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OUTLOOK

M A G A Z I N E



Rehabilitation

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Children's Hospital Near Completion

The finishing touches are being put in place at the new Children's Hospital, situated on a 2.5-acre site at the west end of a block bounded by Kingshighway Blvd., Audubon and Euclid Avenue, and Parkview Place. The hospital's 500,000 square feet of space will more than double the existing area in the old structure. The \$84 million hospital has taken over three years to build, and patients are scheduled to begin moving to the new facility in mid-April. Formal dedication ceremonies will be held in May.

New services within the 235-bed facility will include eight operating rooms and support space that includes a 12-bed recovery area. Eleven diagnostic/treatment rooms will be housed in the radiology service, and there will be two operating areas for oral surgery. A complete rehabilitation service will provide physical, occupational, and speech therapies, with access to hydrotherapy and exercise rooms. Anesthesiology and pathology services will also be included in the new facility.

In the expanded inpatient area, there will be parent sleeping space in patient rooms, 22 intensive care beds (currently, there are 13), and 52 neonatal beds (almost double the current number).

The outpatient clinic areas and the emergency room have also been expanded. A 129-seat auditorium will be housed in the new facility; as will centralized laboratories. A heliport, and additional parking underground, will improve access to the hospital. The new hospital has an all-weather link to the rest

of the medical center, and a structural capacity for future expansion to one million square feet. The existing Spoehrer Tower will be retained and used for support facilities.

The new hospital, with an annual budget of \$46 million, has a sympathetic and visually interesting interior design intended to make hospitalization a less threatening experience for children. Its wider corridors, additional provisions for patient and parent comfort, and improved security will make experiences there more pleasant.



(Photo courtesy Children's Hospital Community Relations Department; Richard Benkof, photographer)

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Director, Medical Public Relations

Glenda King Wiman

Executive Editor

Don Clayton

Editor

Suzanne Hagan

Design

John Howze

Photography

Jim Balmer

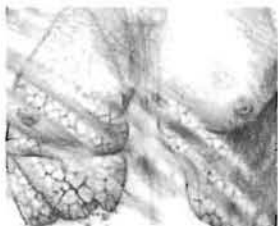
Cheryl Ungar

Circulation

Barbara Hebrank

On The Cover:

The process of rehabilitation is a very personal one. Patient and therapist must develop an intimate relationship whereby the therapist can assess a patient's capabilities in order to develop an individualized therapy program.



Neurobiology

2

Nutrition

6

Rehabilitation

8

Nicotine

16

Colin Painter

18

Personal Outlook

21

Student Stage

22

Newsbriefs

24

Letters

26

The Alumni Report

27

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NEUROBIOLOGY'S SUMMER PLACE

Going to Woods Hole for the summer is a time-honored tradition among biologists. But today, the Marine Biological Laboratory in that Cape Cod village is a far cry from its modest beginnings nearly a century ago. Then, one bare building greeted the handful of instructors, investigators and students who gathered in the summer. The women's long skirts and the men's stiff collars must have been more than a little annoying on those hot summer days when they climbed into the facility's single row-boat to collect specimens from Eel Pond or Buzzard's Bay. Now, Woods Hole (still a jumping-off place for visitors traveling to Martha's Vineyard or Nantucket) boasts the largest marine biological laboratory in the world; the summertime population numbers over 1,000. Freed from everyday obligations and distractions, students and seasoned researchers rub elbows with Nobel Laureates and Medal of Science winners.

The simple sea creatures gathered by past Woods Hole researchers spawned some remarkable biological research. For example, the giant axon of the squid was a perfect experimental system for studying propagation and transmission of the nerve impulse, one of the most basic of neurobiology's secrets. Even today, the sea and the beach are nature's laboratory and classroom, but the sounds of the surf aren't quite sufficient to drown the cacophony from the crowded beach.

Lewis Thomas compares the din from the beach at Woods Hole to the melee that follows the Friday Evening Lectures (which he calls "the Marine Biological Laboratory's weekly grand occasion"). Individual words are unintelligible, he writes, "except that recurrent phrase 'But look —' which keeps bobbing above the surf of language."

