Advancing Neural Regeneration
Blair Clark, a research associate working in the laboratory of Richard Bunge, works on the tedious task of separating cells to be grown in tissue culture. Developing tissue culture techniques for growing nerve cells is only one phase of research. Cultured cells may react in ways different from those maintained in the natural environment. Clinical progress in neural research reflects these difficulties.
Neural Regeneration: Bridging the Gaps

From GAPS — unusual proteins found only in regenerating nerve cells — to experimentally created gaps in spinal cord, basic scientists and clinicians add to our understanding of why brain and spinal cord nerve cells fail to repair themselves after injury.

Hope for Epileptics

Focal epilepsy unresponsive to medical therapy can be surgically corrected. Computer-assisted brain surgery is only one of many techniques used by researchers at the McDonnell Center for Studies of Higher Brain Function in order to increase our understanding of the complexities of the human brain.

The Sounds of Progress

Physicians and audiologists carry out the first clinical trials of the FDA-approved extracochlear implant. The results of this research on profoundly deaf adults will influence the development of electronic hearing devices in the 21st century.

Student Stage

Premeds: Blunting the Scalpel of Cutthroat Competition

Every year, SPIM — the Scholars Program in Medicine — spells relief for 10 high school seniors bent on Once relieved of the pressure to gain admittance to medical school, how do these students spend their undergraduate years?

Newbriefs

The Alumni Report

“Quarterback” Marvin Levin, M.D. ’51, kicks off the fall season Medical Eliot Society fund drive.

Silhouette

Medicine and Movies

Stuart Rosenthal, M.D. ’72, has a career that takes him from analyzing medical images to reviewing major motion picture films. Radiologist Rosenthal, who doubles as a movie critic, began both his film careers during his student days at Washington U.
To the casual visitor, a walk through a rehabilitation clinic specializing in spinal cord injuries can be an unsettling experience. Most of the clients are young men, many barely out of their teens, who've been injured in automobile or motorcycle accidents. To see formerly vigorous young adults left completely or partly paralyzed provokes many thoughts and emotions in an observer. Paramount among them is a sudden realization that even the most simple of acts — dressing, grooming, cooking, or eating — will no longer be possible for many of the clinic clients; most will need assistance just to carry out the simple activities of everyday life.

Strolling among these young men so intent on their therapists' instructions, a visitor is also likely to realize that modern medicine offers no miracles. True, enormous strides have been made in providing electronic devices to assist those who have physical limitations. But in the hearts and minds of those who have been so suddenly disabled — and in the hearts and minds of the families and friends who ache with compassion — is the question that just won't be answered: can I ever be cured? Will I ever walk again?

For some maddeningly obscure reason, injuries to the brain and spinal cord — components of the central nervous system (CNS) — prove permanent. Work by Albert J. Aguayo and his collaborators at McGill University has clearly shown that CNS axons (nerve cells' message-carrying extensions) can regrow, but only under certain unusual circumstances. By contrast, nerves of the peripheral nervous system (PNS) are normally capable of regeneration, often with remarkable recovery of function; nothing extraordinary need be done for this to happen. Efforts are underway here at the medical center to define those circumstances under which CNS neurons can be induced to imitate the PNS's restorative abilities.

A logical beginning point is to compare normal axons with those that are regenerating. Mark Willard, Ph.D., associate professor of anatomy and neurobiology, and his collaborators are trying to bridge the gap in our knowledge of how substances are transported into a nerve cell's nether reaches, which sometimes lie a meter or more from the nerve cell body. Understanding this will enlighten researchers trying to elucidate how nerve cells repair and regenerate themselves.
This micrograph pictures antibody-labelled muscle cells grown in tissue culture. Even muscle cell membrane devoid of cellular content exerts a powerful influence over growing axons: the tip of the axon will “home in” on its preordained spot on the empty cell membrane — the “ghost.” (photo by Josh Sanes)
Willard’s research has shown that not all substances move along the nerve cell axon — the cell process leading away from the cell body — at the same rate. Furthermore, when a cell has been injured, certain ordinarily absent substances called GAPs — growth-associated proteins — appear in the cell. Says Willard, who is also associate professor of biological chemistry: “There are a small number of proteins that are transported in a greatly increased amount only in the regenerating axon, suggesting that they’re involved specifically in axonal growth.

“Pate Skene, a former graduate student in our lab, initially observed these [novel] proteins,” recalls Willard. “Karina Meiri, a postdoc currently in our lab, has obtained preliminary evidence that one of them is associated with growth cones, structures formed at the tip of the growing axon. This supports our original hypothesis that the induction of synthesis and transport of these proteins is a prerequisite for axonal growth.”

**GROWTH CONES AND NGF**

Growth cones, described as “battering rams” by classical neurobiologist Ramon y Cajal, are an active area of investigation. Several students and senior investigators have made strides toward understanding growth cones’ role in nerve regeneration. Until former W.U. student Vincent Argiro filmed growth cone movement in tissue culture, no one realized that different forms of the growth cone — some with finger-like projections, others with a ruffled membrane at the leading edge — move at different rates. “With the tissue culture systems we have,” points out Mary Bartlett Bunge, Ph.D., professor of anatomy and neurobiology, “we can explore many types of variables and their effects on the form of growth cones and their rate of movement, with the goal of finding what conditions are best for regrowth of nerve fibers. Also, we can compare differences in regrowth of axons from both adult neurons and embryos.” Embryonic nerve cells still possess the magic of youth — growth — that adult cells lose. Comparing differences between these cells may point to the reason why adult CNS cells lose the ability to regenerate.

Nerve cells, like most cells, prove to be quite stringent in their growth requirements. Normally, tissue cultures seem to thrive when nature’s own products — like fetal calf serum, for example — are added. But Mary I. Johnson, M.D., associate professor of pediatrics and neurology, who has collaborated with Mary Bunge on growth cone research, recounts a surprising finding: “Traditionally used ‘feed’ or culture medium, which contains serum, actually promotes a slower rate of growth cone extension than a ‘defined’ growth medium — one in which all components are known, but serum is lacking. We’re currently studying how culture conditions, media components or feed level affect the internal structure or conformation of the growth cones and thus
their capacity for growth. We’ve also learned that a low level of the growth medium in the culture dish greatly increases the rate of growth,” continues Mary Johnson, who is also associate professor of anatomy and neurobiology.

Mary Bunge says that there are plans afoot to grow CNS neurons in this defined medium so that they can learn which conditions enhance the regrowth of axons.

But the axonal growth rate is not affected only by what is “fed” them. Nerve growth is affected by more elusive factors as well. Even something as seemingly insignificant as the method of gelling the collagen substratum placed at the bottom of the culture dish can substantially affect their rate of growth. (Patrick M. Wood, Ph.D., research instructor in anatomy and neurobiology, discovered this surprise in the course of his research.) It’s this kind of detail that causes many knowledgeable researchers to become agnostic—lose faith that clinically significant regeneration will become a reality.

But the School of Medicine is full of researchers who are undaunted in their efforts to figure out the whys and wherefores of neural cell regeneration. Work done by Keith Rich, M.D., a neuro-

Montalcini, M.D., and Viktor Hamburg-er, Ph.D., is secreted by smooth muscle cells after they are innervated by sympathetic neurons. The nerve cell axons absorb NGF and carry it back to their cell bodies, thus ensuring the nerve cells’ survival.

Eugene Johnson muses: “I think that there are probably trophic factors other than NGF that exist for many types of regeneration. This research will be performed on cells in tissue culture, as well as in animals.

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the proximity of an injured cell are then
subjected to injury, they respond as if they
had been conditioned, too. This suggests
that a transferable substance, possibly a
trophic factor like NGF, is produced by
the injured cell and leaches into the
medium to affect nearby cells. But pin-
pointing this substance is, as Eugene
Johnson points out, a "monumental
chore. The most important thing about
Keith's work is that a nerve cell can show
an enhanced regenerative response with-
out having been conditioned by an earlier
injury to itself."

**THE RIGHT CONNECTIONS**

As Mary Johnson and Mary Bunge
point out, coaxing nerve cell regrowth is
difficult at best. But orchestrating that
growth so that the nerve cells finally con-
nect with the proper cell, in the proper
region, would seem to be impossible. Yet
in nature, nerve cells "know" where to
make synaptic contact. There are two
types of connections to be made: Neurons
originating in the brain can contact other
erve cells, called interneurons; nerve
cells originating in the spinal cord send
axons to muscle cells.

Josh Sanes, Ph. D., assistant professor
of physiology and biophysics, followed
up on a previously observed, yet mysteri-
ous, phenomenon. Muscle cell membrane
contains a "homing signal" for an incom-
ing axon: When a muscle and nerve fiber
reconnect, the new synapse is at the same
spot where the nerve and muscle were
originally linked. While the basis of this
unusual ability to reconnect is unknown,
one clue comes from Sanes' experiments
in which only the muscle cell's spectre-
like, filmy covering — the basement
membrane — was left in place after in-
jury; the muscle cell's natural tendency
to regrow was stymied. What would an
axon do when it came back to a region of
"ghosts"? "We found that theaxon grew
back and made contact at the original
synaptic site, just as if the intact muscle
cell had been there," reports Sanes.

"There must be something special in the
synaptic part of the basal membrane."
Currently, Sanes is working to discover
the molecular basis of this attraction be-
tween muscle membrane and incoming
axon. He also wants to find out how the
molecular "homing signal" appears. "The
muscle makes these molecules, but the
nerve fiber seems to influence their distri-
bution on the muscle surface, creating a
specific synaptic domain," he concludes.
Physical contact between a nerve cell
and its synaptic "partner" — another
nerve cell, or a muscle cell — is useless
unless the nerve can send across the
synapse's microscopic cleft a chemical
signal that will elicit a response. Research
in the laboratory of Gerald D. Fischbach,
M.D., Edison Professor of Neurobiology
and head of anatomy and neurobiology,
is aimed at pinpointing how this emitter/
receptor relationship develops. Fisch-
bach, who is director of the Center for
Cellular and Molecular Biology estab-
lished recently by a $5 million gift from
the James S. McDonnell Foundation, is
directing investigation of events that
occur within a few hours after a nerve and
muscle make contact. On the surface of
the muscle cell, a cluster of receptors
appears that are specific for the neuro-
transmitter acetylcholine. "We think that
the muscle increases the synthesis of new
acetylcholine receptors and inserts them
[precisely] at the point of nerve-muscle
contact," explains Fischbach. "It didn't
have to be that way — pre-formed recep-
tors might have migrated to, and been
trapped at, the new synapse. A large part
of our effort over the last four years has
been to purify a message from the nerve
which may 'tell' the muscle to increase
its synthesis of receptor. This molecule,
or class of molecules, may be important
not only to the neuromuscular junction,
but also to synapses in the brain."

