when you began to begin to faint
I painted your leg with iodine
threaded the artery
with the needle and then the tube
pumped your heart with dye enough
to see the valve
almost closed with stone...
But health is whatever works
and for as long. I keep thinking
of seven years without a faint...
I keep thinking of seven years ago
when you bled in my hands like a saint.

"One of the things poetry does for me," he said, "is to teach me what I am. It teaches me things I know that I didn't know I knew."

In his scholarly centennial retrospective on the work of William Carlos Williams, he wrote: "W.C.W. took refuge in what he knew, in a poetry of the American idiom, of the daily (and miraculous) life, in a poetry of 'things' and palpability."

Stone spoke of some of those "things" in his valedictory address at Emory University School of Medicine in July 1982. He titled it "Gaudeamus Igitur" ('Therefore, let us rejoice') and, significantly, couched his counsel to the future physicians in a form suggested by "Jubilate Agno," by the late 18th century poet, Christopher Smart.

He said, in part:

For you must fear ignorance more than cyanosis
For whole days will move in the direction of rain
For you will cry and there will be no one
to talk to or no one but yourself
For you will be lonely
For you will be alone...
For what matters finally is how the human spirit is spent
For this is the day of joy
For this is the morning to rejoice
For this is the beginning
Therefore, let us rejoice.

He was speaking of human suffering and the doctor's joy when the harsh trap of pain is loosened. But he was speaking in an idiom he has studied well and has polished with pen and typewriter just as he has honed the skills taught in his medical school classes.

In his writing, he has wrapped the icy impersonality of the scalpel in the warm bunting of empathy and clothed the nakedness of the examining room in dignity. Thus he has made a niche for himself in the rarefied ranks of the "doctors of literature."

But John Stone has drunk deep of the classic and contemporary writers of all literary stripes and has made their time-worn and newly minted words as much a part of his being as Gray's Anatomy. "Robert Frost says that a poem is a 'momentary stay against confusion,' and Wordsworth says that poetry is 'emotion recollected in tranquility.'"

It was these sentiments that express the
...we memorized the body and the word stripped the toughened skin from the stringing nerve the giving muscle ...

Although his world is not always a lovely place, John Stone speaks and writes of it with easy grace and his words are often laced with laughter. "I find there are a lot of serio-comic things happening in medicine. Medicine has its own serio-comic moments. It has a lot of tragedy but it has a lot of heroism."

This tragedy, this heroism are the stuff of which his poetry is made. But though the craft of writing has become as important to his well-being as are rules of health care and nutrition, medicine is his chosen profession, the central core of his life. He continues to expand his own scientific knowledge and to open new doors to those who will follow him into that world of therapy and healing.

Stone's entrance into the field of emergency medicine was a natural progression for a doctor whose skill as a diagnostician was hampered by a very significant gray area—the events that transpired in an ambulance or in the emergency room, before he ever saw his patients. "I got into emergency medicine in the late '60s and early '70s," he remembers, "because of my interest in (preventing) sudden deaths. And I found out that we in academic medicine were not training people to work in the emergency department or in the pre-care (ambulance) phase.

"At the time," he continues, "there were only about ten places in the country where an emergency medicine residency was even offered. I knew that Grady (Hospital) would be a good place to set up an EM training program. So I assembled an interdepartmental advisory group to establish the curriculum, and we got the dean's approval. Then, the dean asked me to direct the program.

"One of the basic problems in emergency medicine is that it's so broad. In one session in the emergency department, you might see an infant with meningitis, someone with a psychiatric problem, a dermatology case, a woman ready to deliver a baby, and a trauma victim. But back in the early '70s, academic medicine had not done much to train people for this sort of non-specialized care."

The emergency medicine program Stone established is entering its second decade, and he points with satisfaction to the 40 or so physicians who have completed the residency there and have gone on to become leaders in the field. But Stone saw that a related area also needed an infusion of special expertise: pre-hospital care. In addition to providing a faculty member to serve as an advisor to the ambulance department, Stone instituted a policy whereby all residents in EM take a turn riding in the ambulance so that they can observe first-hand what measures are taken for the patient during transit. Later, they can use that information to make recommendations regarding improved pre-care techniques.

This goal of Stone's—improved EM care—results in the saving of life, a fact which makes him proud. And he's also glad to have been a part of a landmark written epic in EM. In 1978, W.B. Saunders published Principles and Practices of Emergency Medicine; Stone was one of the book's five editors, writing or co-writing six sections of the book. "This was the first codification of emergency medicine's differences from other medical specialties," he explains. "Until then, EM was seen only as an area of overlap with traditional specialties, not as a specialty unto itself."

This month, I'm down at Grady every day, making cardiology rounds in all services. I also go on EM rounds. Medicine is the best profession I could imagine," he says with satisfaction. "You can look at X-rays, you can see patients, you can be in research or in pure academics. But it comes down to liking people. That's the link of poetry and medicine. Medicine demands that you are concerned with human problems. That's where poetry comes in. Literature can remind us of the patient's humanity and our humanity."

He writes, then, not in some ivory tower, but in a daily, harsh world of human suffering. He is mindful of the words of another literary man, W.D. Snodgrass: "He said, 'I tell you, love is possible. We have to try.'"

John Stone, the physician-poet, savored the words a moment. Then he repeated them: "We have to try."

Mary Kimbrough is a St. Louis area feature writer.

The Smell of Matches was published by Rutgers University Press in 1972; copyright 1978, John Stone.

In All This Rain was published by Louisiana State University Press in 1980, copyright 1980, John Stone.

My Medical School (Dannie Abse, M.D., editor) was published by Robson Books, Limited (London) in 1978. Quoted with permission.
The Ides of March boded well for this year's Fourth Year students. All 134 filed into Cori Auditorium to learn the results of their applications for positions occupying the next three years (or more) of their lives. Only one student did not take a residency; he added his medical degree to one he already had in computer science, landing a spot in industry. As usual, internal medicine topped the list, with 61 students opting for that specialty. Fourteen chose general surgery, and 13 selected pediatrics. Ob/gyn was the choice of 10 members of the class of 1984, while seven chose pathology.

Six students each selected anesthesiology, family practice, and a transitional residency. Three picked psychiatry, two opted for emergency medicine, and one student chose a residency in each of the following: anatomic pathology, diagnostic radiology, laboratory medicine, medicine/pediatrics and primary medicine. None of the graduates chose orthopedics, ophthalmology, preventive medicine or neurology/neuro-surgery. But according to Elmer Brown, M.D., associate dean for continuing medical education and postgraduate education, 79 percent of the graduates matched with one of their top three choices. Thirty-six will remain in St. Louis.