One prominent feature of the Woods Hole summer is the Alexander Forbes Lectureship, part of the Friday Evening Lecture series. Inaugurated in 1959 by the Grass Foundation, the Forbes Lectures feature researchers in many fields — physiology, cell biology, anatomy,

developmental biology, biochemistry — to enlighten the summer platoons of researchers on various aspects of modern neurobiology. The Foundation sponsors these scientists (and their families) for up to six weeks at Woods Hole so that they can be available to answer questions concerning their research, and to get to know the Grass Fellows sponsored by the Foundation each summer.

The Foundation was established by Albert and Ellen Grass. An electrical engineer and instrument maker in the physiology department at Harvard in the 1930s, Albert Grass built electrophysiological devices so superior to any then available that researchers flocked to buy them. (His wife Ellen, whom he met while she was a student at Harvard, now presides over the foundation.) During the past quarter century, the Grasses have returned the favor, so to speak, by supporting basic neurobiological research in many ways.

Former Forbes lecturers have been Bernard Katz, John Eccles, Andrew F. Huxley and Alan Hodgkin — all Nobel Laureates (and knights of Great Britain). Nigel W. Daw, Ph.D., Professor and Head of the Department of Physiology and Biophysics at Washington University School of Medicine, says that collaborators such as Hodgkin and Huxley, as well as Ricardo Miledi and Katz, have each been Forbes Lecturers. But Daw points out that no two individuals from the same institution who were not collaborators have been invited to give the Forbes Lectures . . . until now.

John E. Heuser, M.D., and Dale Purves, M.D., professors of physiology and biophysics at Washington University School of Medicine, have each held the Forbes Lectureship within the past three summers. Although Heuser and Purves are not collaborators (in fact, they work in completely different areas of research), their paths have coincided and followed similar twists of fate through the years. Each earned an M.D. from Harvard, and both were daily lunch mates when they trained as postdocs in Katz's lab. Each

considered an offer from the University of California at San Francisco; Heuser accepted, later joining Purves at WU. Now, both share with *Outlook* some of the knowledge they imparted to the hundreds of persons who attended their Forbes Lectures.



John Heuser, M.D., prepares to freeze-fracture a sample he will view in the electron microscope.

When John Heuser's quiet voice swells in an animated description of Mickey Mouse performing flip-flops, he's not composing stories to entertain his two pre-schoolers. Instead, he's explaining the mechanism by which the dynein arms of microtubules move from a relaxed position to a rigid posture, permitting the structures containing the microtubules (cilia or flagella) to beat, thus causing motile cells to move. Seeing these dynein cross-linkages has only recently been possible, thanks to use of the special, quick freeze-fracture techniques Heuser developed eight years ago, a feat which earned him an invitation to present the Forbes Lectures in 1981.