Fischbach's group has managed to
isolate a small molecule which may be
responsible for these trophic effects. Curr-
ently, they are completing its purification
and eventually will deduce its sequence
of amino acids. Knowledge of its com-
position will enable them to synthesize it
and eventually show where in the nervous
system the molecule is active.

**BRIDGING GAPS**

One person who recognizes the degree
of difficulty in separating a process as
complex as regeneration into discrete
events, and then manipulating these
events to achieve the desired clinical
results, is Richard Bunge, M.D.,
Beaumont-May Institute of Neurology
Scholar in Anatomy and professor of
anatomy and neurobiology. Richard
Bunge and his collaborators have
achieved some success in "helping" CNS
cells repair themselves, but enhancing
regeneration is very difficult. Currently,
Bunge and his colleagues transplant bits
of tissue, inserting them into artificially
created gaps in the spinal cord, to provide
a sort of scaffolding that may entice a re-
generating axon to grow across. "We are
transplanting cells to provide a surface on which new axons can grow. One of the problems with the regrowth of nerve fibers in the CNS is that there is often a tissue gap they cannot traverse. They have no way of crossing a fluid-filled gap. They must grow on a suitable solid terrain.” Bunge believes that if the right conditions are provided, it may be possible to achieve both growth and, most importantly, restoration of function. But providing the right conditions means that first those conditions must be defined.

“Our tissue culture techniques allow us to define the cellular content of an implant so we can know the specific type of cell we have provided to the injured neuron. So far, we have only shown that we are able to implant the cells and that they survive and are maintained in the proper position. But we don’t know yet whether we have actually helped axonal growth to occur.”

However, Richard Bunge, although optimistic, is a realist: “In thinking about what one wants to accomplish in spinal cord injury, one has to define what one considers as the most serious deficiency. People interested in this kind of injury always talk about helping people walk again. But there are more urgent aspects. For instance, those persons with upper spinal cord injuries are in many ways in worse shape than paraplegics. There are many problems: bladder control, bowel control, sexual function, respiration, bedsores and very serious pain. So one has to define what one’s goals are.”

Regardless of the results of today’s research on neural regeneration, if history is any guide, unexpected findings may crop up, and not necessarily just in the field of neural research. Mark Willard points out that perhaps the reason CNS neurons don’t regenerate after injury is that their ability to manufacture GAPs is “turned off.” “An important experiment,” he says, “would be to find a way to turn on the synthesis of GAPs in these cells and then see whether it helps them regenerate. My bet is that indeed it will be a necessary process in order for regeneration to occur, but it won’t be sufficient.” Of course, in order to accomplish this, it’s likely that general principles governing genetic control of the production of many kinds of proteins, including GAPs, would be deduced in the process.

But there are many events that must occur in order for a regenerating axon to grow in the proper direction, eventually making contact with the proper cells, in order for a nerve cell’s function to be regained. And following injury, all these events must occur in individual nerve fibers whose extensions are bundled together in the structure we call a “nerve.”

Says Josh Sanes: “One can imagine that the sort of non-selectivity in PNS regeneration that one sees after injuries to peripheral nerves could be improved eventually if one knew what the particular selective regenerative mechanisms were and how to bring them about.”

Richard Bunge is also heartened by the fact that the brain is not the sole organizer of motor activity, as is often thought. The spinal cord of cats and dogs may have more organizing ability than was once believed. In experiments with these animals, chasms created in the spinal cord sometimes leave them with enough motor function so that they appear to be walking. This implies that there are organizing areas in the spinal cord, called pattern generators. Reflects Richard Bunge: “Driving those pattern generators may not require much input from the brain, but you do need some. Restoring some input from the brain by creating at least a small degree of regeneration in an injured spinal cord might drive more useful motor function than we think. It also might permit some control of visceral function, which would be very useful. Or it might allow the delivery of some sensations that would be helpful for the patient to know when he is hurting, so he can roll over in bed. So we would be glad to take one little step at a time.”
Hope for Epileptics

By Debra Fabian

A computer-aided surgical procedure to successfully treat focal epilepsy in children and adults may help neurological scientists reveal new secrets about the human brain. At Washington University School of Medicine, researchers have developed a method of "mapping" the functional areas of the brain. According to Sidney Goldring, M.D., director of the McDonnell Center for Studies of Higher Brain Function, the procedure uses an array of 48 sensing electrodes that are placed on the patient's brain. These sensors are used to determine the location of the focus of the epilepsy. The sensors also can help scientists learn more precisely the areas governing speech and the senses, as well as the association cortex where many of the brain's basic functions are integrated.

Historically, epilepsy surgery has been a last resort, recommended only after other treatments — medication and diet — were exhausted. The operation traditionally has been done under local, rather than general, anesthesia. The patient had to be awake as the neurosurgeon carefully stimulated the brain, millimeter by millimeter, to test motor and sensory responses. The abnormal area in the brain could not be removed unless the neurosurgeon could be reasonably sure that the operation would not disturb functional areas and cause even more severe neurologic problems — for example, loss of the ability to speak. Under those conditions, it is not surprising that many patients, especially children, were not able to undergo brain surgery as a treatment for epilepsy.

Through research conducted at Washington University School of Medicine, a technique has been developed to conduct focal epilepsy surgery under general anesthesia on children as well as adults. The work is being done under the direction of Goldring, professor and head of neurological surgery. After prolonged laboratory work, Goldring developed the technique and has refined it for more than 15 years, with increasingly successful results.

"The method not only enhances the accuracy of the clinical procedure — epilepsy surgery — but also gives us important information about the brain," Goldring said. "The unique function of the human brain can ultimately be understood only by studying the human brain, but there have to be safe ways of doing it without any risk to the patient. This technique adds no risk, because the same tools that are being used to gather the information needed for treatment are also being used to collect the physiologic data, and the computer system that we have designed is such that it can all be done simultaneously."

The procedure initially was made possible by the LINCS digital computer that was first developed for laboratory investigators in 1962 by a group of MIT engineers who later came to Washington University. (The Laboratory Instrument Computer — LINCS — was designed and built during an era when computers were massive tools of industry and the military. In December, 1983, the LINCS, pioneer of today's age of personal computers, celebrated its 20th anniversary in Washington, D.C.)

A more powerful and far more compact computer is used now. In just moments the computer records brain waves from 16 sites and provides calculations needed to identify the areas of the brain concerned with vital functions. "The surgery of epilepsy can only be done if the epilepsy is focal — in other words, only if it's arising from one particular area of the brain and if that area is safe to remove," Goldring explained.

To decide if surgery is a viable option, Goldring first determines if the seizure is emanating from the left or right hemisphere of the brain. He then proceeds with brain surgery, placing a matrix of 48 sensing electrodes — tiny platinum contacts imbedded in a gossamer-thin sheet of plastic called silastic — on the dura, the layer of fibrous tissue that envelops the brain. The surgeon replaces the bone and the scalp, completes the closure and then begins recording brain wave activity, usually on the same day.

For the next 24 to 72 hours the patient is monitored in an observation room, where the atmosphere is relaxed and stress-free. Children, for example, often play with toys or watch television as they are observed.

The entire monitoring period is videotaped. The split screen of a television monitor simultaneously displays the patient's behavior and the electrocorticogram (ECG) as brain waves are recorded by the 48 sensors. The videotapes are in-

Surgery to correct focal epilepsy has been performed on both adults and children. Of the patients who underwent surgery performed by Sidney Goldring, M.D., more than 60 percent were improved when evaluated one year post-surgery.
valuable because they can be replayed after a seizure occurs. By reviewing the tapes, Goldring can determine exactly which area of the brain shows abnormal activity immediately before an epileptic convulsion.

"The most reliable evidence, in my opinion, for identifying a seizure focus, is to be able to see what area of the brain acts abnormally in the moment preceding the seizure. And with the help of the computer we can be much more confident that we have located not only the source of the seizures, but also the functioning healthy areas of the brain," said Goldring.

The electrode array also allows Goldring to examine language function in the patient. By sending an electrical stimulus through the sensors to the brain, he is able to map the boundaries of the speech area. When the stimulus momentarily interferes with the patient’s speech, he knows that he has identified the area that is critical for language.

Once the observation period is over, the patient returns to the operating room. If Goldring has not been able to identify a focus for the epilepsy, he simply removes the sensing electrodes. When he locates a focus for the epilepsy, however, he removes the abnormal brain area, if the procedure will not deprive the patient of such vital skills as speech or motor ability.

Washington University is one of the few recognized centers for conducting surgery for focal epilepsy, Goldring commented. Of the nation’s epileptics, about 360,000 have focal epilepsy which cannot be controlled with medication. "This group of epilepsy patients makes up a small percentage of the total population. Nevertheless, it is a substantial number of people for whom there currently is no medical treatment," he noted. "Surgery does offer some help."

His results in 100 patients, 44 of whom were children between the ages of 5 months and 14 years, are impressive. In these patients, the seizures had not been controlled by all available medicine; in fact, patients often had toxic reactions to conventional anticonvulsant medications. Among the children, seizures occurred

Nearly 360,000 of the nation’s epileptics have focal epilepsy that is unresponsive to medication. Here, surgeon Goldring is shown placing the electrodes (detail, upper left) that will enable the location of aberrant electrical activity in the brain to be pinpointed if the patient suffers a seizure during the monitoring period.
anywhere from several times a week to 50 times a day. Almost 75 percent of the patients evaluated with the electrode arrays had surgery to remove the focus of the epilepsy. Among those whom Goldring has followed for more than one year, more than 60 percent had a good result. For Goldring, a "good result" means stopping or reducing the seizures so that the patient can be employed or educated, or so that institutionalization isn't necessary.

Goldring's work is supported through the McDonnell Center for Studies of Higher Brain Function, which was established at Washington University in 1980 with a $5.5 million gift from the McDonnell Foundation. The foundation recently announced an increase of its support of the center's brain research through another gift of $5 million. James S. McDonnell, the late chairman of the foundation's board, was fascinated by the relationship between the mind and the brain, and helped to create the McDonnell Center so that scientists could gain greater knowledge about how the brain works.

At Washington University, 67 laboratories in 14 departments are devoted to research on the nervous system. The McDonnell Center's mission is to provide the resources and environment for an interdisciplinary approach to understanding the brain's function. An example of this interdisciplinary effort is current collaborative studies being carried out by McDonnell scientists under the direction of Goldring and Marcus Raichle, M.D., professor of radiology and neurology.