Here is a listing of the cities and the respective medical centers/hospitals which the graduating class of 1984 will enter:

**ARIZONA**
- Tucson
  - Tucson Hospitals
    - Randall Sato, Transitional

**CALIFORNIA**
- Fresno
  - Valley Medical Center
    - Alexandra Reichman, Internal Medicine
- Long Beach
  - VA Medical Center
    - Dale Brent, Internal Medicine

**Los Angeles**
- Cedars-Sinai Medical Center
  - Patricia Gray, Obstetrics & Gynecology
- Los Angeles County–University of Southern California Medical Center
  - Margaret Mahony, Obstetrics & Gynecology
  - Cheryl Wright, Internal Medicine
- University of California Hospitals
  - Shirley Huang, Pathology
  - U.C. L.A. Medical Center
    - William Penny, Internal Medicine

**Sacramento**
- University of California–Davis Affiliated Hospitals
  - Keith Loper, Anesthesiology
  - James Ruben, Internal Medicine

**San Diego**
- University of California–Davis Affiliated Hospitals
  - Bruce Barshop, Pediatrics
  - Gary Chun, Pediatrics

**Santa Rosa**
- Sonoma County Community Hospital
  - Michael Willett, Family Practice

**Sepulveda**
- VA Hospital
  - David Klashman, Internal Medicine

**Stanford**
- Stanford University Medical Center
  - Walter Chien, Internal Medicine
  - Lynne Scannell, Pediatrics

**COLORADO**
- Denver
  - University of Colorado Affiliated Hospitals
    - Mark Cooper, Pediatrics
    - Eric Suba, Pathology
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Manske Holds Reynolds Chair

Paul R. Manske, M.D., has been named the first Fred C. Reynolds Professor of Orthopedic Surgery at W.U. School of Medicine. Manske is chief of the Division of Orthopedic Surgery in the Department of Surgery at the School of Medicine. His appointment as Reynolds Professor was announced by William H. Danforth, M.D., chancellor of Washington University.

The endowed chair was established five years ago in honor of Fred C. Reynolds, M.D., professor emeritus of orthopedic surgery and long-time team physician for the St. Louis Football Cardinals. Reynolds is internationally recognized for his contributions to orthopedic surgery and to sports medicine. He was a faculty member at Washington University for more than 30 years, and of them as chairman of the Division of Orthopedic Surgery. During that time, he held appointments at Barnes and Children's hospitals, as well as at other hospitals affiliated with the medical center. He was a member of many professional organizations, serving as president of both the American Academy of Orthopaedic Surgeons and the American Board of Orthopaedic Surgery.

Principal donors of the chair are the St. Louis Football Cardinals, Anheuser-Busch Charitable Trust, Mr. and Mrs. John G. Burton, John M. Olin and the National Football League Charities, Inc., as well as many friends and former patients of Reynolds. The endowment provides perpetual income for the Division of Orthopedic Surgery.

Manske was appointed chief of the medical school's Division of Orthopedic Surgery in June 1983. He serves as chief orthopedic
surgery. For the past 10 years, he has written extensively on tumor growth and the body's natural defense mechanisms. He has been listed in Who's Who in Medicine and Who's Who in America. He holds a fellowship in orthopedic surgery and became assistant professor in 1976, directing the training of residents in orthopedic surgery.

A 1964 graduate of Washington University School of Medicine, Manske took his postgraduate surgical training at the University of Washington in Seattle. He held a residency in orthopedic surgery at Barnes Hospital, and a special six-month fellowship in hand surgery with Harold Kleinert, M.D., at the University of Louisville. He joined the Washington University faculty in 1972 as an instructor in orthopedic surgery and became assistant professor in 1976, directing the training of residents in orthopedic surgery.

He established a private orthopedic surgery practice in 1979 in South St. Louis County and served as clinical associate professor in 1976, directing the training of residents in orthopedic surgery.

Catalona Named Chief of Urology

William J. Catalona, M.D., has been appointed chief of the Division of Urology in the Department of Surgery at WU School of Medicine. Announcements of the appointment were made by Samuel A. Wells, M.D., head of the Department of Surgery. Catalona will serve as urologist-in-chief at Barnes, Children’s and Jewish hospitals. He also holds appointments at John Cochran Veterans Administration Hospital and St. Louis County Hospital.

Catalona joined the School of Medicine faculty in 1976 as an associate professor in urology, and was named professor in 1982. A specialist in cancer diagnosis and treatment, Catalona has researched the relationship between tumor growth and the body’s natural defense mechanisms. He has written extensively on the management of bladder and prostate cancer through chemotherapy and surgery. Recently he has evaluated the promise of interferon as an anti-cancer drug.

Catalona received the bachelor of science degree from Otterbein College in 1964, and the doctor of medicine degree from Yale Medical School in 1968. He interned in surgery at Yale-New Haven Hospital, served a residency in surgery at the University of California–San Francisco, and another in urology at Johns Hopkins Hospital. Assigned to the U.S. Public Health Service while in the military, he served as a clinical associate with the National Cancer Institute in Bethesda, Md.

He is a fellow of the American College of Surgeons, and a member of the American Association of Immunologists, American Association of Cancer Research, American Urologic Association, Association for Academic Surgery, Societe Internationale D’Urologie and American Association of Genitourinary Surgeons. Among his honors are the James Ewing Society Award for Cancer Research, Resident Award for Clinical Research from the mid-Atlantic section of the American Urologic Association, Grayson Carroll Essay Contest Award for Clinical Research, and the C.E. Alken Award for Research in Urology. He was an American Cancer Society clinical fellow and junior faculty fellow, and has been listed in Who’s Who in America, American Men and Women in Science and Who’s Who in Frontier Science and Technology.

He is author of two books, Carcinoma of the Prostate and Genitourinary Cancer II, and has written 13 book chapters and almost 100 journal articles. He also serves on the editorial board of several urologic journals.
William Don Owens, M.D., has been appointed head of the Department of Anesthesiology at W.U. School of Medicine. Announcement of the appointment was made by William H. Danforth, M.D., chancellor of Washington University. Owens has served as acting head of the department for more than two years.

He was an instructor in the anesthesiology department at Harvard Medical School before joining the Washington University School of Medicine faculty in 1973 as an assistant professor of anesthesiology. He was named associate professor in 1981 and acting head of the department in 1982.

Owens is anesthesiologist-in-chief at Barnes and Children's hospitals. He also serves as medical director of respiratory therapy and codirector of the surgical intensive care unit at Barnes Hospital.

He received the bachelor of arts degree from Westminster College in 1961, and the doctor of medicine degree from the University of Michigan in 1965. Owens interned at the Presbyterian Medical Center in Denver, Colo., served a residency in the Department of Anesthesia at Massachusetts General Hospital in Boston, and a fellowship in the Department of Anesthesia at Harvard Medical School. He served with the United States Navy hospitals as ensign and lieutenant commander.

He is a fellow of the American Society of Anesthesiologists and a diplomate of the American Board of Anesthesiology. His memberships include the American Society of Anesthesiologists, Missouri Society of Anesthesiologists, St. Louis Society of Anesthesiologists, Association of University Anesthesiologists, International Anesthesia Research Society, Academy of Anesthesiology, Society of Critical Care Medicine, and the St. Louis Metropolitan Medical Society.

A principal investigator of various anesthesiology research projects, Owens has been an invited lecturer and visiting professor, and has delivered scientific presentations at universities and organizations throughout the United States and Canada. He is associate editor of Survey of Anesthesiology, and has written more than 40 journal articles.

Unanue Named Head of Pathology

Emil R. Unanue, M.D., has been named head of the Department of Pathology at the School of Medicine. His appointment, effective Jan. 1, 1985, was announced by William H. Danforth, M.D., chancellor of Washington University. Unanue succeeds Paul E. Lacy, M.D., Ph.D., Edward Mallinckrodt Professor and head of the Department of Pathology.

After more than 20 years as department head, Lacy has stepped down from the position to concentrate full time on his research. A member of the National Academy of Sciences, Lacy is recognized worldwide for his scientific achievements, in particular for his success in controlling diabetes by transplanting clusters of insulin-producing pancreas cells. Lacy's work has significantly advanced immunology, organ transplantation, and the continuing search for better diabetes treatments.