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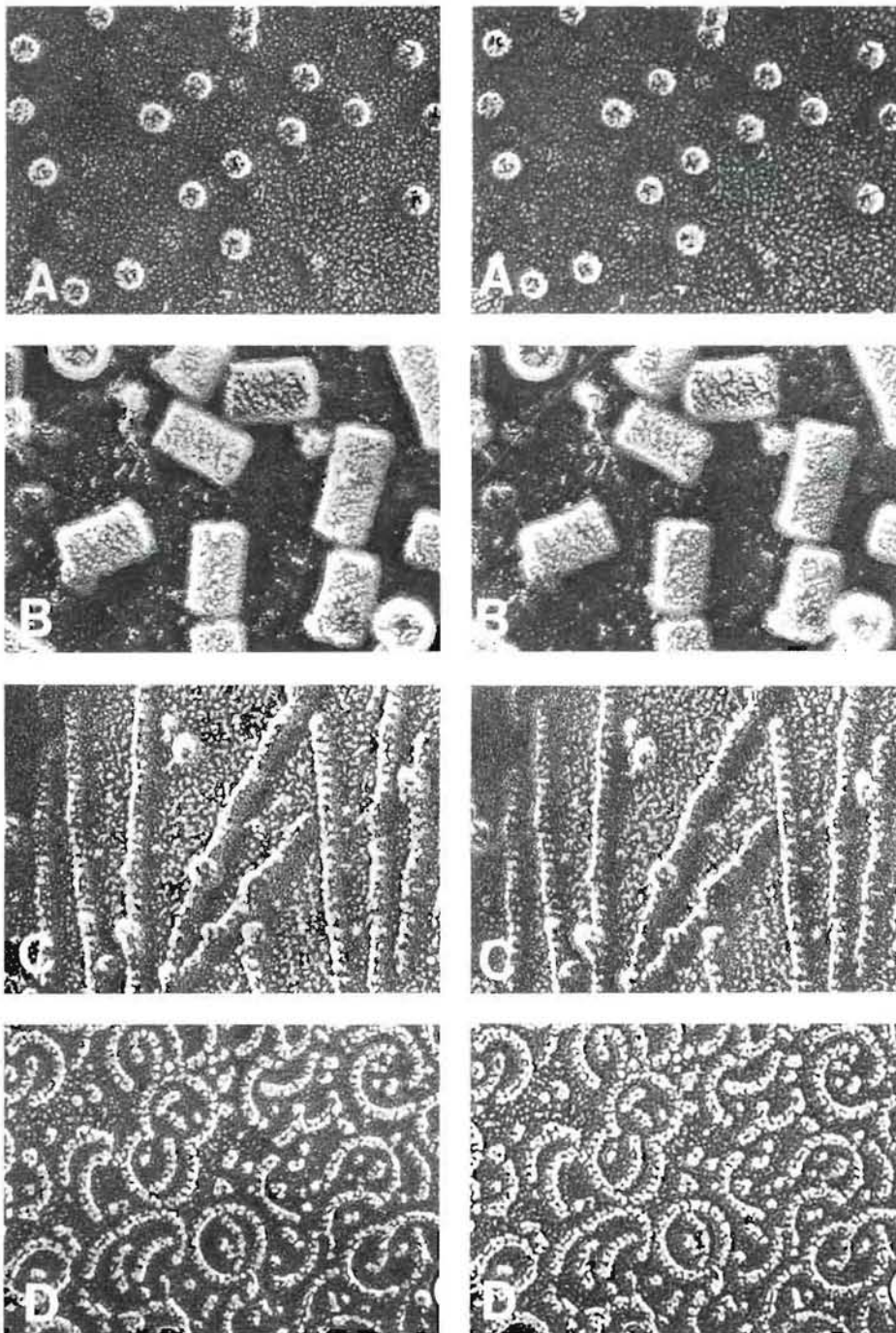
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had perennially plagued electron microscopists attempting to view frozen tissue samples: distortion caused by the formation of ice crystals during the inevitably slow freezing process. He finally developed a rapid freeze-fracture technique which allows biological materials to be frozen, crystal-free, within milliseconds. Why? Just so he could see a phenomenon that had been postulated by Bernard Katz — and accepted by the scientific world as biological fact — but never proven: the release of packets of acetylcholine into a nerve synapse, the mechanism by which a stimulus is transferred from one neuron to another.

"I came back from the London lab where Katz had been recording electrical activity at the synapse," recalls Heuser. "He predicted that there would be packages of transmitter that would rush to the surface and burst — discharging the chemical — when the nerve was stimulated, and that this would be the mechanism of synaptic transmission.

"I just got the impulse to prove it, and the main proof is seeing it. I couldn't use the traditional methods of preparing samples because they inevitably call for embalming tissue. You can't embalm something to catch an event which lasts one-thousandth of a second. I needed something appropriately rapid, and that was freezing. So I built a machine which would freeze tissue rapidly, and I struggled with it until it worked."

Heuser's machine drops the sample onto a frozen block of copper and presses it down. Then, after the sample is freeze-dried and fractured gently with a liquid nitrogen-cooled microtome, a shadow casting of metal outlines the exposed, frozen tissue surface (which may be compared to a bas-relief work of art). After the tissue is digested away, the metal replica can be viewed under the electron microscope at a resolution which permits the organization of macromolecules to be seen. Because the metal replica is tilted in the electron microscope and photographed from two slightly different vantage points, a lifelike image results



This series of photomicrographs, taken at 250,000x magnification, reveals molecular substructure of (a) ferritin, (b) hemocyanin, (c) actin, and (d) tubulin. These proteins were all freeze-dried after absorption onto mica flakes and photographed using the platinum replication technique.

when the photograph is seen through 3-D glasses.

Heuser has succeeded in producing breathtakingly vivid stereo images of cellular substructures (and even images of molecular outlines), and now he's ready to pioneer a more challenging territory: the interior of proteins. "What I'm doing now is taking thin slivers of mica, breaking them up in very fine pieces and mixing them with protein," Heuser says. "The protein sticks to the surface and then I freeze that and crack it open. The molecules are stuck to the surface of the mica, and they look just gorgeous."