Their objective is to develop other techniques that can more efficiently give information about the functional areas of the brain; in other words, not just techniques that show where the area for movement is, or the area for sensation, because those specific areas make up a very small part of the brain.

"The vast expanse of the human brain is made up of so-called association areas — areas in which the information from vision and hearing and touch and memory are all integrated to produce the human qualities of behavior," said Goldring. "We know very little about those vast areas of the brain."

Through positron emission tomography (PET), a non-invasive method for studying the metabolism of the brain, Raichle and his team are carrying out studies to determine where oxygen is being used in the brain during specific functions. Concurrently, Goldring and other McDonnell scientists are studying the configuration of electrical responses to stimuli in minute areas of the cerebral cortex.

minute areas of the cerebral cortex. "It's already been shown that the electrical pattern for an area that has to do with a specific function like movement or vision is clearly different from the electrical configuration of the response that comes from the association area," Goldring said. "So it is possible that by this technique, we might be able to gain new information about all these association areas — information which, correlated with the metabolic results obtained by Raichle and his team, should provide important new insights about the function of the human brain."
THE SOUNDS OF PROGRESS

BY SUZANNE HAGAN

When Virginia Turner's hearing began to disappear in the late 1950s, a legacy of her losing battle with Meniere's disease, she missed the familiar, everyday sounds the most — her kitten's soft meow, her dog's guttural bark. As time went on, the magnitude of her hearing loss increased. She became unable to enjoy the lovely strains of music from her radio, something which had always brought her great pleasure. Finally, nearly two decades ago, the ultimate loss occurred — the voices of her husband and daughter completely faded away. Diagnosed as totally deaf in both ears, Mrs. Turner nevertheless continued to wear a body-type hearing aid on the advice of physicians who felt that the continued stimulation would keep any remaining cells alive, and she never gave up hope that someday she'd hear again.

Within the past few years, articles began to appear about the work at the House Ear Institute in Los Angeles to develop hearing system implants. When Mrs. Turner read them, the 54-year-old, longtime resident of Rock Island, Illinois, sensed that someday her turn would come. "My doctor had very little information about these implantable hearing devices," she says, "but he kept me posted. In the meantime, I read everything about the implants that I could get my hands on, and that was so good for me. It really kept my spirits up."

In 1982, she was referred to the University of Iowa Hospital. That June, she underwent a three-hour procedure in which the receiver for an intracochlear hearing system was implanted in the skin, just behind her ear. Three weeks later, the system's external components — transmitter, signal processor and headband microphone — were connected. "It was a marvelous day," Mrs. Turner recalls. "Right away, I knew it worked because I could hear the audiologist counting aloud to see if I was getting anything through it."

The device implanted in Mrs. Turner's ear, and the extracochlear implant recently approved by the FDA for U.S. clinical trials, work in similar fashion. Washington University Medical Center is one of the centers chosen by 3M, manufacturer of the extracochlear implant, to evaluate the device's safety and effectiveness. At the medical center, a team led by John M. Fredrickson, M.D., will screen a population of severely or profoundly deaf adults, selecting at least five to receive the extracochlear implant developed by the Viennese husband-wife team of Erwin Hochmair and Ingeborg Hochmair-Desoyer. The Hochmair hearing aid was further refined by 3M, which is now sponsoring its clinical investigation.

A New Development Comes of Age

There are many types of surgically implanted hearing systems. All involve some type of electrical stimulation of the cochlea — the pea-sized, snail-shaped organ buried deep inside the inner ear. The cochlea is lined with microscopically fine structures called hair cells. When stimulated by sound waves carried into the inner ear, these cells create nerve impulses. The miracle of hearing occurs as these nerve impulses are transmitted to the brain.

In an intracochlear device such as Mrs. Turner's, the receiver's electrode is implanted inside the cochlea. The electrode directly stimulates the nerve fiber endings in the hair cell region, creating an impulse that the auditory nerve carries to the brain. But Washington University's Fredrickson has opted for the extracochlear implant, placed on the surface of the cochlea. He judges it less likely to produce further inner ear damage during its implantation. The receiver's electrode is implanted on the surface of the cochlea's round window; the cochlea itself remains intact. In Fredrickson's judgment, this difference makes the extracochlear implant the most acceptable of all the available devices.

"There are some potential advantages to an intracochlear electrode," Fredrickson concedes. "Eventually, we may even go that route. But right now, we are nowhere near the eventual state-of-the-art achievable with electronics and signal processing. And since there is some inevitable additional inner ear damage that will occur with the implantation of an intracochlear device, I just don't think that today, it's the way to go."

The extracochlear hearing system Fredrickson works with has many similarities to Mrs. Turner's device. The extracochlear implant is a single-channel device, and Mrs. Turner's system cur-
The microphone of the extracochlear implant is fitted in the ear canal much as an ordinary hearing aid. The microphone amplifies sounds which are sent to the device's receiver, pictured here on the skin surface behind the ear. Underneath the skin, the receiver picks up these signals, sending them to the cochlea. (Photo courtesy of 3M)

Fredrickson, chief otolaryngologist at Barnes and Children's hospitals at the Washington University Medical Center, believes that children are not suitable candidates for implants at this stage of research and development. He is concerned that the surgery may destroy some of their remaining, healthy hair cells in the cochlea: "There is much research and evaluation to be done before I believe children will be suitable candidates," he concludes.

**A Select Group**

Besides being a pioneer recipient of the 3M Vienna intracochlear implant system, Virginia Turner typifies patients who will be selected for the clinical trial: She lost her hearing after she began to speak, and she is completely deaf — unaided hearing in both ears tests at the bottom of the scale. Candidates like Mrs. Turner should also be proficient at lipreading, since that skill (along with the implant) provides better understanding of speech. Fredrickson, Lindburg professor and head of otolaryngology at the School of Medicine, says: "Deaf persons will be able to hear and monitor the pitch of their own voices, and that of others, permitting a much higher level of communication than was ever possible before. In addition," he continues, "these systems will allow..."
Once the implant is in place, a post-surgical period of therapy will enable the recipient to achieve maximum benefit from the device.

Most importantly, the patients selected for screening must be among those who are not helped by conventional hearing aids. Audiologist Margaret W. Skinner, Ph.D., assistant professor of otolaryngology at Washington University School of Medicine, explains: "For the high sound levels needed by people with severe-to-profound hearing losses, the earmolds of a conventional aid must fit snugly into the ear canal. Even when they do, some sound often escapes. We are all familiar with the squeal that occurs when amplified sound reaches a microphone and causes feedback. To prevent this, the gain of the hearing aid must be set lower. For someone with a profound hearing loss, this lowered gain may not be sufficient to make important sound audible; for this reason, the aid is of no benefit."

"For others," continues Skinner, "the gain on the hearing aid can be set high enough to make these sounds audible and comfortably loud, but the amplified signal is very distorted and, therefore, irritating and tiring to listen to. For all these reasons," concludes Skinner, "conventional aids may not provide sufficient benefit for over a quarter of a million Americans with severe-to-profound hearing losses who want to wear an aid."

The clinical research conducted at Washington University Medical Center will be unique in one respect. "In addition to meeting the study's requirements specified by 3M," says Skinner, "we will go a step further. We will use the same hearing tests with similar patients who wear conventional hearing aids and who participate in the same intensive aural rehabilitation as those with the extracochlear implants. In collaboration with other researchers at our medical center, we will compare the results from a third group of patients wearing a vibrotactile aid. (A vibrotactile aid is a sound-sensitive device which produces sensations of touch on the wearer's skin.) In this way, we'll get a truer picture of the success of the implantable device."

New Hope for the Profoundly Deaf

Meniere's disease, a contributory cause of Mrs. Turner's hearing loss, is characterized by fluctuating hearing, tinnitus, and episodes of vertigo associated with sensations of ear pressure (caused by an increase in volume of endolymph circulating in the inner ear); it is but one of
many conditions that can detrimentally affect hearing. Ototoxic antibiotics, and meningitis and other infections, are among the causes of acquired hearing loss. Many types of congenital afflictions, such as malformed sensorineural components in the inner ear, also reduce hearing. However, most of the deaf patients who will be selected for the clinical trials of the extracochlear device, will have acquired their hearing loss postlingually — after they had heard the human voice and acquired the ability to speak.

Patients selected for the study will find lipreading to be easier, as Mrs. Turner’s experience attests: “At times, such as in a one-on-one conversation, it’s almost like normal hearing,” she reports. “Naturally, if the person I’m talking to turns his head, I can’t catch everything they’re saying. But if I telephone my husband or my parents, I can talk to them.” She can hear the difference between one-, two-, and three-syllable words. Thus, if Mrs. Turner telephones a normal-hearing person who is aware of the code — “no” (one syllable), “yes-yes” (two syllables) — she can carry on a conversation.

Although Mrs. Turner had been a hearing person for several years before the onset of Meniere’s disease in her late 20s, sounds she hears now are different from what she remembers. “When I was first able to hear a lawnmower, I didn’t know what it was,” she reflects. “I just knew it was a new sound. Everything sounds different with the implant than with normal hearing. But some sounds are almost like what I remember before going deaf.”

At the Washington University Medical Center, audiologists supervised by Skinner will work with patients selected for the trial. Eligible patients must be over 18 years of age, in general good health and of normal intelligence. They must have a severe-to-profound sensorineural hearing loss. Further, these patients must be among the group not helped by any conventional type hearing aid. But they must have some auditory nerve reserve to carry impulses from the inner ear to the brain.

There will be an intensive training period the first few months after the implant is in place. Initially, Skinner will supervise audiologists at the medical center who will conduct this training, but further work is required; typically, a friend or relative will also work with the implant recipient. Patients like Virginia Turner who are highly motivated to learn will eventually be able to communicate better with families, friends and co-workers. In other words, the potential payoff for determined recipients is significant improvement in all aspects of their everyday lives.

Besides periodically testing patients’ hearing after they receive the implant, Skinner will help them sharpen their hearing by selecting the best combination of signal processing and volume. “It will basically be a process of trial and error,” she says, “to know what the right combination for each wearer will be.”

Patients selected for the trial must have reasonable expectations of what the device can do for them. Like Virginia Turner, they will have to contend with the frustrating, zigzag progression their hearing will take: “The implant has helped me so much,” says Turner. “But at times I can’t hear something that I had heard the day before, like my dog barking or the sound of raindrops. That has to do more with understanding, and practice in remembering what I hear.” But the frustrations are well worth it, according to Mrs. Turner: “When you go from hearing nothing, to hearing something, it seems like a lot.”