Unanue currently is on the faculty at Harvard Medical School, where for the last 10 years he has been Mallinckrodt Professor of Immunopathology in the Department of Pathology. As head of the pathology department at Washington University, he will serve as Edward Mallinckrodt Professor of Pathology and as pathologist-in-chief at Barnes, Jewish and Children's hospitals.

Unanue has centered his research on the interactions among immune system cells. He has been instrumental in showing the critical role played by macrophages, cells which activate the body's immune response to foreign invaders. Macrophages ingest and destroy foreign substances, and also stimulate the production of specific lymphocytes that attack invaders. Macrophage interactions with other immune system cells are important in organ transplants, and in the body's response to many disease states, especially infection and cancer.

Unanue joined the faculty of Harvard Medical School in 1970 as an assistant professor of pathology, becoming an associate professor in 1972 and the Mallinckrodt Professor of Immunopathology in 1974. Since 1977 he has served as a consultant in pathology to Brigham and Women's Hospital in Boston.

During his career he has served two years as an associate and three years as a postdoctoral research fellow.
of the Department of Experimental Pathology at the
Scripps Clinic and Research Foundation in La Jolla, Calif. He
also spent two years as a research fellow in the
Immunology Division of the National Institute for Medical
Research in London.
A native of Cuba, Unanue received the bachelor of sci-
ence degree in 1952 from the Institute of Secondary Educa-
tion in Havana, Cuba, and
the doctor of medicine degree
in 1960 from the University
of Havana School of Medicine. He served an internship
in pathology at Presbyterian University Hospital in
Pittsburgh.
Among his honors are the Parke Davis Award from the American Association of Pathologists, a Research Career Development Award of the National Institutes of Health, and an honorary master in arts degree from Harvard University in 1974. He
also received a Guggenheim Fellowship from the John
Simon Guggenheim Memorial Foundation in New York.
Unanue is a member of the Allergy and Immunology Research Committee of the
National Institutes of Health, associate editor of three immunology journals, and on the editorial boards of two other journals. His memberships
include the American Association of Pathologists, the American Society for Cell Biology, American Association of Immunologists,
British Society for Immunology, Reticuloendothelial Society, and the Venezuelan Society of Allergy and Immunology.
He is co-author of Textbook of Immunology and Macrophage Regulation of Immunity, and has written more
than 200 journal articles.

Three Researchers Receive Javits Awards

Three faculty members
at the School of Medicine
will conduct research for the
next seven years with $2.5
million from Javits Neuro-
sience Investigator Awards.
Recipient are Barbara A.
Bohne, Ph.D., associate pro-
fessor of otolaryngology;
Gerald D. Fischbach, M.D.,
professor and head of
anatomy and neurobiology;
and Dale Purves, M.D., pro-
fessor of physiology and
biophysics. The U.S. Con-
gress gives the awards in
honor of Sen. Jacob K. Javits
of New York, on recommenda-
tion of the National Advi-
sory Board of the National
Institute of Neurological and
Communicative Disorders
and Stroke.
The awards are for investiga-
tors who have submitted
regular research grant ap-
lications for competitive re-
view during the 1984 fiscal
year and who have made sub-
stantial contributions in some
field of neurological or com-
municative sciences. The
prestigious grants provide a
seven-year commitment of
support to the researchers
who receive them.
Bohne will study the
effects of noise on the inner
ear in hopes of identifying
early damage before hearing
problems become too severe.
Fischbach, recently named
to the National Academy of
Science, conducts research
on the development of em-
brovic neurons and muscle
cells in tissue culture and the
formation of functional con-
nections between them. He
hopes to learn how to prevent
the cells from dying and how
to promote their viability.
Ultimately, this work could
improve treatment for chronic
degenerative disease of the
nervous system.
Purves will examine how
the nervous system changes
over time by following the
formation and maintenance
of connections among nerve
cells in mammals. The point
of his work is to understand
cellular mechanisms that
allow the human nervous sys-
tem to store information
gained from experience.

Cancer Center Dedicated

Ceremonies were held
Friday, April 6, to dedicate
the Washington University/Barnard Cancer Center, the
first outpatient facility in the Midwest to offer comprehen-
sive care for patients with
cancer or blood-related
diseases.
The dedication lecture,
"Bone Marrow Transplanta-
tion for Malignant Disease," was delivered by E. Donnall
Thomas, M.D., an interna-
tionally recognized hemato-
ologist who is head of the
division of oncology at the
University of Washington
School of Medicine and di-
rector of medical oncology at the Fred Hutchinson Cancer
Research Center in Seattle,
Wash.
All physicians associated
with the Barnard Cancer
Center are specialists in
hematology or oncology. The
taff includes medical doc-
tors, surgeons, radiation
therapists and nurses trained
in treating cancer patients,
as well as clinical research
physicians studying new
treatments for advanced or
difficult-to-treat forms of the
disease. Because the staff is
a multidisciplinary group,
patients can benefit from sev-
eral professional opinions in
a single visit, and from the
center staff's interaction with
referring physicians.
Researchers to Study Adolescent Health Care

Felton Earls, M.D., Blanche F. Ittelson professor and director of the Division of Child Psychiatry, and Lee N. Robins, Ph.D., professor of sociology in psychiatry, have received a three-year grant of more than $800,000 to evaluate an innovative national program for delivering health care to young people.

The grant was awarded by the Robert Wood Johnson Foundation to evaluate a program that started three years ago to improve health care for young people and training in the new discipline of adolescent medicine. Twenty academic medical centers from throughout the nation are participating in the foundation's Program to Consolidate Health Services for High-Risk Young People.

"Each of these centers is trying to consolidate mental health and physical health services," Earls said. "The constraints imposed by large medical centers frequently result in fragmented services for youth. A pregnant teenager presenting to an obstetrics clinic may get satisfactory prenatal care while ongoing depressive illness goes either undetected or untreated. Truly comprehensive care could have a profound impact on adolescents."

Earls and Robins will study the program's success in decreasing occurrences of — and deaths from — accidents, suicide, homicide, depression, early pregnancy, sexually transmitted diseases, alcoholism and drug abuse. All of those problems have been documented as increasing in frequency among adolescents nationally, said Earls, a staff member at Barnes, Jewish and Children's hospitals.

"We are checking the concept of consolidating health services for its particular value to adolescents," he explained. "The high risk young people in this study tend to be from urban, minority, poor socio-economic groups. Most of their health problems relate to social environment and behavior, so the real importance of our study is to find out whether improving their health also improves their quality of life."

According to Earls, the results could have a major impact on academic medicine and physician training, especially in the emerging discipline of adolescent medicine. Also, he said, the results could affect government policy on appropriations for adolescent health care, perhaps encouraging consolidation efforts between private and public agencies.

Earls and Robins will evaluate six of the 20 centers participating in the program, as well as several academic medical centers that do not have foundation funding but provide traditional health care to adolescents.

NSF Award to Establish Computer Facility

The National Science Foundation has awarded $125,000 to the School of Medicine in partial support for the purchase of equipment for a computer facility in the Department of Biological Chemistry. This central facility can be used directly or tied into small computers in users' laboratories, which will greatly facilitate research, says Luis Glaser, Ph.D., professor and head of biochemistry at the School of Medicine.