Heuser's bevy of biological beauties includes pictures of molecules at substantially higher resolution than has been obtained before. For example, his micrographs of certain antibody molecules clearly show the Y-shaped structure of the molecule, something which had been inferred — but never seen.

"My biggest headache right now is the metal itself, which appears in the background as little white dots. If I could reduce that metal grain, it would permit even greater resolution so that I could see the interior of molecules, not just their exterior. But just seeing molecular shapes, and the way molecules are packed together, is a whole new world for me."

Heuser's foray into molecular biophysics has indeed been a labor of love shared by his wife Ursula Goodenough, professor of biology at W.U. Their work on eukaryotic cilia culminated in micrographs of the molecular substructure of dynein, the protein that moves the cilia. They found that dynein can be activated to change shape by hydrolyzing ATP. "When the protein's supply of ATP is depleted, it looks stiff and contracted. ATP causes its 'head' to jump. There's a little connector between its head and the adjacent microtubule that oscillates back and forth between those two positions, and that's what pulls on the microtubule, creating motion.

"Right now, we're particularly fascinated with the sperm tail — what makes it wiggle?" muses Heuser. Indeed, the

answer to this biological riddle will pave the way for understanding how *all* microtubule-activated motility systems work, such as the beating of respiratory cilia in the trachea and bronchi. And it's a safe bet that the world will don 3-D glasses in order to view the answer.



Dale Purves, M.D., in a reflective moment.

Unravelling the complexities of the human brain is a biological challenge that won't be completely met in our lifetime. But Dale Purves is optimistic that work on the development of synaptic connections in relatively simple neural systems will provide some clues about the mechanisms which endow the brain with remarkable abilities.

"A common view is that the brain is like a computer," Purves explains. "But a computer's circuit diagram wires A to B, and B to C, and so on. The machine ultimately works according to the predetermined plan. The nervous system of higher animals doesn't seem to be made the same way. The connections between

mammalian nerve cells are established with a great deal more flexibility, and over a surprisingly long period of time."

This was part of the message Purves took to Woods Hole last summer: flexibility, not rigidity, is the strategy determining how nerve-to-nerve communication is established. By making intracellular recordings from mammalian autonomic ganglia, Purves and former M.S.T.P. student J.W. Lichtman, M.D., Ph.D., (now assistant professor of physiology), found that many neurons have more axons innervating them at birth than are in place just a few weeks later. Evidently, the synaptic deck can be reshuffled; each neuron is not dealt a pat hand. Instead, the axons innervating a target cell interact competitively with one another in a cellular replay of the Darwinian notion of survival of the fittest. "The nervous system is more like an ecosystem than a computer. Individual nerve cells and their synaptic connections are like organisms seeking to survive and thrive in a particular niche," Purves says. "They're not just elements in an electrical circuit."

Evidently, many nerve connections are made, like promises, to be broken later. But that doesn't imply a lack of order, despite the apparent chaos of the developing central nervous system: the eventual result is invariably a set of highly stereotyped neural connections. "People thought that those stereotyped connections were simply the result of a set of corresponding labels on nerve cells ultimately finding one another," Purves continues. "That's basically the hard-wired computer scheme. Although this idea is still a powerful one, cells matching labels doesn't seem to be the mainspring of synapse formation."

Analyzing synaptic connections from different levels of the spinal cord to autonomic ganglia in small mammals, Purves and his collaborators determined that the rules of connectivity are not so much "A goes to B," as "A prefers B." If normal events are even slightly perturbed, neuron A will hook up with neuron C instead. "The final pattern of innervation,"

says Purves. This is part of the development of the nervous system.

Purves' work suggests that the nervous system is built on a flexible, dynamic process. Many years ago, Purves and his colleagues found that in the 19th century, M.D., an important role in development. It gets even more complex; the competitive nature of the cell's survival is one of the key factors in their taxonomic approach. Hamburg suggests that the synaptic connections are general innervation.

More importantly, the electrical connections between cells are a league away from simple peroxide change. The nerve cells are destined to show how they axons.

"Neural ganglia are particularly interesting because of the range of connectivity. Complicated things are done with none. "AI

says Purves, "is really an equilibrium. This is probably what allows our brains to develop so uniquely."