The Gift of Hearing

For Mrs. Turner, her everyday life is more normal, thanks to the implant. “I can use my kitchen timer now, which makes cooking a lot easier. And if I’m in the kitchen, I can now hear a knock at the front door. I can even hear a car when it pulls into the driveway,” she continues. “If I’m out walking, I now feel as though I’m part of the scene.”

One of her greatest satisfactions has been her ability to hear the voice of Roy, her husband of 36 years; and it was a red-letter day when she first heard the voice of her adult daughter, Sharon. “She was just a little girl when I began to lose my hearing.” recounds Mrs. Turner. “Hearing her adult voice for the first time was a great joy.”

Virginia Turner is confident and optimistic: “When you can hear, you are a part of things.”

This diagram indicates the placement of the implant’s internal and external components. The long-term effects of direct electrical stimulation of the cochlea cannot be predicted. However, researchers at the medical center have selected an extracochlear implant for research, rather than an intracochlear device, because the latter requires surgical invasion of the cochlea. (art work by Surgical Illustration)
STUDENT STAGE

Premeds: SPIM

Blunting the Scalpel of Cutthroat Competition

BY DEBRA FABIAN

Walt Schalick is not one to sacrifice. A Renaissance man in the making, he wants it all — to study Old English, to further develop his already expert fencing skills, to polish his talents as a magician, to major in both physics and English, and — most of all — to be a physician.

Schalick, now a university junior, would have had difficulty pursuing both his personal interests and a medical career. An intense emphasis on the sciences, nearly perfect grades, and a restricted social life constitute the formula traditionally used by even the brightest undergraduates to gain admission to medical school.

SPIM, which stands for Scholars Program in Medicine, has changed all that for Schalick and for dozens of other specially selected premedical students at Washington University in St. Louis.

Each year, Washington University admits 10 outstanding high school seniors to SPIM, which guarantees them a place in the university's School of Medicine before they even begin college. That guarantee is offered at several other top institutions, but the accompanying education is usually at an accelerated pace.

That's not the case with SPIM, say Morton Smith, M.D., and Aaron Shatzman, Ph.D., who direct the program.

The signature of the Washington University program is its philosophy: students will be happier — and will get the best possible undergraduate and medical education — with a full eight-year program. Smith, an ophthalmologist and an assistant dean at the School of Medicine, and Shatzman, an assistant dean of arts and sciences and freshman advisor to SPIM students, are partners in advancing a shared belief — that self-discovery is the single most important aspect of an undergraduate education.

Better Persons, Better Doctors

“Our approach is to offer these students a truly broad education as a foundation for the scientific and technical training they will receive in medical school,” Smith explains. “Through SPIM, we hope to do more than just turn out good doctors; our ambition is to create an excellent medical education with an undergraduate experience that fosters a humanitarian outlook on life.” Shatzman adds: “We want interesting, wonderful students. We're looking for people who are bright, but who are also well rounded. We want them to do well academically, and we want them to do exciting and unusual things with their lives. It's possible to be a successful premed, to get into a great school of medicine, and still be good to your soul and spirit in the process.”

Unfortunately, Smith says, the “cutthroat” nature of premedical programs in the United States forces many future physicians to concentrate solely on grades. SPIM removes the pressures and anxieties associated with applying for admission to medical school. And the competition is intense. In 1981-82, there were 36,727 applicants for 16,634 first-year places in American medical schools; last year at
Aaron Shatzman, assistant dean of arts and sciences and freshman advisor to SPIM students, calls the program (now entering its eighth year) "a genuine success. We want applicants to choose the university first, the program second."

the School of Medicine, there were 5,467 applicants for 120 available positions.

"Our point with SPIM is to offer students the freedom to slow down so they can find themselves, to learn what they like and dislike, to go out and smell the flowers," says Smith. "This is the time for them to learn, to take risks and — within limits — make mistakes."

Shatzman, talking to a group of prospective SPIMers, says, "We don't want to turn you into acceptably trained physicians in the shortest possible time. We could, but we don't want to. We want you to see what's interesting and to have the freedom to identify your abilities and your inclinations — what you're good at and what you enjoy."

SPIM students have the time and freedom to pursue whatever subjects they like and to take humanities courses, not just science courses. They can go to Europe if they want — 50 percent of the SPIMers have gone abroad for their junior year.

"How many traditional premeds can afford the time, given the intense competition to enter medical school?" asks Smith.

The scholars' program, entering its eighth year, has been "a genuine success," Shatzman says. Each year, some 500 outstanding high school seniors from across the country apply for the 10 available positions in SPIM. Forty finalists are brought to the campus for two-day visits in the spring so that faculty can meet and evaluate the students, and so that the stu-
udents, in turn, can evaluate the university. "It's expensive and time consuming," Shatzman says, "but we force them to look at us, so that if they choose Washington University, it's for the right reasons. We want them to select the university first, and the program second.

When it's February and a student just got his first C, and he catches the flu and is three weeks behind, I want that student saying, 'I'm miserable but I love Wash. U.' not 'I'm miserable and I never wanted to come here.'"

The School of Medicine's admissions committee names the 10 scholars and several alternates in early April. Students named to the program are notified by mail, and have a week to accept or decline the position. The SPIM classes average half women, half men. "These students have proven in high school that they are the most outstanding in the United States academically," Smith explains. "The young people we consider all have GPAs of close to 4.0, SATs through the ceiling, tremendous extracurricular activities, and other subtle things that indicate a mature 18-year-old."

In the beginning, Smith says, some medical school faculty questioned the wisdom of the program, believing it is impossible to judge whether an 18-year-old fits the criteria for entrance to medical school. Yet all SPIM undergraduates have gone on to medical school, most at Washington University. "The question has a certain amount of validity," he comments, "but I'm willing to go along with a system that takes a few outstanding high school students who obviously are more mature than their colleagues. I have confidence that they'll eventually fit the criteria I want, and I'm willing to try it as an experiment."

Accepting the program gets easier each year because the SPIM students continue to prove themselves, Smith adds. The scholars' only obligation is to maintain a B average. To preserve the program's commitment to an unhurried education, however, the automatic guarantee to medical school does not extend to students who receive bachelor's degrees in less than four years.

To give a "shopping list" of accomplishments considered attractive in candidates for SPIM would be a disservice, Shatzman asserts, because there are no specific factors used as guidelines in the selection process.

Last May the program produced its first graduates, three charter members of SPIM who completed their undergraduate studies a year early through advanced placement courses. They are Andrew Saltzman of Flushing, N.Y., who has begun a residency in obstetrics and gynecology at Case Western Reserve University Affiliated Hospitals in Cleveland, Ohio; Paul Tartell of Elmhurst, N.Y., who holds a surgery residency at Montefiore Hospital Center in New York City; and David Lubarsky of Scarsdale, N.Y., serving an internal medicine residency at West County Medical Center in Valhalla, N.Y.

Lubarsky, a 24-year-old who set aside time for concert piano and jazz dance while in medical school, says his goal "is to find a nice even balance between career and personal growth, which I don't think stops when you leave college. That's part of what SPIM has to say." One of the program's greatest values is that it helps eliminate the fierce competition common among premeds, he says. "I never even thought in those terms. You're never tempted to think that another person is going to steal your spot. As long as you do well, you are secured a place at a superb medical institution."

For Traditional Premeds, No Time For Risks

Beyond the reduced pressure, advisor Shatzman says, SPIM offers the premed great choices in curriculum. "The curriculum for a traditional premed is much the same everywhere in the United States — two semesters of biology, four semesters of chemistry with lab, two semesters of physics, math and calculus," Shatzman
points out. "Grades are crucial, and the course sequence is largely predetermined. Most students, under the stress of that system, don't take risks."

At Washington University, both regular premeds and SPIM students follow the traditional curriculum. Regular premeds tend to major in one of the sciences, but SPIM students have some flexibility in the sequence of their coursework. And with guaranteed admission to medical school, they have the rare freedom to explore virtually any interest areas and to major in any subject.

Kevin Herbert, chairman of the Classics Department at Washington University, has taught three SPIM students. "The program is brilliant," he comments. "I doubt there's another in the country that offers premeds a more desirable situation. It changes their whole view of undergraduate education. Very capable young people can be more than grade grubbers."

Shatzman and Smith both point to Walt Schalick as a fine illustration of SPIM students. Schalick coaches the university's fencing club, and plans to continue his studies in Old English. This year, the future pediatrician plans to begin entertaining young hospital patients with a local chapter of David Copperfield's organization, Project Magic. "Magic would be perfect with medicine, especially for children," says Schalick, "because it gives them something to think about."

Besides allowing him to pursue outside interests, Schalick says, SPIM has taught him to loosen up and laugh more. "Most of the people in the program will tell you that it's nice to have the burden lifted, but that they still push themselves a lot. I do that too, but also let the pressure off, when I want to." His mother, Judy Schalick, remembers "some momentary hesitation" about his decision to join SPIM and attend Washington University. "It's always difficult to know if a young person is making the right decision," she observes. "Now I'm sure he did. Walt has grown enormously. He's found such fine and fast friends. He might not have, had he let himself become a book grind."
Chihiro Morishima has worked in an immunology laboratory at the School of Medicine since her freshman year. She received the bachelor's degree in biology from W.U. in May: “Because of SPIM, my life became normal. I still took time to read the newspaper and do things that other students don’t do.”

One of his good friends is Chihiro Morishima, who received the bachelor’s degree in biology from Washington University in May. She, too, learned through SPIM to relax about her classes and to set priorities for her time. “My conclusion after four years of college is that it’s not a matter of just being smart; it’s a matter of working hard. You have to set priorities and decide what is most important. Is it really to spend all your time studying? Because of SPIM my life became normal, in that I still took time to read the newspaper, and do things that students, who are really channeled to do well, don’t do. It’s nothing really exceptional. It’s just being normal.”

Morishima considers the year she spent studying at Washadu University in Tokyo one of the most valuable experiences of SPIM. However, she also values the work she has done since her freshman year in an immunology laboratory at the medical school. That research experience has been so positive that she is inclined to make immunology her career, although she’ll wait to decide until she’s received training in clinical medicine.

Are SPI Mers Better Physicians?