This most recent award follows an initial NSF grant acquired by Leonard J. Banaszak, Ph.D., professor of biological chemistry and associate professor of physiology and biophysics, soliciting funds for a VAX 11/780 computer. A second instrument was recently purchased with this latest award, and both are housed in a facility under the direction of Richard Wrenn, D.Sc., research assistant professor of biological chemistry. In addition, Wrenn has organized courses on computer technology that have been well attended by graduate students, faculty and postdoctoral fellows.

The new computing facility, which has been open for about a year, is used by faculty in all preclinical departments, as well as some clinical departments. "Dr. Wrenn has done a tremendous job in rapidly making this facility available to a large number of users," remarks Glaser. "The facility is self-supporting — all users pay a fee for their use, and it is less expensive than any facility available to the faculty."

Richard Wrenn, D.Sc., director of the new computing facility in the Department of Biological Chemistry.
Pilbeam Delivers Terry Lecture

Internationally recognized anthropologist David Pilbeam, Ph.D., delivered the 31st Robert J. Terry Lecture May 3 at Washington University School of Medicine in St. Louis. Alumni and friends established the lectureship in 1938 to honor Terry, who was head of the Department of Anatomy from 1900–1941. Recently, additional funds have enabled the expansion of the Terry Lectureship into a visiting professorship.

Pilbeam’s lecture was entitled “Human Origins Research: Then and Now.” Pilbeam, professor of anthropology at Harvard University, has earned an international reputation among scholars for his studies on the origin of man. A native of Britain, his research has focused on the evolution of man and apes, ancient environments and climates, and the history of paleoanthropological ideas. His field experience in anthropology has taken him to Egypt, Uganda, Spain, Greece, Kenya and Pakistan.

He has been a member of the faculty at Harvard University since 1981. He has served also at the Kenya National Museums, as scientific director of its International Program for the Study of Human Origins and as interim scientific director of its International Louis Leakey Memorial for African Prehistory.

Pilbeam was on the faculty at Yale University for 13 years, beginning in 1968, as an assistant professor of anthropology. He was named a professor of anthropology in 1974, and the next year was appointed professor of geology and geophysics. For 11 years at Yale he served as curator of anthropology at the Peabody Museum, and for three years was chairman of the Department of Anthropology. Pilbeam began his career at Cambridge University, where he was a demonstrator in physical anthropology and acting director of the Duckworth Laboratory of Physical Anthropology.

He holds master’s degrees from Cambridge University and Harvard University, and a doctorate from Yale University. Pilbeam’s honors include the 1983 Silliman Lecture at Yale and the 1982 Harvey Lecture at the University of New Mexico. Also in 1982, he was selected as correspondent to the Museum National d’Histoire in Paris. He has written two books, The Evolution of Man and The Ascent of Man: An Introduction to Human Evolution, and is the author or co-author of more than 70 articles concerned with his own discoveries in evolutionary biology and with theories and concepts relating to human evolution.

Gottesman Receives Goodman Award

Irving Gottesman, Ph.D., professor of psychiatric genetics at W.U. School of Medicine, received the 1984 Mortimer B. Goodman Award Saturday, April 14, from the Missouri chapter of the Alliance for the Mentally Ill. The award is presented each year to a mental health professional in recognition of that person’s contributions to the Alliance.

The Alliance for the Mentally Ill is a self-help and advocacy group established by family and friends of the severely and chronically mentally ill. The alliance provides education, information and referral services as well as funding for research on mental illness.

Gottesman is a psychiatric geneticist whose research focuses primarily on the transmission of schizophrenia. His theory is that genes — not social environment alone — influence mental illness.

Gottesman has been on the School of Medicine faculty since 1980. He had previously served as director of the Behavioral Genetics Center at the University of Minnesota. He received the bachelor of science degree in psychology in 1953 from the Illinois Institute of Technology in Chicago, and a doctorate in psychology in 1960 from the University of Minnesota.
FURTHERMORE

Virginia V. Weldon, M.D., deputy vice chancellor for medical affairs at the School of Medicine, was awarded the prestigious Smith College Medal from her alma mater last winter. The award cites Weldon for a life that exemplifies "the true purpose of liberal arts education." She is a 1957 cum laude graduate of Smith College, the largest private liberal arts college for women in the country.

Most recently, Weldon was elected as a fellow of the American Association for the Advancement of Science (AAAS). She was one of 269 members of AAAS named as new fellows in 1984.

Weldon is also professor of pediatrics at the School of Medicine, vice president of the Washington University Medical Center, and a staff physician at Barnes and Children's hospitals. A specialist in pediatric endocrinology, Weldon has studied mechanisms of abnormal growth in childhood. During her career at the medical school, she has served as assistant to the vice chancellor for medical affairs, assistant director of the Clinical Research Center, and co-director of the Division of Pediatric Endocrinology and Metabolism.

Jeff W. Lichtman, M.D., Ph.D., assistant professor of physiology and biophysics, and Dov Kadmon, M.D., assistant professor of urology, have each received a federally funded Research Career Development Award. The prestigious national award provides salary support to young scientists in the early stages of their independent research careers.

Kadmon is currently conducting research to develop a radionuclide scan to detect early spread of prostate cancer. His work, conducted at the Urologic Research Laboratory at Jewish Hospital, is funded through a grant from the National Institutes of Health. The research is performed in collaboration with Michael Welch, Ph.D., professor of radiology and Barry Siegel, M.D., professor of medicine and radiology and staff member at Barnes and Children's hospitals.

Lichtman's research, begun when he was an M.S.T.P. student in Dale Purves' laboratory, centers on aspects of developmental neurobiology. His award was funded by N.I.H.

Gilbert H. Nussbaum, Ph.D., assistant professor of radiation physics in radiology at the School of Medicine, has been appointed an associate director of the Hyperthermia Foundation, a private, non-profit organization supporting research in clinical hyperthermia. Nussbaum also has been appointed to the newly formed hyperthermia committee of the American Association of Physicists in Medicine, and to the hyperthermia subcommittee of the Radiation Research Society.

REHABILITATION

Dear Editor:

I just wanted to thank you for the beautiful article in Outlook. When I went to the AOTA conference in Kansas City, several alumni talked to me about the article and how proud they were of being graduates of Washington University because of the quality of rehabilitation provided here, as described in your article.

A person working in the Department of Chemistry here at the University was so touched by your article that she applied to O.T. School for this fall.

I knew that the article was important because of the caring that you showed in its development. I think it instilled a sense of pride in those of us that work here to have what we do depicted so that it reflects the humanism and caring that we try to put into our services.

Sincerely yours,
Carolyn Baum, M.A., O.T.R., F.A.O.T.A.,
Director, Occupational Therapy
Irene Walter Johnson Rehabilitation Institute
Washington University Medical Center

Dear Editor:

I appreciated Outlook's article on rehabilitation, and I have heard many favorable comments about it. Your thorough article will go a long way to acquaint the medical profession with rehabilitation medicine, a field that so often is ignored . . .

Sincerely,
Franz U. Steinberg, M.D.
Director, Department of Rehabilitation Medicine
The Jewish Hospital of St. Louis
Washington University Medical Center

FOR-PROFIT MEDICAL CARE

Dear Editor:

Peter Tuteur's "Personal Outlook" on for-profit institutions was excellent and sorely needed. Much of the flurry about profit status is misinformed, either based on serious ignorance or on a strong desire to protect the status quo. He is correct in stating that outcome, cost, and quality of service should be the criteria for evaluation of health services. These services should not be judged on whether they are provided by a profit or nonprofit group.