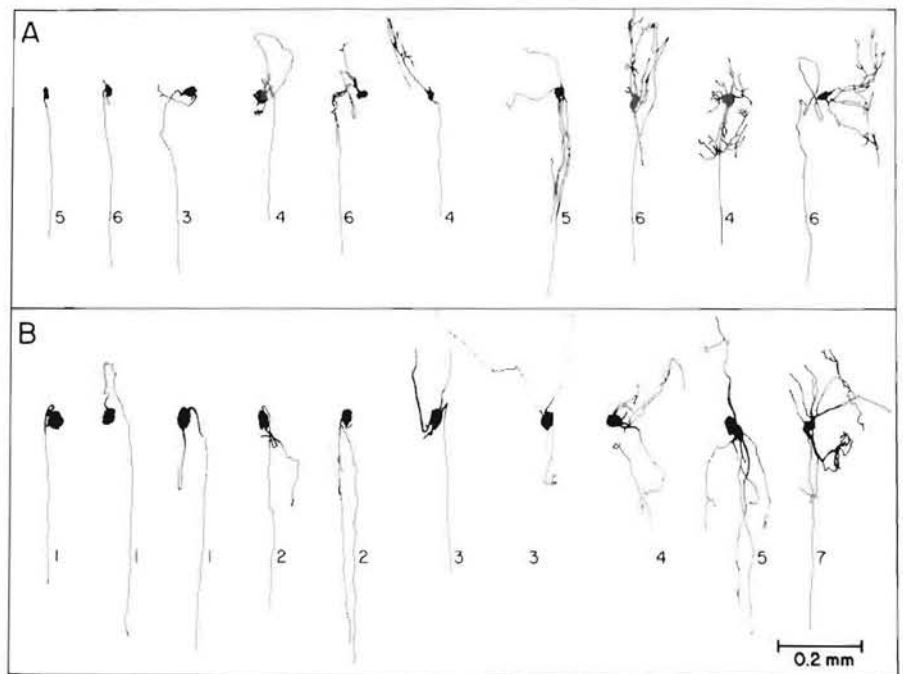
Purves' discoveries about the competitive aspect of neural connections in the autonomic nervous system have been built on a sturdy foundation laid down many years ago at Washington University. A trophic substance called nerve growth factor (NGF — discovered at WU in the 1950s by Rita Levi-Montalcini, M.D., and Viktor Hamburger, Ph.D.) is important for innervation of smooth muscle by sympathetic neurons. Early in development, those neurons which can't get enough of this trophic substance will die; the more successful will survive the competition among axons in the target cell's microenvironment. NGF may be one of many compounds for which nerve cell axons compete when innervating their target cells. "One of the many important aspects of Levi-Montalcini and Hamburger's work," Purves says, "is that it suggests what nerve cells might compete for during the establishment of synaptic connections. Target cells may generally produce agents like NGF that innervating axons struggle to acquire."

Monitoring this competition requires a veritable bag of biological tricks. Besides the electrophysiological measurements of the connectivity of autonomic ganglion cells as they mature, Purves and his colleagues use a marker enzyme (horseradish peroxidase) to visualize the anatomical changes characteristic of developing nerve cells. A nerve cell's anatomy, and destiny, seem to be correlated: evidently, the shape of a target nerve cell determines how the competition will unfold among axons innervating that cell.

"Nerve cell shape, at least in autonomic ganglia, seems to strongly influence competition," says Purves. "Different parts of the nervous system have a tremendous range of nerve cell geometries (shapes), ranging from very simple to extremely complex. Some cells have literally thousands of branches, and others have none. Nobody really knows why.

"Autonomic ganglion cell shapes also

Relationship between neuronal shape and innervation is shown in this two-part series. (A) shows the shape of newborn parasymphetic ganglion cells. The number beside each axon indicates the number of preganglionic inputs. (B) shows ganglion cells from adult animals. No consistent relationship exists between neuronal shape and inputs in the neonatal cells, but competition between axons results in a proportional relationship between shape and inputs in maturity.



have a surprisingly large range. The number of axons innervating a mature nerve cell goes hand in hand with neuronal geometry. Nerve cells without branches will be innervated by a single axon, whereas nerve cells with many branches are ultimately contacted by a commensurate number of axons. The more complex the target cell, the more protection for the axons innervating it. The way an extended surface protects synapses from interacting with one another is something we're trying to understand."