Assistant medical school dean Smith says some people wonder how SPIM students’ academic performance compares to that of regular medical students. “They have the same broad ranges as the rest of their class—top to bottom,” he says. And will their broad education make them better physicians? Not necessarily, Smith admits. “If you asked 50 different outstanding physicians what makes a good physician, they probably would give you 50 different answers. A good physician, I think, must be a good person, so in that respect, nothing definable distinguishes a good physician from a good lawyer or a good architect. Taking humanities may not make you a humane person, but I think it makes you a more broadly educated person, which in turn may add to being a more humane person. We have every confidence that these young people will be good physicians.”
The Division of Biology and Biomedical Sciences at the School of Medicine will receive $360,000 as part of an academic fellowship program sponsored by the Lucille P. Markey Charitable Trust.

Announcement of the five-year grant was made by Louis Glaser, Ph. D., chief of the division and professor and head of the Department of Biological Chemistry.

The School of Medicine is one of 15 institutions to receive a grant from the Markey Trust. The trust is awarding a total of $5.4 million as part of its program to support predoctoral fellowships in basic medical research. The funding will be used to defray stipends, tuition, research and travel of outstanding predoctoral candidates in the Department of Biological Chemistry.

The Lucille P. Markey Charitable Trust was established in November 1983 under provisions of the will of the late Lucille P. Markey, who died in 1982. She directed that assets of the trust, headquartered in Miami, be used exclusively for support of basic medical research.

**CHEMICAL GUIDE PROVIDES LIST OF EXPERTS**

Three researchers have compiled a public service directory that lists St. Louis area experts who can answer questions about chemicals. "Answers to Chemical Questions: The St. Louis Guide," has been produced by Frederick Sweet, Ph. D., professor of obstetrics and gynecology at the School of Medicine; David L. Garin, Ph. D., associate professor of chemistry at the University of Missouri-St. Louis; and Ernest Mayer, research chemist at Monsanto Chemical Co. The service is the first of its kind in the United States, and is sponsored by the St. Louis section of the American Chemical Society.

The guide is available to government officials, reporters, disaster and emergency response personnel, academic chemists and libraries. It lists the names and telephone numbers of more than 100 St. Louis experts who can answer questions about health, agriculture, environmental safety, industrial and consumer chemicals, as well as miscellaneous topics such as crime scene investigations, planetary astronomy and biology.

The guide also lists the names and telephone numbers of three information brokers who maintain extensive files and can assist in locating experts to answer complicated questions.

Further information about the guide is available through Sweet at (314) 362-3174 or Garin at (314) 553-5349.

**BROWN IS SELECTED McCORMICK SCHOLAR**

A faculty member of the Department of Ophthalmology at the School of Medicine has been named a Robert E. McCormick Scholar by Research to Prevent Blindness (RPB, Inc.).

Joel E. Brown, Ph. D., Bernard Becker Research Professor in Ophthalmology, received an unrestricted grant of $20,000 to support his research, which centers on the mechanisms by which photoreceptors react to light.

The award was announced by Bernard Becker, M. D., professor and head of the Department of Ophthalmology at the School of Medicine. Becker is on staff at Barnes, Children's and Jewish hospitals.

RPB, a voluntary organization committed to the financial support of eye research, provides funding to 56 American institutions. Since 1960, the organization has awarded $178,000 to Washington University School of Medicine.

Brown is the second Washington University faculty member to be named a McCormick Scholar. Robert F. Miller, M. D., associate professor of ophthalmology, physiology and biophysics, received the award in 1982.

Brown joined the Washington University faculty in late 1983 as the first Bernard Becker Research Professor. He has served on the faculties at State University of New York at Stony Brook, Vanderbilt University and Massachusetts Institute of Technology (MIT).

For the past several summers, he has pursued his research at the prestigious Marine Biological Laboratory in Woods Hole, Mass. Brown holds a doctorate in physiology, and master's and bachelor's degrees in electrical engineering from MIT.

**STORZ FELLOWS IN OPHTHALMOLOGY APPOINTED**

The Department of Ophthalmology has named the first recipients of the Storz Fellowships in Ophthalmology.

The Storz Fellows are Bruce H. Cohen, M. D., and Kenneth Michael Karlin, M. D. The appointments were announced by Bernard Becker, M. D., professor and head of the Department of Ophthalmology at the School of Medicine, and a staff physician at Barnes, Children's and Jewish hospitals.

The fellowships, established through an $880,000 endowment to the School of Medicine and Barnes Hospital from the late Charles R. Storz, Jr., will be used to fund students seeking advanced training in ophthalmology.
Storz, the former head of Storz Instrument Co., died in 1979.

Cohen has been named the Charles R. Storz, Sr., Glaucoma/Retinal Fellow in Ophthalmology. He received the doctor of medicine degree in 1980 from Johns Hopkins Medical School and interned at St. Johns Mercy Medical Center in St. Louis. He recently completed a residency in ophthalmology at the Washington University Medical Center. As a Storz Fellow, Cohen will receive training on the glaucoma service as well as in retinal surgery. His career interest is diseases and surgery of the retina and vitreous.

Karlin has been named the Kathryn G. Storz Glaucoma Fellow in Ophthalmology. He received the doctor of medicine degree in 1980 from Louisiana State University School of Medicine and interned at the Ochsner Foundation Hospital and Clinic in New Orleans, where he recently completed a residency in ophthalmology. As a Storz Fellow, Karlin hopes to combine clinical and surgical patient care with clinical research using pharmaceutical agents, laser and surgical techniques.

Karlin has been named the Kathryn G. Storz Glaucoma Fellow in Ophthalmology. He received the doctor of medicine degree in 1980 from Louisiana State University School of Medicine and interned at the Ochsner Foundation Hospital and Clinic in New Orleans, where he recently completed a residency in ophthalmology. As a Storz Fellow, Karlin hopes to combine clinical and surgical patient care with clinical research using pharmaceutical agents, laser and surgical techniques.

BRICKER NAMED ASA PRESIDENT

Eugene M. Bricker, M.D., professor emeritus of clinical surgery at the School of Medicine, has been elected president of the American Surgical Association.

The American Surgical Association is the oldest, and one of the most prestigious, of this country's organizations for American surgeons.

"It is quite an honor that Dr. Bricker has been named president of the American Surgical Association," said Samuel B. Wells, M.D., Bixby Professor and chairman of the Department of Surgery. "He is only the second faculty member in the history of Washington University School of Medicine to hold that office." The late Evarts Graham, M.D., chairman of the surgery department at the medical school and surgeon-in-chief at Barnes Hospital from 1919–51, presided over the association in 1937.

Bricker has been on the faculty at Washington University since 1938, when he was named an instructor in surgery. He became an associate professor of clinical surgery in 1947 and a professor of clinical surgery in 1966, and received emeritus status in 1975. He is on staff at Barnes and Children's hospitals.

FURTHERMORE

Willard B. Walker, M.D., has been elected a member of the Executive Faculty of the School of Medicine.

Walker was elected by the school's part-time faculty to serve on the council, which is the school's governing body. He succeeds Richard V. Bradley, M.D., and will represent the part-time faculty for the 1984-85 term.

Walker joined the School of Medicine as an instructor in surgery in 1953, and was named associate professor of clinical surgery in 1972. A 1946 graduate of Washington University School of Medicine, he completed an internship and residency in general surgery at Barnes Hospital.

For 25 years, Walker served as a surgical consultant and supervisor of surgery at Homer G. Phillips Hospital. He is now on staff at Barnes and Children's hospitals.

Walker is vice president of Gateway Vascular Society, and a member of the American College of Surgeons, American Medical Association, Missouri State Medical Society, St. Louis Metropolitan Medical Society and the Southern Medical Society.

Michael J. Welch, Ph.D., professor of radiology (radiation chemistry) at Mallin- knoot Institute of Radiology, has been installed as president of the Society of Nuclear Medicine.

Trained as a chemist, Welch began working with radioisotopes during his undergraduate and graduate student career. He was one of the first to utilize a hospital-based cyclotron to produce short-lived radiopharmaceuticals.

His group has developed radiopharmaceuticals for the measurement of regional cerebral blood flow, metabolism and receptor concentrations. They have also formulated compounds useful for clinical nuclear medicine, including iodinated fibrinogen and labeled platelets that are used to visualize blood clots in veins and arteries.

Formerly, Welch held other local and national positions within the Society. In 1980, he was awarded the Paul C. Aebersold Award, the highest recognition for science bestowed by the Society.

Welch received the bachelor's and master's degrees from Cambridge University in England. He earned his Ph.D. from the University of London and completed a post-doctoral fellowship at Brookhaven National Laboratory.
San Francisco), Aldo A. Rossini, M.D. (University of Massachusetts Medical School), Donald F. Steiner, M.D. (University of Chicago Pritzker School of Medicine), and Lacy.

Grodsky described current studies on insulin storage and secretion. The animal model for Type I diabetes was the subject of Rossini's talk. Steiner summarized the genetic and molecular aspects of insulin production, and Lacy spoke on the transplantation of pancreatic islets. David M. Kipnis, M.D. delivered the opening and closing remarks.

The 29th George H. Bishop Lecture in Experimental Neurology was the highlight of the Spring Neuroscience Symposium. John R. Pappenheimer, Ph.D., (Harvard University) was the Bishop lecturer. Pappenheimer described hypoxic insomnia.

Sidney Goldring, M.D., professor and head of neurological surgery, presented the James L. O'Leary Prize for Research in Neuroscience to Pamela Manning, Ph.D., of the Department of Pharmacology, and Jeffrey J. Neil, M.D., Ph.D., of the Department of Anatomy and Neurobiology.

Michael W. Vannier, M.D., assistant professor of radiology at the School of Medicine, has received the 1984 Lindbergh Award. Presented annually by the American Institute of Aeronautics and Astronautics (AIAA), the award recognizes distinguished application of aerospace technology toward improving the quality of human life.

Vannier, a former consulting engineer for NASA, was cited for his leadership in aerospace computer-aided design technology as applied to surgical reconstruction of craniofacial deformities. His role in the cooperative program between Mallinckrodt Institute of Radiology and McDonnell Douglas has led to the creation of the first accurate 3-D computer visualization of the human skull. Using the computer software Vannier developed, surgeons can now use computer "blueprints" to correct complex craniofacial abnormalities.

Joyce Brockhaus, R.N., Ph.D., is the first nurse ever named to the faculty of the School of Medicine. Brockhaus, a specialist in adoption and child psychiatry, has been named instructor in the William Greenhill Eliot Division of Child Psychiatry in the Department of Psychiatry. The appointment was announced by Felton J. Earls, M.D., Blanche F. Itleson Professor of Child Psychiatry and director of the division.