It is my feeling that we are going into an era of real change towards corporate medicine and we should make every effort to be certain it is done in the best manner . . . .

Thanks again for his "sane" voice in a very confused time.

Sincerely,
Samuel P. Martin, M.D. '41
Director, Robert Wood Johnson Foundation Clinical Scholars Program
University of Pennsylvania School of Medicine
Daniel Nathans, M.D. '54, the School of Medicine's second alumnus to be awarded the Nobel Prize in Physiology or Medicine, is a recipient of the Alumni Achievement Award for 1984. In 1978, when Nathans' Nobel Prize was announced, Walter Bauer, M.D. '54, Nathans' anatomy lab partner, remarked: "A calm, rather intense person, Nathans was one to whom medical school work came very easily. There was no question about his being at the top of his class." For his part, Nathans credits Oliver Lowry as his first teacher of "the joy of research." Nathans' co-discovery of restriction enzymes and their use in investigating the genome of the SV40 virus led to his selection as recipient of the Nobel Prize.

Born in Delaware, Nathans is the youngest of nine children of Russian immigrants Samuel and Sarah Nathans. His graduation from the School of Medicine magna cum laude was the first step in Nathans' illustrious scientific career. He completed postgraduate training at Columbia-Presbyterian Medical Center in New York. In 1962, he completed research under Dr. Fritz Kipmann at Rockefeller University in New York. Subsequently, he accepted an assistant professorship in microbiology at Johns Hopkins, where he has remained.

In 1981, he was named professor and director of the Department of Molecular Biology and Genetics. The next year, he was appointed professor of molecular biology and genetics as a senior investigator at the Howard Hughes Medical Institute. In 1979, he received an honorary D.Sc. from W.U. and was principal speaker at the Elliot Honors program in Graham Chapel.

In addition to the Nobel Prize, Nathans has received the Selin, un Waksman Award in Microbiology and the U.S. Steel Foundation Award in Molecular Biology. He is a member of several professional societies, including the National Academy of Sciences, and he is a fellow of the American Academy of Arts and Sciences. He has also served on the editorial boards of two journals. In addition, his volunteerism has included service on the scientific advisory board of the Jane Coffin Childs Memorial Fund for Medical Research.

Washington University Medical Center Alumni Association is pleased to select Daniel Nathans as a recipient of the 1984 Alumni Achievement Award.

1984 Alumni Achievement Awards

Albert L. Rhoton, Jr. M.D. '59, another recipient of the 1984 Alumni Achievement Award, is honored for his noteworthy accomplishments, particularly in the field of neurosurgery. His hospital appointments have included a consultancy in neurosurgery at the Mayo Clinic, service as staff neurosurgeon at Rochester Methodist Hospital, Rochester State Hospital, and St. Mary's Hospital in Rochester, Minnesota, and chief of the division of neurosurgery at the J. Hills Miller Health Center in Gainesville, Florida. In 1972, Rhoton established a neurosurgical and vascular surgical education program at the University of Florida, which has trained over 1,000 neurological and vascular surgeons since its inception.

Rhoton, a cum laude graduate of the School of Medicine, is remembered by his classmates as unpretentious and always willing to help. He completed a surgical internship and assistant residency at Columbia Presbyterian Medical Center in New York. After serving an assistant residency in neurosurgery at the New York Neurological Institute, he returned to St. Louis in 1962 to serve as assistant resident, then chief resident neurosurgeon, at Barnes Hospital. He also completed a fellowship in neuroanatomy at the School of Medicine.

In 1966, he was named instructor in neurosurgery at the Mayo Clinic; subsequently, he was appointed assistant professor. Remarkably, only 13 years after graduating from medical school, Rhoton was named professor of surgery at the University of Florida. In 1978, he received the R.D. Keene Family Professorship in Surgery. Currently, he chairs the Department of Neurological Surgery at the University of Florida.

He has held many offices in several professional societies and is a member of several professional organizations. He also chairs and serves on committees or editorial boards of four professional journals. Rhoton has written or co-authored over 130 publications on microsurgical anatomy and microsurgery of stroke.

David W. Talmage, M.D. '44, has spent the last 25 years living in Colorado. During his tenure at the University of Colorado, he has displayed a flair for both research and administration that has been recognized and rewarded by his peers. The Washington University Medical Center Alumni Association is pleased to extend their...
recognition of Talmage’s accomplishments by presenting him with a 1984 Alumni Achievement Award.

Talmage has received appointments in the Department of Medicine and the Department of Microbiology at U.C. serving as a professor in each department. In 1966, he was appointed associate dean of faculty at UC School of Medicine. Subsequently, he received promotions to acting dean and dean of the medical school, where he remained until 1971.

In 1973, he began a 10-year tenure as director of the Webb-Waring Lung Institute that ended upon his appointment in 1983 as director of the Given Institute of Pathobiology. Currently, he is also associate dean for research affairs at the U.C. Health Sciences Center.

Born in Korea to missionary parents, Talmage served three years as medical officer with the U.S. Army. After completing an internship and residency at Barnes Hospital, Talmage completed a postgraduate fellowship here. After a year at the U. of Pittsburgh as assistant research professor of pathology, he spent seven years at the U. of Chicago in the Department of Medicine.

A member of several professional societies, he has served on the editorial board or as editor of two journals. Talmage has also served as president for two professional groups.

Appointed by the governor of Colorado, Talmage served two years on the state scientific advisory council. At the invitation of Caspar Weinberger, he served four years on the council of NIAID at NIH. He has a long, productive record of voluntarism.

Talmage’s research has diverged, investigating infectious diseases as well as cancer. In addition, his interest in immunity has led him to delve into antibody diversity and graft tolerance.

He has received numerous awards and honors, including Phi Beta Kappa and AOA membership. He has been Markle Scholar and Fulbright-Hays Senior Scholar.

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1984 Alumni Faculty Awards

Paul O. Hagemann, M.D. ’34, has provided a half-century of dedicated service to his patients, and he has supported the School of Medicine and the medical center in its mission to educate young physicians and clinicians for 46 years. In recognition of his unique contributions to Washington University School of Medicine and his excellence as a physician, Hagemann has been selected as a recipient of the 1984 Alumni/Faculty Award.

After completing postgraduate training at New York Hospital and New Haven Hospital, Hagemann spent six months as a Sterling Fellow in the Research Department at New Haven Hospital. In 1937, he completed a residency in medicine at Barnes Hospital. Beginning in 1938, he received the first of several appointments in the Department of Medicine here. Currently, he is emeritus associate professor of clinical medicine.

Director of the Barnes Hospital Laboratories from 1941 to 1944, he left to serve in the U.S. Army. After serving as chief of the Arthritis Clinic at WU, he was named consultant in arthritis at Barnes Hospital in 1947. He served a ten-year term as chief of medicine at St. Luke’s Hospital.

A 43-year diplomate of the American Board of Internal Medicine, Hagemann has held office in several professional societies. He is a member of Phi Beta Kappa, AOA and Sigma Xi. In addition, he has had a long and productive career as a volunteer for the School of Medicine’s development, which was recognized by the Alumni Citation on Founders Day 1983.