Working out the pattern of nerve cell connections in the autonomic nervous system may yield information about how nerve cell connections in the brain are established. However, Purves doubts that neurological research in animals other

than higher vertebrates will provide pertinent information about establishment of connections in the human brain: "The attraction of studying autonomic nerve cells is that you can do things with them that you just can't do in the brain, yet they are honest-to-God mammalian nerve cells that probably obey all the same rules as brain cells. But there's a danger in being too much of a reductionist. Apparently, these developmental features are not found in the nervous system of a worm. Lower animals really *do* seem to use the hard-wired approach in putting their nervous systems together. Our brains probably get their immense power not just from their size, but from a developmental strategy in which neural connections remain malleable for many years."

Nutrition:

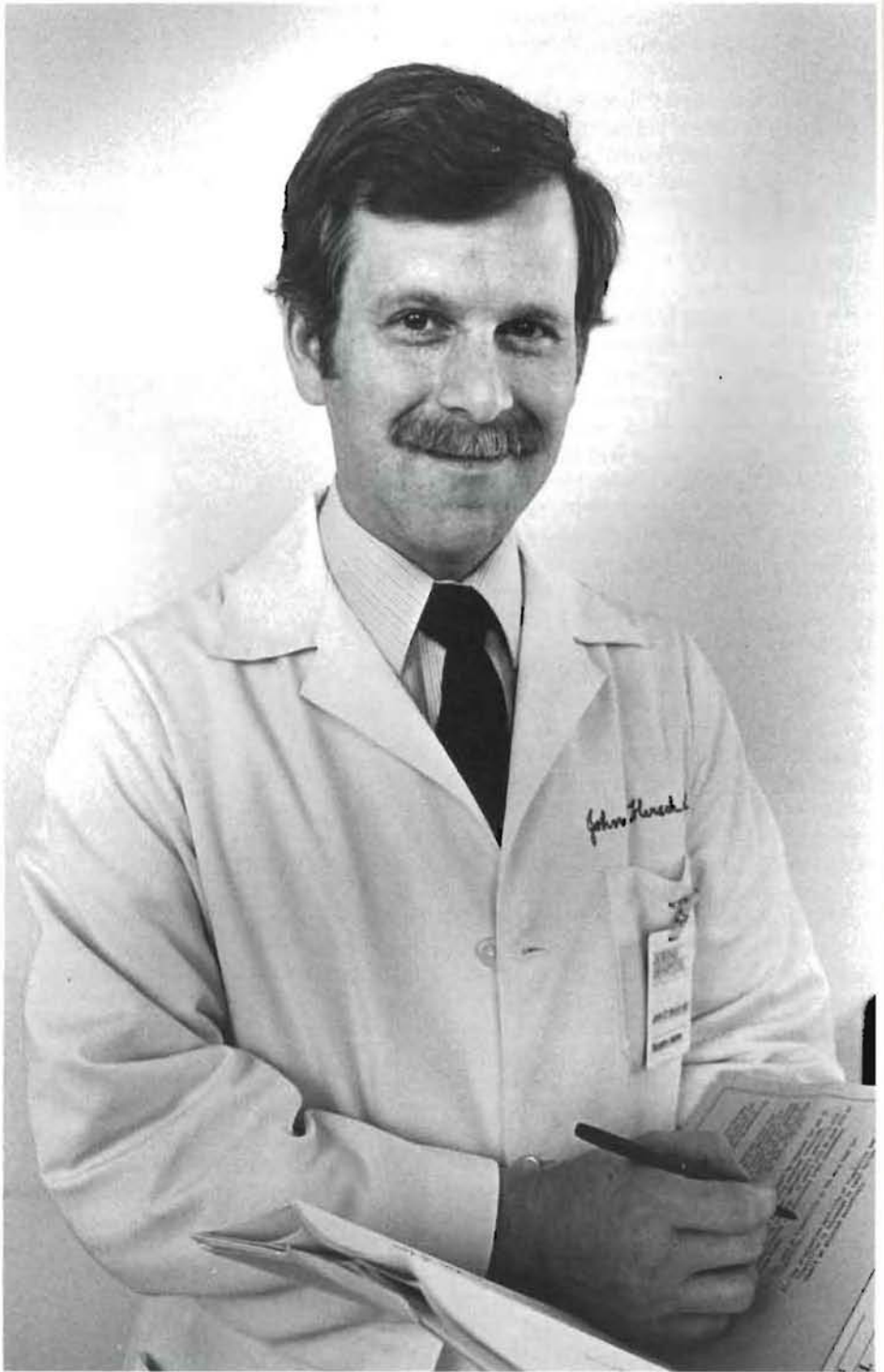
The Surgeon's Cutting Edge

by Denise Bogard and Suzanne Hagan

Unlike other teenage boys who spent their summers working on their tans or their tennis games, John Hirsch's single-mindedness went in a different direction — he would someday be a surgeon at Jewish Hospital, he promised himself. To that end, he spent his summers during the Vietnam War era doing research at Jewish Hospital under a succession of mentors. In 1963, for example, 15-year-old Hirsch conducted biochemistry research under the watchful eye of Sam Frankel, Ph.D. The following summer, Hirsch worked on an early version of the CPK enzyme analysis, a measure of the degree of damage caused by a myocardial infarction. And the summer after he graduated from Horton Watkins High School, he labored over non-H-2 histocompatibility mapping in the laboratory of Ralph Graff, M.D. In fact, all his summer breaks from Case Western Reserve University brought him back to St. Louis for more research at Jewish Hospital.

As Hirsch spent his final preparatory years at Washington University School of Medicine, his boyhood dream neared fulfillment. But before he graduated in 1973, chance sent him searching through a pile of books, unceremoniously dumped in a bin in the library, destined to be thrown out. One in particular caught his eye — and changed the course of his interest forever.

Parenteral Alimentation in Surgery: With Special Reference to Proteins And Amino Acids, published in 1947, was the rescued volume's title. Today, the tome occupies a place of honor on Hirsch's home bookshelves. Its author, Robert Ellman, M.D., just happened to have been a young Barnes surgeon who was the first physician in the U.S. to successfully administer proteins intravenously. Back then, physicians like Ellman maintained an all-night vigil by patients' bedsides to monitor their progress, so new and danger-fraught was this revolutionary nutritional technique. "Much of what Ellman had to say then is still valid today," says Hirsch, a clinical instructor