Since 1983, Brockhaus has served on the clinical faculty of the child psychiatry division and as a clinical specialist in child psychiatry at Children's Hospital.

Certified as an adoption specialist by the North American Center on Adoption, Brockhaus serves as an expert witness in child custody cases for the Illinois Division of Child and Family Services. She helps St. Louis families prepare for adoption through Family and Children's Services of Kansas City and has worked with the community placement program at St. Louis State Hospital—Juvenile Treatment Center.

Brockhaus has also been on staff at St. Louis State Hospital—Juvenile Treatment Center, the University of Missouri—Columbia and St. Louis University. She received the B.S. N. with Eliot Honors from W.U. in 1968, the M.S. in nursing from the University of Missouri—Columbia in 1971, and the Ph.D. in education from St. Louis University in 1976.

Brockhaus was awarded a postdoctoral certificate in family and marital therapy from W.U. in 1981. In addition, she has presented professional programs and written several book chapters, monographs and articles on psychiatric nursing, foster care and adoption.

Brockhaus holds clinical membership in the American Association of Marital and Family Therapy and received an award for outstanding service to children from the Missouri Division of Family Services. She belongs to many professional organizations, including the American Association of Marital and Family Therapy, Child Welfare Advisory Committee for Missouri, Mental Health Association, Missouri Child Care Association, Missouri Foster Care Association, Open Door Society of Missouri and the St. Louis Community Adoption Council.

Three faculty members at the School of Medicine have been cited for their teaching skills. They are: William A. Peck, M.D., John E. and Adeline Simon Professor and associate chairman of the Department of Medicine; Joseph L. Price, M.D., associate professor of anatomy and neurobiology; and Octavio de Marchena, M.D., assistant clinical professor of neurology and neurological surgery.

Children's Hospital was officially dedicated in outdoor ceremonies held on June 8. The gathering was called to order by Linn B. Perkins, President and CEO of Children's Hospital. Among the speakers were C. Alvin Tolin, president emeritus of the hospital; Samuel B. Guze, M.D., president of the medical center; William H. Danforth, M.D., chancellor; and Alan Robson, M.D., president of the hospital's medical staff.

Donald O. Schnuck, chairman of the board of trustees, gave a brief address entitled "The Premier Provider."

Adolph I. Cohen, Ph.D., professor of anatomy and neurobiology in ophthalmology, has received the prestigious Proctor Award for 1984 from the Association for Research in Vision and Ophthalmology. Cohen, who specializes in photoreceptor structure and biochemistry research, is the second W.U. faculty member to be so
B. Saul Boyarsky, M.D., J.D., professor of urology at Washington University School of Medicine in St. Louis, has been elected to the General Committee of Revision of the United States Pharmacopeia Convention, Inc. He will serve on a drug information subcommittee and will chair an advisory panel on obstetrics, gynecology and urology for the Pharmacopeia, a yearly publication that helps set standards for medications used by the American public.

Boyarsky has served as professor of urological surgery and professor of biomedical engineering at Washington University since 1970. He was head of the Division of Urological Surgery at the School of Medicine from 1970-73, and associate professor of pharmacology from 1970-80. He is currently on staff at Barnes Hospital.

Boyarsky holds bachelor of science and doctor of medicine degrees from the University of Vermont. He held a fellowship in surgery at the University of Vermont and another in physiology at New York University, with an internship at Johns Hopkins Hospital and a residency in urology at Duke University. He received the doctor of jurisprudence degree from the Washington University School of Law in 1981 and was admitted to the Missouri Bar in 1983.

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 a 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 Physicians in Medicine, and to the hyperthermia subcommittee of the Radiation Research Society.

Martin S. Silverman, Ph.D., assistant professor of psychology at the Central Institute for the Deaf, was named an Alfred P. Sloan Foundation Fellow for 1984. Silverman was one of 90 winners selected from 400 nominations. The fellowship includes a $25,000 award to aid Silverman in his research involving the mapping of...
brain activity.

Barry A. Siegel, M.D., professor of radiology and director of the Mallinckrodt Institute of Radiology’s Division of Nuclear Medicine, has been appointed an American Medical Association (AMA) Board of Nuclear Medicine, representative on the Residency Review Committee for Nuclear Medicine. The committee, which consists of representatives from both the AMA and the American Medical Association (AMA), is responsible for maintaining the quality of graduate medical education in the specialty of nuclear medicine. Siegel’s two-year term began Jan. 1.

Martin I. Resnick, M.D., was the Lawrence M. Aronberg Visiting Professor of Urology for 1984. Resnick, professor and chairman of urology at Case Western Reserve University, spoke on “Changing Concepts in the Management of Upper Urinary Stone Disease” at grand rounds.

This professorship, an annual event, was established seven years ago by Aronberg M.D. ’36, who is clinical instructor in urology at the School of Medicine.

Rosemary Anne Stevens, Ph.D., chairman of the history and sociology of science department at the University of Pennsylvania, delivered the Ninth Annual Phi Beta Kappa/Sigma Xi Lecture this spring. The lecture, sponsored by the two honor societies and the Assembly Series, was held to honor the newly elected members of Phi Beta Kappa and Sigma Xi.

Stevens’ topic was “American Medicine: 1984–2001.” She predicts that the government will set the “rules of the game” in medical care, eventually resulting in the abolishment of the traditional fee-for-service practice enjoyed today by most clinicians. She does not foresee the development of a government-run, national health care system, but instead a mix of health insurance benefits plus growing regulation. Hospitals will consolidate and undergo a “vertical integration” that will be common in 2001; there will also be increased variety in the types of services offered, plus a tendency for the government to provide “Cinderella services” (any expensive type of long-term, chronic care). The role of profit-making systems, she says, will remain limited; however, there will be an increase in high technology in health care, as well as an increasing role played by consumer self-help groups.

Future health care planners, according to Stevens, will need a blend of skills: management, planning, knowledge of medicine, and political savvy. The boundaries of some specialties will grow, as will the number of referrals between specialties. Schisms between male and female clinicians will widen, she says, as will those between U.S. and foreign medical school graduates. Stevens predicts that future planners will remain uninterested in preventive medicine and rehabilitation, as well as geriatrics, despite the fact that our aged population will continue to increase. Today’s physicians, says Stevens, are poorly prepared to enter the realm of future decision makers in health care — they are uninterested in politics, or participating in boards or commissions that set policy.

A member of Sigma Xi herself, Stevens has been with the University of Pennsylvania since 1979 and chair of her department since 1980. Her books include American Medicine and the Public Interest; Foreign Trained Physicians and American Medicine; Welfare Medicine in America; and Alien-Doctors: Foreign Medical Graduates in American Hospitals.

In addition to Sigma Xi, she also is a member of the National Board of Medical Examiners, the Institute of Medicine, the National Academy of Science, the History of Science Society and the American Association for History of Medicine.

Lester King, a medical historian, delivered the Fourth Estelle Brodman Lecture in March. Estelle Brodman was director of the medical school’s library from 1961 to 1981. King’s lecture, “Levels of Medical Education and Practice in America, 1760–1915,” traced the roots of medical education in America.

A graduate of Harvard University School of Medicine, King has pursued careers in his specialty of pathology, as editor of the Journal of the American Medical Association, and in medical history. He is the author of some 60 papers in pathology and 40 papers in medical history. His books include The Medical World of the Eighteenth Century (1958); The Growth of Medical Thought (1963); The Road to Medical Enlightenment (1970); The Philosophy of Medicine (1978); and Medical Thinking: a Historical Preface (1982).

An internationally known author and speaker, King was the recipient of the Boerhaave Medal and was president of the American Association for the History of Medicine.

The Biomedical Computer Laboratory at Washington University School of Medicine hosted a Computer-Based Education workshop in April, in conjunction with the 68th annual meeting of the Federation of American Societies for Experimental Biology (FASEB). An estimated 35,000 scientists came to St. Louis for the convention.

The program was designed for educators interested in the use of computers in teaching. Tutorial presentations included an overview of computer-based education, a review of methods and techniques, a discussion of hardware and software issues, physiologic simulations, and computer-based lesson planning.

Small group working sessions gave participants experience in simulations and lesson writing. The workshop was taught by faculty members of W.U. School of Medicine, Rush Medical College, Virginia Mason Research Institute, and Indiana University.
All usually finds most of the world huddling under football blankets or rain ponchos, cheering their favorite team to victory. But the fall of 1984 will find Marvin E. Levin, M.D. '51, huddling with alumni in the "network cities." At the School of Medicine, fall signals the start of a campaign to kick off a fund drive for a second Alumni Endowed Professorship.

According to "quarterback" Levin, calling the signals will not be easy: "Our medical school alumni can't all be solvent," he acknowledges. "But there are certainly many who can afford to join the Medical Eliot Society."

Levin knows that recruiting new Eliot Society members at $1,000 apiece is not as formidable a challenge as some other fundraising appeals might be. The AEP is a chance for alumni to put their money into something that really counts — and lasts forever. "Every dollar contributed by new medical alumni Eliot Society members goes right into that main till for the professorship," emphasizes Levin. "Nothing for management or overhead."

Samuel B. Guze, M.D. '45, vice chancellor for medical affairs, created the concept of the alumni endowed professorships. All undesignated alumni gifts, says Guze, benefit the AEP fund drive. "Money from medical teaching funds, or earmarked for the AEP, or from new Eliot Society members, is eventually channelled into the AEP," he remarks.

The first AEP fund drive, led by Thomas B. Ferguson, M.D., successfully raised funds to endow a professorship awarded to Philip Needleman, Ph.D., professor and head of pharmacology.

Eventually, says Guze, he would like to see one endowed alumni professorship in each of the school's 18 departments, both preclinical and clinical. And he's confident that this will happen. "Right now, about 40 percent of our alumni annually give. If 500 alumni would join the Eliot Society every five years, or renew their memberships, we would have five AEPs."

"I really believe that half our alumni have the resources to become members of the Eliot Society," continues Guze. "And if this happened, we'd have an alumni endowed professorship in each department within five or six years."

With Levin calling the plays, Guze's game plan approaches a win: Thirty-five new Eliot Society members joined in 1983, and 75 in 1984. If this trend continues, Guze's goal of a professorship in each department will be realized within a decade.

"He's a drumbeater for diabetes education, and a clinician so busy that he doesn't have time to attend the golf tournaments he organizes to raise funds for a kids' diabetes camp."
He’s a medical man and a movie man whose working world is a blend of science and the magic of make-believe. He’s a physician and a movie critic whose twin careers are tied together by the technology of film.