Edward H. Reinhard, M.D. ’39, has been an exemplary educator, scientist and physician since his undergraduate days as a Phi Beta Kappa at W.U. It is an honor for the Medical Center Alumni Association to select him as a recipient of the 1984 Alumni Faculty Award.
Alumni/Faculty Award.

After completing an internship in medicine at New York Hospital, Reinhard returned to complete an assistant residency in medicine at Barnes Hospital, including a term as chief resident under former Department of Medicine head, Dr. Barry Wood. Subsequently, he was appointed to the Department of Medicine as an instructor, and he received several promotions eventually culminating in his appointment as full professor in 1959. Reinhard served as consultant in oncology to the Mallinckrodt Institute of Radiology and on the staff of Barnes and Jewish hospitals; he has also been a consultant to John Cochran Veterans Hospital.

He is a member of several medical societies, diplomate of the American Board of Internal Medicine and fellow of the American College of Physicians. He has also served on several professional committees. Currently professor emeritus in the Department of Medicine, he maintains an active role at the new W.U./Barnard Cancer Center.

Frederick C. Reynolds, M.D. '34, is perhaps best known locally as the long-time team physician for the St. Louis Football Cardinals. For his half-century record of professionalism in clinical practice and teaching, as well as his internationally recognized contributions to orthopedic surgery and sports medicine, the W.U. Medical Center Alumni Association is pleased to select Reynolds as a recipient of the 1984 Alumni/Faculty Award.

A native of Texarkana, Texas, Reynolds completed postgraduate training in surgery and neurosurgery at Barnes Hospital. From 1937 to 1943, he served a preceptorship in orthopedic surgery under Dr. E. B. Mumford in Indianapolis, Indiana. In 1943 he was appointed chief of orthopedic surgery at the U.S. Army General Hospital.

From an appointment as instructor in clinical orthopedic surgery at the School of Medicine, Reynolds eventually achieved full professorship in orthopedic surgery in 1956. He has twice served as division chief in orthopedic surgery here. Currently he is professor emeritus of orthopedic surgery, and he has been a staff member at Barnes and Children’s hospitals, as well as the St. Louis Shriners Hospital for Crippled Children.

Reynolds has held memberships in over two dozen distinguished professional organizations, and he was a founding member of the American Orthopedic Society of Physicians. He has served as president of the American Board of Orthopedic Surgery and the American Academy of Orthopedic Surgeons and has had a long editorial career. Reynolds was awarded the Alumni Citation by W.U. on Founders Day 1978. Most recently, a named professorship was established in his honor at the School of Medicine.

John D. Vavra, M.D. '54, has been fondly referred to over the years as “Mr. Ethics” by the W.U. medical students. He initiated a senior course on medical ethics in 1967, and has consistently reminded his students of their professional obligations to dying patients and their families. Thus, it is a pleasure for W.U. Medical Center Alumni Association to honor Vavra by awarding him a 1984 Alumni Faculty Award.

Vavra, a native of Boulder, Colorado, served as chief resident in medicine at Barnes Hospital. He has held clinical and research fellowships in hematology at the School of Medicine and with the U.S.P.H.S. He joined the faculty as instructor in medicine in 1959, eventually being promoted to full professor in 1967. In 1969, he was appointed adjunct professor of philosophy and theology at Eden Seminary in St. Louis. Subsequently, he has spoken on and written about topics such as the psychology of death and dying, abortion and euthanasia.

In 1973, Vavra was named chairman of the Health and Human Studies Committee, which reviews research on human subjects performed at the university. For 10 years, he headed the W.U. internal medicine service at City Hospital. Residents remember him as a crusader for improved care of indigent patients.

For 15 years, he served as assistant dean for postgraduate training. His genuine concern, leadership, honesty and integrity have inspired hundreds of W.U. medical students. In 1966, he delivered the AOA lecture, and in 1968 he delivered the Senior Graduation address. In 1970, Vavra received the Senior Award and the Alumni Teaching Scholar Award. In addition, he holds memberships in several professional medical societies.
Robert Jessen is a general practitioner also on staff at Ivinson Memorial. After completing his undergraduate work at the University of Utah (Salt Lake City) and an M.D. at Long Island College of Medicine (Brooklyn, NY), he completed a residency at Barnes Hospital.

David Anderson practices obstetrics and gynecology at Ivinson Memorial. Anderson completed his undergraduate work and his M.D. at the University of North Carolina (Chapel Hill). He took a residency at Barnes Hospital.

Vira Santibhavank has joined the Guthrie Clinic in Towanda, Pa., as an associate in anesthesiology. Santibhavank received his medical degree from the Faculty of Medicine, Ramathibodi Hospital, Hamidol University (Bangkok, Thailand) in 1972. He completed a residency in anesthesiology at the University of Iowa and a fellowship in cardiovascular anesthesiology from W.U. School of Medicine.

Before accepting this position, Santibhavank was attending anesthesiologist at Miami Valley Hospital in Dayton, Ohio, assistant professor of anesthesiology at Ohio State University Medical School, and instructor in anesthesiology at W.U. School of Medicine. He is board-certified in anesthesiology.

Walter H. Reichert has joined the department of psychiatry at Pioneer Valley Hospital, Salt Lake City, Ut. Reichert earned a medical degree at the University of Utah and completed an internship at Barnes Hospital. He received additional training at New York Hospital and Memorial Hospital, N.Y. He was a research associate at the NIH and director of neurology at Burke Rehabilitation, White Plains, N.Y.

Robert B. Tober is medical director of Collier County Emergency Medical Services and works in emergency medicine at Naples Community Hospital (Fla.). After completing an internship at Jewish Hospital, he did further work in emergency medicine at St. John’s Mercy Medical Center in St. Louis County.

F. Thomas Ott recently performed the first cataract removals ever done at Clay County Hospital (Fla.). Ott completed his residency in 1969 at Barnes Hospital. He is on staff at Barnes and St. Louis Eye hospitals. Ott has been practicing in the St. Louis area since completing his residency, and is board-certified by the American Academy of Ophthalmology.

Harrison H. Shoulders, Jr., has opened a practice in general surgery and proctology in Lewisburg, Tenn. Formerly, Shoulders resided in Nashville. In 1971, he spent a year at St. Mark’s Hospital in London studying colo-rectal surgery.

Shoulders earned an M.D. from Vanderbilt and completed a six-year residency at W.U. Medical Center. In the 1960s, he was a full-time staff member at Vanderbilt Hospital and the V.A. Hospital before entering private practice. He is a diplomate of the American Board of Surgery, the American Board of Colon and Rectal Surgery, and a Fellow of the American College of Surgeons, the American Society of Colon and Rectal Surgery, as well as the Royal Society of Medicine, Proctology Section.

Philip A. Waldor has recently joined a Phoenixville, Pa., practice in general and vascular surgery. A graduate of Rutgers, with a medical degree from Temple University School of Medicine, Waldor completed a residency in general surgery at Barnes Hospital. He also completed a fellowship in general surgery at W.U. Medical Center.

Charles D. Phelps has been named head of ophthalmology at the University of Iowa College of Medicine. Phelps joined the UI medical college faculty in 1971 and currently is professor of ophthalmology. He is also on staff at UI Hospitals, where he is director of glaucoma service.

Phelps is internationally recognized for his research on glaucoma. He is principal investigator of a UI study aimed at determining why some glaucoma patients are more susceptible than others to optical nerve damage. The study is supported in part by a $390,984 grant from the NIH.