John Hirsch, M.D.

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in surgery at the School of Medicine. But the field of parenteral nutrition has progressed remarkably beyond the pioneering work that kept physicians up nights.

Ellman's patients received crude protein hydrolysates coursing through their intravenous catheters — and anaphylaxis usually was not far behind. Today, nutritionally deprived patients — cancer patients, burn and trauma victims, and persons with inflammatory bowel syndrome — can safely receive intravenous "meals" of crystalline amino acids, vitamins, trace minerals, glucose and fatty acids.

"Now, our patients have much more available to them than just a crude solution of protein and calories," reports Hirsch. "And patients who are properly nourished fare better than those who are not," he continues. "They do better post-operatively, they respond better to medical treatments, and they have fewer complications from their surgical treatments."

But total parenteral nutrition (TPN) has not been without its pitfalls. It took until the late 1960s for Ellman's ideas to catch on, and once the medical profession did take note, they overdid it. Named as "the fourth great coming" (anesthesia, asepsis and antibiotics being the first three), TPN was hailed — then nearly failed; complication rates from the procedure were unacceptably high. It took the efforts of Hirsch and others who saw the benefits of TPN — and ways around its complications — for Ellman's ideas to flourish. Today, reports Hirsch, the sepsis rate for TPN has decreased from 10 percent to less than 0.5 percent, and fewer than 5 percent of patients develop complications from central vein catheterization.

To make sure that patients at Jewish Hospital get exactly the kinds of nutrients they need, in the amounts they need, Hirsch set up a nutritional support team in 1978 to assess each incoming patient requiring parenteral nutrition.

The interdisciplinary team has a number of roles. For example, the team nurse conducts the nutritional assessment and instructs patients on catheter care. The nurse is also involved with instruction

of patients who are released from the hospital but continue parenteral nutrition at home.

The pharmacist on the team also plays a key role, for he or she must keep abreast of new nutritional products on the market, selecting the correct one for a particular patient. The pharmacist must also supervise the product's preparation and storage.

A dietitian supervises patients who are on tube feedings or who are taking some food orally, particularly those who are moving from parenteral feeding to enteral. A social worker helps the team nurse work with home-bound patients.

The team's objective is to return patients as quickly as possible to a normal nutritional mode: "Patients should not be NPO more than three days, if possible," explains Hirsch. "We're not here to starve people."