Stuart L. Rosenthal, M.D. ’72, is director of nuclear medicine in three Portland, Oregon, area hospitals — Holladay Park, Dwyer and Willamette Falls — where his duties include the study and evaluation of medical images. But to film fans of the Northwest, he’s also the popular critic, reporter, commentator and on-camera personality at KATU, the ABC-TV affiliate in Portland.

He’s an entertainer in his own right whose bearded, bespectacled face is becoming as familiar in Portland as are the faces of many stars he interviews. His lifelong love of movies has blossomed into a multi-faceted show business career. He not only critiques films and interviews stars, but, as a feature newsman, Rosenthal covers a wide range of stories, many of them unrelated to the movie industry.

The Oklahoman-turned-Oregonian balances both his careers with the skill of a vaudeville juggler. But if either ever has to give, he’ll quickly pull down the curtain on his Hollywood hobby. “Medicine,” he says, “is my priority. In television, I do what I have time to do. I work a lot on weekends and in the evening. At the hospitals, I am on call 24 hours a day.” But both professions hold a special challenge for him, and that’s what the doctor prescribes for himself. “The joy in medicine is challenge. In medicine, you are looking for a solution. You are analyzing the problem, just as you are in films.

“I don’t have the ideal temperament for detail work or following minute things over the long term,” he conceded. “I like the satisfaction I get from a diagnosis versus the uncertainty of following a patient through treatment and recovery. I look at films and I make a decision.” At the moment, he was speaking of medicine, but his statement applies equally to both careers.

Neither his love for medicine nor movies has diminished with the years. He sees nothing remarkable in this. “All my life,” he said, “people have asked me, ‘Which are you going to do?’ I really haven’t had to choose. Some say that if you have another interest, you really aren’t dedicated to medicine. I don’t feel this way. I enjoy both. One is an outlet for the tensions of the other.”

A DUAL FASCINATION

While medicine ultimately upstaged movies as his primary profession, his interest in both began during his boyhood in Tulsa 38 years ago. When young Stuart wasn’t watching a western or a science fiction feature at the Ritz, he was visiting a nearby hospital laboratory to look through microscopes.

As an undergraduate biochemistry major at Michigan State University, he wrote a daily film column for the Michigan State News. As a medical student at Washington University, he free-lanced for St. Louis and Kansas City newspapers and was film critic for St. Louis Magazine. As a senior, he made the first of what would become annual trips to the famed Cannes Film Festival in France. Later, he would produce a one-hour documentary on the 1980 festival.

He also launched a five-night-a-week film series on the Hilltop campus, running box office hits to get enough money to bring in the less-popular, quality films he wanted to show.

Even on long-distance, conversing across the miles with a faceless voice, you could almost picture the grin as he looked back over the years: “We put on ‘I Am Curious, Yellow’ in Graham Chapel. None of the exhibitors would show it because it was X-rated. The Globe-Democrat denounced the showing in an editorial. The County Prosecutor threatened to close us down because the Missouri Supreme Court had declared the movie obscene — it would barely get an ‘R’ today. The final showing had to be cancelled.”

Rosenthal’s taste in movies is eclectic. John Ford’s “The Searchers” is one of his favorites. So are films by directors Ozu (Japan), Renoir (France) and Browning (USA). Genres that are among his favorites include “film noir” — American movies, made from 1946 to 1955, which...
reflect, as he says, "the unseen menace, the perfect expression of post-war paranoia" — and Italian films, especially those made in the '40s-'50s era.

What about today's films? Rosenthal says that he wants stars to be more than cardboard figures. Movie scripts should stimulate and entertain, "to say or show something in a new way." He enjoys a lively musical and light-hearted escapism, as well as dark drama or sinister mystery. An admirer of John Ford/John Wayne westerns, he loves the brashness of Jimmy Cagney, the underrated gifts of Clint Eastwood, the "American values" in his filmography. Rosenthal says that he wants stars to be more than cardboard figures. Movie scripts should relate to the present, observing the images Rosenthal reflects, as he says, "the unseen menace, the perfect expression of post-war paranoia" — and Italian films, especially those made in the '40s-'50s era.

While Rosenthal's subjects are by no means limited to films, his extensive knowledge of movies and numerous contacts within the industry yield personal invitations to openings or other special film events across the country and abroad. Recently, he traveled to Japan where he produced a series of stories, two of which relate to the Japanese film industry.

He reports with gusto and, as he says, in a "sarcastic and cynical" style. Still, he has learned to interview his guests with sensitivity and with what he believes is the questioner's most important asset, a listening ear.

Those interviews are not always comfortable. During a rare TV interview, Clint Eastwood was at first suspicious and taciturn. But soon Eastwood became cordial and responsive and even played his office piano with a parrot perched on his shoulder.

On other occasions, Rosenthal exchanged film stories with Michael Caine and found Meryl Streep "very bright and very open and a lot of fun. You can't do serious, in-depth movie reviews on television," he said. "If you get across one or two points you have done well." He tries to emphasize his opinions with lively and occasionally outrageous performances which have created a fan club of his own.

"For the review of the movie, 'Christine,' a car driven by a man in an opossum suit ran over me. When I reviewed 'Superman,' I flew down a freeway and made arm signals to turn into side streets." In a review of a Chuck Norris movie, Rosenthal staged a fight with a manikin — and the manikin won. "I hit it, and my 'hand' broke into pieces. I kicked it and my 'leg' flew off."

Even though he enjoys creating such bizarre performances, Rosenthal is a serious student of film art and production. Enthusiasm, objectivity and dedication mark his approach to film art and production, as well as his analyses of medical images.

Patients are the principal players in his real world of discipline and science which can only be mirrored by the make-believe of Hollywood or television's role-playing and false facades. The images Rosenthal sees and studies in his medical practice are not the illusionary flickerings of a movie, not pretend plots to be played out in a shooting schedule and stored in a metal container. Here, he is involved in both diagnosis and therapy, conferring with technologists and his fellow physicians, suggesting new or alternative procedures to enable the team to arrive at a diagnosis.

Board-certified in both nuclear medicine and diagnostic radiology, his practice is confined primarily to the former — a specialty which was recognized as a separate discipline just about the time he entered medical school. Diagnosing the spectrum of thyroid diseases — malignancies, auto-immune disorders, and hyper- as well as hypothyroid conditions — is a particular interest of his, reflecting his predilection for nuclear medicine. In Portland, he has launched programs in radiological imaging techniques such as gated cardiac blood pool studies, renal nuclear medicine, and nuclear imaging to assess gastrointestinal bleeding.

In medicine, as well as in the movies, Rosenthal studies the past and its application to the present, observing the unbroken threads of progress and growth.

For the present, Rosenthal lives in a house surrounded by woods that are home to the 25 or so wild raccoons which share his property and his larder. In his two-career life, there isn't much time for recreation. For the medical man, there are patients to be seen, medical films to be studied, diagnoses to be made. But if his work at the hospital is finished in time, he might take in a movie — just for fun.

Mary Kimbrough is a St. Louis-area freelance writer and frequent contributor to Outlook.
CLASS NOTES

**40s**

Samuel P. Bessman, M.D. '44, has received the 1983-84 Distinguished Scientific Achievement Award of the American Heart Association. Bessman, professor and chairman of the Department of Pharmacology and Nutrition at USC's School of Medicine, received the award in May and was cited for his contributions in cardiovascular research.

Bessman's research is on the metabolic basis of muscle contraction, as well as study of diabetes and hepatic coma. He also investigates nutritional factors in mental retardation. Bessman invented the first implantable artificial pancreas and developed the currently accepted treatment for lead poisoning.

Mary D. Bublis, M.D. '46, has received a life fellowship from the American Psychiatric Association. She was awarded a gold medal and cited for her contributions to psychiatry and her community. Bublis, a long-time resident of West Texas, qualifies for this honor, which is only given to those whose age and length of APA membership equal 95 or more years.

Bublis married orthopedics resident Norbert Bublis while she was a third-year student and gave birth to the first of her six children on the last day of her internship in ob/gyn in 1947. She was named Plainview (Texas) Woman of the Year in 1968 and was cited as Outstanding Woman of the Panhandle by West Texas State University. In addition to her numerous community and civic activities, Bublis was on the first board of the Hale County Child Welfare Unit, serves on the board of South Plains Health Provider, and for the past five years has been county jail doctor.

Bublis has held office in the Hale-Floyd-Briscoe Medical Society and is a member of the AMA, the Texas Medical Association and the APA. She is on the state council of communications of the TMA and has served on the clinical faculty of the Texas Tech Medical School for several years.

Known to her community as “Doctor Mary,” Bublis finished medical school in three calendar years, deciding on psychiatry as her specialty while doing a rotation through St. Louis City Hospital. Her first husband, W.U. Law School student William F. Cheaney, was killed in an Army training accident shortly after their marriage.

**50s**

William D. Sawyer, M.D. '54, was a recent seminar speaker at the University of Southern Colorado, addressing the effect of electronic developments on health care. Dean of the School of Medicine at Wright State University in Dayton (Ohio), Sawyer spoke on the role of the computer on nerve stimulation. He has been an instructor in microbiology at many schools, including Johns Hopkins.

**60s**

Arthur J. Schneider, M.D. '61, has been appointed professor in the Department of Anesthesiology at the Milton S. Hershey Medical Center at Penn State. After completing residencies in surgery and anesthesiology at Case Western Reserve University, Schneider served on the faculty in the Department of Anesthesia there. He became associate professor in the Department of Anesthesia at Hershey Medical Center in 1980. Schneider’s research interests include geriatric anesthesia and pulmonary disease.

Laurence W. Muench, M.D. '62, has been named chief of anesthesiology at Kings Mountain Hospital (N.C.). A native of Evanston, Ill., Muench interned at Cleveland Metropolitan General Hospital and completed a residency in general surgery at Barnes Hospital, as well as a residency in anesthesiology. A diplomate of the American Board of Anesthesiology, he is a member of the American Society of Anesthesiology.

David C. Bisno, M.D. '66, has joined the medical staff at Douglas General Hospital (Ga.). Bisno, an ophthalmologist, specializes in cataract surgery and insertion of intraocular lens implants. He is a graduate of Harvard and has lived in Atlanta since 1973.

Michael B. Rumelt, M.D. '66, performs surgery for cataract removal and lens implants at the Jersey Community Hospital (III.). Board-certified in ophthalmology and internal medicine, Rumelt limits his practice to ophthalmology. He has subspecialty training in glaucoma and is on the staff at several St. Louis area hospitals, including Barnes and Jewish hospitals.