Phelps is a native of Waterloo, Iowa; he earned undergraduate and medical degrees from UI. He completed residencies in internal medicine at Boston City Hospital, ophthalmology at UK, and postgraduate fellowships in ophthalmology at UI and at W.U. School of Medicine.
He served for three years as an elected member of the College of Medicine Executive Committee, including one year as its elected chairman. Since 1979, he has directed UI medical student education in ophthalmology, creating resource materials used nationwide for educating students in ophthalmology. He is editor of a section of a new medical textbook published by Harper & Row. He has published many scholarly articles and serves as scientific referee for three journals in his field. Phelps is a member of the visual disorders study section of the NIH and co-chairman of the glaucoma section of the Association for Research in Vision and Ophthalmology. An associate examiner of the American Board of Ophthalmology, Phelps also serves on programming and steering committees of many national and international ophthalmology organizations. He is a frequent lecturer for his field. Phelps is a medical student education and public health scientist and public health scientist.

Robert J. Glaser, Director for Medical Science of the Lucille P. Markey Charitable Trust, received an honorary Doctor of Science degree from the Mt. Sinai Medical School of the City University of New York. He has also been elected to the Board of Trustees of the David and Lucille Packard Foundation.

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an article in the Waterloo, Ill., Republic Times when he retired at the end of 1983. Schaller came to Waterloo in 1938 and never practiced elsewhere, except for a three-year army stint during World War II, when he was chief psychiatrist at the 108th Station Hospital in Newfoundland.

Schaller completed an internship at St. Luke's Hospital in St. Louis and a surgical internship at Wabash Hospital in Moberly, Mo. After a brief time with the Institute of Juvenile Research in Chicago, he joined the Illinois Department of Welfare, Psychiatry and Criminology, where he was superintendent of the diagnostic clinic at the state prison at Menard; later, he was appointed chief psychiatrist there.

In 1938 he moved to Waterloo, joining the general medical practice of Dr. O.C. Heilming. Eventually, he built a professional building to house his medical practice and his son's dental practice.

His professional affiliations include emeritus membership in the AMA, the Illinois State Medical Society and the Monroe County Medical Society. He is a charter member of the Illinois Academy of Family Physicians and was a member of the first Monroe County Department of Health. For many years he served as chairman of the utilization committee of the Monroe County Nursing Home and is on the staff of St. Clement Hospital in Red Bud.

'S30s

Edward Massie, M.D. '35, and Bernard S. Lipman, M.D. '44, have just completed the Seventh Edition of their book, Clinical Electrocardiography, published by Year Book Medical Publishers (Chicago). Lipman is currently in private practice in Atlanta, Ga., specializing in internal medicine and cardiology. Massie is clinical professor emeritus of medicine at Washington University School of Medicine and a staff member at Barnes and Jewish hospitals at the medical center.

This edition of their book, considered a classic in its field, gives a more comprehensive presentation of electrocardiographic interpretation, emphasizing electrophysiology and cardiac arrhythmias.

'S40s

John F. Blinn, Jr. M.D., December 1943, has been inducted into the University of the Pacific (Stockton, Calif.) Hall of Fame. Blinn, a 1940 graduate of the school, has had over 50 years' involvement with the football program, beginning in 1933 when he served as assistant team manager. He began his tenure as team physician in 1956 and has not missed a single UOP game since then. A member of the Block P honorary society, Blinn has received many awards for his service at UOP. Blinn was formerly team physician for the Stockton Ports.

Seymour Brown, M.D. '40, has been appointed chief of anesthesiology at Bay Pines Veterans Administration Medical Center, St. Petersburg, Fla. He interned in pathology at Barnes Hospital and completed further study at the Illinois School of Medicine hospitals in Chicago. Brown completed an anesthesiology fellowship at the Lahey Clinic in Boston.

While still a student, Brown gained recognition as the first clinician to make regular organized preanesthesia and postanesthesia patient rounds. During World War II, Brown served with the Navy Medical Corps on combat ships in the South Pacific.

Francis Burns, M.D. '40, has retired from a 35-year practice in obstetrics and gynecology. Burns counts 6,137 infants delivered during his lifetime of practice in Hannibal, Mo., including two sets of triplets.

During World War II, Burns served four years in the 19th Division, 116th Infantry, Medical Detachment. Burns opened his practice in 1948, after finishing a three-year residency at St. Louis City Hospital and a six-month residency in gynecology/pathology at the Washington University Maternity Hospital. Upon completion of his advanced training, he accepted an offer from Dr. Howard Goodrich to join his practice in Hannibal. From 1952 to 1960, Burns was the only ob/gyn in Hannibal. He helped establish the medical libraries at both Hannibal hospitals and he led the move to form the Hannibal Clinic, which opened in 1958, later returning to private practice in 1970.

Burns introduced innovations in anesthesia, as well as laparoscopy, to patients in the Hannibal area. He also worked with Dr. James Steele to establish the NECAC Family Planning Center during the late 1960s, where he served as director and medical consultant until his retirement.

Hanes H. Brindley, M.D. '42, has stepped down after serving a year as president of Scott and White Memorial Hospital in Temple, Tex. Brindley, a native of Temple, continues to serve on the orthopedic staff at the hospital.

He completed several residencies before coming to Scott and White in 1951; from 1974 to 1980, he was chief of orthopedics. He is a member of many medical societies, including the prestigious Clinical Orthopedic Society. He is also a past regent of Temple Junior College.

David Citron, M.D. '44, cited as a "doctor's doctor," will step down this summer as director of the Family Practice Residency Program at Charlotte Memorial Hospital (N.C.). At the end of the year, he will retire from the hospital staff, moving to downtown Charlotte to establish a practice in an area where doctors are in short supply. He intends to practice internal medicine as a part-time staff member and consultant to the Mecklenburg Medical Group.

Citron has had a private
practice in internal medicine for 20 years. He is a past president of the Mecklenburg County Medical Society; in 1973, he instituted Memorial Hospital's teaching program in family practice.

While president of MCMS, he advocated the concept of peer review of his colleagues. In 1981, he challenged the legislature's attempt to repeal the law mandating revocation of driving privileges for refusal to submit to a Breathalyzer test.

Citrion is a member of the Institute of Medicine of the National Academy of Sciences. He is also chairman of a task force of the National Board of Medical Examiners; he holds the same office for the legislative committee of the Federation of State Medical Boards. In 1979, he was president of the Board of Medical Examiners in his state.

**'50s**

Gerald Diettert, M.D. '54, recently accompanied his son Bruce to the commencement ceremonies at the University of Montana. But both father and son walked across the stage to accept diplomas. The senior Diettert earned an honors degree in pre-medical sciences, while the younger obtained an honors diploma in business.

Diettert, a Western Montana cardiologist, interrupted his studies in 1950 to enter the military. Subsequently, he entered medical school and was graduated. But he always regretted his incomplete bachelor's degree. Upon re-enrolling last fall, he was told that he only needed nine credits to graduate; so he enrolled for 12 credits in history classes. Now thoroughly "hooked," he's currently a graduate student in history at UM. "It'll probably take me five years to finish," he says. "If I keep working at this, maybe I can get my Ph.D. with my granddaughter."

**David Starrett, M.D. '52**

was nominated as a vice-presidential candidate in the American Psychiatric Association elections for 1984.

After completing an internship and residency at Highland Hospital in Oakland, Ca., Starrett took a residency in psychiatry at the University of Colorado; later, he studied at the Institute for Psychoanalysis in Chicago.