**70s**

Terry F. Plasse, M.D., '73, has been named medical director of Interferon Sciences Inc. of New Brunswick, N.J. Formerly clinical and research fellow at the Department of Neoplastic Diseases at Mount Sinai Hospital in New York, he has held faculty appointments at the Medical University of South Carolina and at Mount Sinai School of Medicine.

Jerold E. Boyers, M.D. '74, was recently named a Fellow in the American Society for Head and Neck Surgery. He is the first Nevadan to be inducted into this society. Boyers completed five years of postgraduate work at Mount Sinai Medical Center in New York. Currently, he is in practice in Las Vegas with his father.

William S. Coleman, M.D. '74, has been elected a Fellow in the American College of Cardiology. Currently, he is a cardiothoracic surgeon in Spokane, Wash.

Charles J. Oestrich, M.D. '75, has joined Gwen J. Liang, FHS, in opening a new eye care center in West Haven, Conn. A magna cum laude graduate of Colgate, where he was also Phi Beta Kappa, Oestrich completed ophthalmology residency at Mount Sinai Hospital in New York. He also spent a year studying glaucoma and the effects of diabetes on the eye.
Patricia L. Stranahan, M.D., Ph.D., has opened a practice in medicine in Bloomfield, Co. She received the M.D. and Ph.D. in 1975 concurrently from W.U. and the University of Colorado Medical School. She completed residency at the University hospitals. An anatomic and surgical pathologist, Stranahan specializes in clotting disorders.

John F. AufderHeide, M.D. '76, has joined the medical staff at Mercy Medical Center (Wisc.). A diagnostic radiologist, AufderHeide is a graduate of the University of Missouri–Columbia. He interned at the University of Pennsylvania (Phil.) and completed a residency at Barnes Hospital.

Catherine Henry, M.D. '76 joins her husband, FHS William Henry, at the Riverwood Clinic (Wisc.). A board-certified pediatrician, she completed her training at Children's Hospital.

James Trig Brown, M.D. '77, has been promoted to assistant professor of medicine at Duke University Medical Center. Brown came to Duke in 1977 as an intern, served his residency and a fellowship there, and joined the faculty in 1981.

William L. Lanzer, M.D. '77, has completed training in adult reconstructive surgery at the Mayo Graduate School of Medicine. He will accept a position as assistant professor of orthopedic surgery at the University of Washington, Seattle.

James V. Kasin has been named chief of staff-elect at Aiken (S.C.) Community Hospital. A native of Australia, Kasin attended medical school at the University of New South Wales and interned at Cairns Base Hospital in Queensland. After arriving in the U.S., he took a three-year residency at Barnes Hospital. Subsequently, he spent three years at the Medical College of Georgia.

Byron T. Westerfield has been elected a fellow of the American College of Physicians. A specialist in pulmonary medicine, he lives in Martinsville, Va., where he is on staff at Memorial Hospital. He trained in internal medicine at LSU and at Jewish Hospital and completed training in pulmonary medicine at Long Beach Veterans Administration Medical Center.

Westfield is board-certified in internal medicine and pulmonary medicine. Among his many professional affiliations is a fellowship in the American College of Chest Physicians.

Sander Peck is the new chairman of the governing board at Garfield Medical Center in Monterey Park, Ca. A graduate of Cornell University and New York University School of Medicine, Peck completed further training at UCSF. He also spent eight years in the USAF, achieving the rank of lieutenant colonel.

Since 1972, he has practiced internal medicine and cardiology in the Monterey Park–San Gabriel area. Peck served as chief of staff at Garfield Medical Center in 1977 and has been a member of the governing board since 1978.

Thomas M. Irwin, Jr., has opened a practice in otolaryngology in Galliano, La. A graduate of Tulane, Irwin is board-certified in otolaryngology. He is also on staff at Charity Hospital in New Orleans.

M. David Orrahood, long-time Owensboro, Ky., physician and pathologist, is the new surgeon general for the 100th Army Reserve Division. A native of West Virginia, Orrahood is a graduate of West Virginia University and Harvard Medical School. He completed pathology training here and at St. Louis University Medical School.

Orrahood, whose military service has spanned more than 30 years, is a member of the teaching staff for the medical technology programs at Brescia and Kentucky Wesleyan colleges and Murray State and Western Kentucky universities.

William Henry has joined the Riverwood Clinic (Wisc.) as staff surgeon. Following a residency at Barnes Hospital, Henry was named director of a surgical care unit at St. Luke's Hospital in St. Louis and entered private practice in 1983. He joined the Wisconsin Clinic in January 1984.

Gilbert H. Mayor has joined the staff at The Memorial Hospital in Owosso, Mich. A nephrologist, Mayor completed a residency at Barnes Hospital and held fellowships in endocrinology and metabolism, as well as nephrology, at the University of Michigan Medical Center in Ann Arbor.

A fellow of the American College of Physicians, Mayor twice received the AMA Physicians Recognition Award. He is currently on the faculty at the Center for Environmental Toxicology (MSU) and a professor of medicine at MSU School of Medicine. He is board-certified in internal medicine and nephrology.

Lawrence L. Bauer is a medical staff member at Mercy Medical Center in Oshkosh, Wisc. A graduate of the University of Missouri–Rolla, he studied medicine at the Medical College of Wisconsin and completed an internship and residency in radiology here.

Gwen J. Liang, a magna cum laude graduate of Yale University, is a partner in Eye Associates, an ophthalmology group in West Haven, Conn. She and her partners have opened a new eye care center there. Liang, a graduate of Harvard Medical School, completed study in neuro-ophthalmology at Barnes Hospital and finished an ophthalmology residency at Mount Sinai Hospital in New York.

John S. Spratt, M.D., has written "Neoplasms of Colon, Rectum and Anus," recently published by W.B. Saunders Co. The book's chapter on neoplastic growth rates was co-written by his son, John A. Spratt, M.D. '80. The elder Spratt is professor of surgery at the University of Louisville (Ky.), and his son is a surgical resident at Duke University Hospital.

The text's preface was written by Lauren V. Ackerman, M.D., who was formerly professor of pathology at the
Robert C. Garrett has been named assistant administrator of Riverside General Hospital in Secaucus, N.J. He will oversee the departments of rehabilitation medicine, laboratory medicine, radiology, pharmacy, cardiopulmonary medicine and several support staff sections in the hospital. A resident of Hackensack, Garrett is the former administrative director of the Emergency/Trauma Services of Hackensack Medical Center.

Ben R. Brewer is the new president of Baptist Hospitals, Inc., of Louisville, Ky. Currently, Brewer is president of the Louisville Baptist Hospitals Division of the organization. Brewer completed a residency at Baptist Memorial Hospital in Memphis, followed by three years as assistant administrator of Georgia Baptist Hospital in Atlanta before joining BHI in 1958. He is a past president of the Kentucky Hospital Association, a fellow of the ACHA, and a member of the board of directors of both the American Protestant Hospital Association and Watterson College. He has also held office and served on committees of the State Hospital Association and the AHA.

Brock Place has been appointed assistant administrator at the Bountiful (Utah) Lakeview Hospital. A native of Salt Lake City, Place holds the B.S. degree in biology from the University of Utah. Currently, he is ending a seven-year tenure at the Veterans Administration Hospital in Topeka, Kansas, where he is a health systems specialist.

Roger Pence is the new administrator of the Russell County (Ky.) Hospital. Pence holds the bachelor’s degree in business management from the University of Cincinnati. He previously served as administrator of Rockcastle County hospital in Mount Vernon and spent three years as administrator of a 127-bed hospital in Grafton, W. Va. Pence also served as vice president of planning with the Galesburg (III.) Hospital and was a health care consultant with the TriBrook Group of Oak Brook, III.

Geoffrey Lieu has been named associate administrator for ambulatory and professional services at the University Hospital in Salt Lake City. He graduated from St. Olaf College with a degree in economics and has done postgraduate work at the Johns Hopkins University School of Hygiene and Public Health. Lieu has been a consultant, and he was assistant administrator and director of planning at St. Mark’s Hospital. A member of the ACHA, he also has been director of the Salt Lake Community Nursing Services, the Utah Hospice, and the Crossroads Urban Center.

In Memoriam

Abigail Eliot Smith, M.D., '27, died on May 4, 1984. Her maternal grandfather was William Greenleaf Eliot, founder of Washington University. Her father, Professor Holmes Smith, taught art history at the university.

1907
Martin G. Fronske, M.D., April 2, 1984
1922
Ward C. Fenton, M.D., June 19, 1984
Paul B. Sheldon, M.D., January 12, 1984
1925
Lloyd C. Miller, M.D., February 9, 1984
1927
Abigail Eliot Smith, M.D., May 4, 1984
1930
Adolph C. Lange, M.D., March 17, 1984
James L. McElroy, M.D., February 1, 1980
1931
Peter V. Sundwall, M.D., February 24, 1984
1934
Ben P. Frissell, M.D., January 25, 1984
1935
Albert Krause, M.D., May 16, 1984
1938
George W. Blankenship, M.D., May 5, 1984
Roy W. Thomas, M.D., February 17, 1984
Frank J. Weber, Jr., M.D., October 26, 1983
1941
Thomas L. Ozment, III, M.D., February 11, 1984

D 1943
James H. Quinn, M.D., May 7, 1984
1943
Parker R. Beamer, M.D., March 7, 1984
Edward L. Kettenbach, M.D., April 19, 1984
1953
Stanley Reitman, M.D., April 29, 1984
1954
David D. Nolting, M.D., April 9, 1984

Former House Staff
Mark Brown, M.D., FHS
November 19, 1983
Hector M. Janse, M.D., FHS
Unknown
Frank Impastato, M.D., FHS
September, 1983
Francis X. Marrone, M.D., FHS
November 19, 1982
William J. Miller, M.D., FHS
April 12, 1984
Jim E. Russell, M.D., FHS
1978

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David T. Hammond, M.D., ’60
President
Jack Siekask, Director
Medical Alumni and Development Programs
Chris Owens, Director
Medical Alumni Programs
Ruth Moenster
Secretary
The signal processor for the extracochlear implant is small enough to fit in a shirt pocket or to be attached to a belt. The extracochlear hearing system, recently approved by the FDA, is the subject of clinical research at selected medical centers, including Washington University Medical Center. (See story, page 12.)

(photo courtesy 3M)
Specific brain regions can be electronically monitored during the first phase of surgical correction of focal epilepsy. Here, a surgeon places the electrodes on the brain surface. (See story, page 8.)