In addition to maintaining a private practice, he is a former administrator of psychiatric services at the Denver City Hospital. For the past 23 years, he has overseen the psychiatric services at the Denver V.A. Medical Center. He has supervised the inpatient division of the department of psychiatry at the University of Colorado since 1974. Starrett organized a part-pay psychiatric clinic, as well as several organizations to develop community resources and integrate service at psychiatric facilities.

He has performed several roles for the APA, including seven years as assembly member, eight years on the Board of Trustees, and five years on the Board's Executive Committee. Currently, Starrett serves on the APA's Joint Commission on Public Affairs.

**Thomas Mazzocco, M.D. '57**

has developed a new lens implant for patients undergoing cataract surgery. The six-mm lens can be compressed to half that size, requiring a smaller surgical incision than other lenses. The patient reaches maximum visual capacity one to six days after surgery.

Mazzocco, clinical professor of ophthalmology at UCSF and assistant clinical professor at USC, began research on the lens in 1978. After three years of research and development, Staar Surgical Co. was formed to develop and market the lens. This spring, the FDA approved its use in humans.

**'60s**

**Elliot Finkelstein, M.D. '61**

has been elected president of the Massachusetts Society of Eye Physicians and Surgeons. Finkelstein, a past member of the Society's Executive Board, has served as chairman of several of the Society's committees. He is a diplomat of the American Academy of Ophthalmology and is on the staff of the Massachusetts Eye and Ear Infirmary and Beth Israel Hospital. He also holds an appointment at Harvard Medical School.

**Lily Ann Hanes, M.D. '60**

is the first radiation oncologist to set up a practice in Alton, Ill. She is a staff member at St. Joseph's Hospital in Alton and St. John's Mercy Medical Center in St. Louis County; she is also a consultant to Christian Hospitals Northeast-Northwest in St. Louis County. She makes her home aboard a 41-foot sloop, the "Bonnie Scot," moored in Piasa Harbor near Alton.

Hanes was the first woman resident at Mallinckrodt Institute of Radiology, where she was also appointed clinical trainee in radiation therapy. While at Mallinckrodt, she was named chief resident. She has served on the faculty at Rush Medical College and Loyola University in Chicago, and at Washington University School of Medicine. She was the first woman to serve a four-year term as a member of the Radiation Study Section of the National Cancer Institute at NIH. She was elected vice speaker of the House of Delegates of the Missouri State Medical Association — the first woman ever elected to the post in the association's 119-year history.

Hanes is the author of several published works and has received recognition from the American Cancer Society for distinguished service, achievement and leadership in cancer control.

**Hugh H. Tilson, M.D. '64**

is head of pharmacology and epidemiology at Burroughs Wellcome Research Triangle Park, N.C. Tilson is clinical professor of family medicine and adjunct professor of social medicine at UNC School of Medicine. He also carries appointments in health policy and administration, epidemiology and pharmacy at UNC. He is adjunct associate professor of community
and family medicine at Duke University. Tilson was board-certified in preventive medicine in 1972.

Before assuming his current position with Burroughs Wellcome, Tilson was state health director for North Carolina. He is the author of several publications and has served on many editorial boards. Currently, he is vice president of the county medical society.

Sydney A. Smith, M.D. '69, has been elected to the Mississippi State Medical Society. After interning at the University of Kentucky, Smith completed a neurology residency there. He is also a member of the Coast Counties Medical Society.

'S70s

Marc Weissbluth, M.D. '70, director of the Sleep Disorders Center at Children's Memorial Hospital in Chicago, has recently written a book on colic. CRYBABIES: What to Do When Baby Won't Stop Crying is the first book written on the subject by a physician. In his book, Weissbluth summarizes most of the facts and beliefs concerning infant colic and offers an explanation of how infant crying, temperament, and sleep patterns are interrelated. He also gives parents tips on how to encourage good sleeping habits in their infants after colic has subsided.

Thomas P. Wharton, Jr., M.D. '71, has been appointed to the staff of St. Elizabeth's Hospital (Mass.) Department of Cardiology. Wharton comes to his new post from the U.S. Veterans Administration Medical Center in Boston, where he served as head of the cardiac catheterization laboratory.

A graduate of Yale University and the Washington University School of Medicine, Wharton completed an internship and residency in internal medicine at Brigham and Women's Hospital (Peter Bent Brigham Hospital) and was a research and clinical fellow in cardiology at Brigham.

Jonathan M. Mann, M.D. '74, has resigned as chief medical officer for the state of New Mexico. Mann has worked for the state's Health and Environment Department since 1977, where he was director of the Office of Epidemiology.

Mann earned an MPH from Harvard in 1980. He will leave his current position to join the national Centers for Disease Control in Atlanta.

William N. Sitz, M.D. '74, has left his position as emergency room doctor at St. Anthony Hospital (Ore.) to join Pendleton Internal Medicine Specialists. A native of Ontario, Sitz completed a residency in internal medicine at St. Vincent Hospital in Portland before practicing internal medicine in Grand Coulee, Wash. In 1979, he joined the staff at St. Anthony.

Sanford Timen, M.D. '74, has been named chief of otolaryngology in the department of surgery at the Mt. Sinai Medical Center in Ohio.

A clinical instructor of otolaryngology at Case Western Reserve University School of Medicine, Timen joined the Mt. Sinai staff in 1980.

Dennis Parenti, M.D. '78, conducts a weekly arthritis clinic at the offices of Medical Associates, East Stroudsburg, Pa. The clinic treats patients with chronic, progressively disabling rheumatic disorders.

Parenti completed an internship and residency at Temple University in Philadelphia. Following a residency in rheumatology at State University of New York Downstate Medical Center in Brooklyn, Parenti joined the staff at St. Luke's Hospital, Muhlenberg Medical Center and Good Shepherd Rehabilitation Hospital. He has also applied for privileges at Pocono Hospital.

Laura F. Wexler, M.D. '71, has been elected as a Fellow in the American College of Cardiology. Wexler, a resident of Boston, Mass., is a graduate of Barnard College. She is currently assistant professor of medicine, Boston University School of Medicine.

Lesley Z. Blumberg, M.D. '73, has been appointed chief of surgery for Midway Hospital Medical Center in Los Angeles. The department consists of 390 surgeons. Blumberg, an obstetrician/gynecologist, is the first woman to hold this position at this facility since its opening in 1947.

Blumberg completed an internship and residency in obgyn at Cedars Sinai Medi-
Super PET Scanner

The Super PET scanner, newest in a long line of positron emission tomography devices developed by Michel M. Ter-Pogossian, Ph.D., is being installed in the cardiac care unit at Barnes Hospital. Super PET replaces an earlier model that has been used in a wide variety of cardiac research programs. It will be utilized in the continuing clinical trials of t-PA, a new drug that is effective in clearing life-threatening blood clots from coronary arteries. PET's unique ability to image heart metabolism has helped researchers determine that t-PA, if given soon after the onset of a heart attack, can significantly preserve cardiac muscle function. As Super PET is transferred to Barnes from its berth at the Mallinckrodt Institute of Radiology, Ter-Pogossian reports that he and his team of researchers are progressing in the development of two additional scanners, Super PET B and Super PET H.
Above are PET scans of the same section through a heart attack victim's left ventricle. These images, which are displays of metabolic activity, illustrate that therapy with the new drug t-PA can help restore cardiac function. See page 6.