"Any patient whose albumin is less than three, or who has lost more than 10 percent of their body weight in the last six months, is flagged," says Hirsch.

"I get a computer printout each day," he continues. "Patients whose nutritional status is severely compromised might get a more thorough workup: anthropomorphic measurements, energy skin testing, and other estimates of a patient's energy requirements." He points out that a new Beckmann MMC Horizon System permits indirect calorimetry via measurements of oxygen consumption and carbon dioxide production, plus measures of the ventilation volume.

From Hospital To Home

Hirsch has also pioneered the establishment of a home TPN program in 1979, enabling patients who were in the hospital only for nutritional support to go home and administer TPN themselves. In five years, home TPN has grown from use by just a few dozen patients in the U.S. to about 3,000 today. And in St. Louis, seven hospitals have adopted home TPN,

including Children's Hospital and several services at Barnes Hospital.

But there are obstacles to overcome with TPN. Although in-hospital TPN is costly (about \$15,000 to \$30,000 per month), the home TPN program is not cheap: it costs about \$30,000 to \$40,000 per year, certainly a sum outside the reach of most patients. However, Medicare and Medicaid will fund selected TPN patients.

Another problem with intravenous feedings is the perennial battle against infection and thrombosis. But Hirsch has developed a second-generation catheter which has features designed to minimize these problems.

The intravenous catheter has uses other than delivering nutrients. For example, it can also be used by patients who would be able to go home, save for their need for antibiotics or analgesics such as morphine. "Home patients with terminal cancer can adjust their intake of morphine so that they can be comfortable but not euphoric," says Hirsch. "And patients with osteomyelitis, SBE (subacute bacterial endocarditis) or histoplasmosis can very nicely receive their antibiotic therapy at home, at much less cost and just as effectively as they can in the hospital."

Since St. Louis is in a region known to be endemic for histoplasmosis, home administration of amphotericin or other antibiotics for histoplasmosis is a definite need. "In general, home administration of antibiotics is accepted by many physicians," says Hirsch. "But home chemotherapy for cancer patients is more problematic. Doctors are not as sure of its effectiveness, and not all chemotherapeutic agents are suitable for home administration."

Nevertheless, self-administration of nutrients and medications at home is a growing field whose surface has just been scratched. "One of the most satisfying feelings I ever have," admits Hirsch, "is sending a patient home who would otherwise have to be hospitalized." ■

Denise Bogard is a St. Louis area freelance writer.

MARRIAGE BETWEEN

■ A quadriplegic calls a nurse by simply blowing a puff of air, which activates an electronic “buzzer”; the nurse responding to the patient’s call in the neurological unit at Barnes Hospital may be the one to provide home care, should the patient need skilled nursing once discharged.

■ A physician calls in a physical therapist to identify a patient’s pathokinesiology (dysfunction of movement). Once the diagnosis is agreed upon, the therapist decides what type of treatment is best — and provides it.

■ In 1968, Time Magazine featured a story about Robert M. Arhelger, an honor student at Stanford Law School. A 1957 “graduate” of newly established Irene Walter Johnson Institute, he was a wheelchair-bound man with cerebral palsy. Today, someone like Arhelger would be unlikely to attract the attention of a national magazine.

None of these events may seem especially remarkable. But they are symptomatic of the vast array of changes in the evolution of modern medicine. They also are clear signs that developmental disabilities — such as cerebral palsy, epilepsy, autism, and mental and learning disabilities — no longer confine individuals to a lifetime of institutionalization with a diagnosis of “mentally retarded.” And it means that future Franklin Roosevelts won’t feel compelled to hide the extent of their disabilities from the rest of the world.

At Washington University Medical Center in St. Louis, state of the art medicine is wedded to the kind of old-fashioned, individualized care that supports and enhances recovery. Nowhere is that more apparent than in the services offered by Irene Walter Johnson Institute of Rehabilitation (IWJ), directed by Michael H. Brooke, M.D., and Jewish Hospital’s rehabilitation services headed by Franz U. Steinberg, M.D., research assistant professor of surgery at the School of Medicine.

IWJ provides outpatient care and inpatient therapy for patients at Barnes and Children’s hospitals. The institute’s services include physical, occupational and speech therapies, social work, exercise and fitness programs, cardiac rehabilitation, and home health services. In addition, specialty clinics provide services to amputees, burn patients, and patients with muscular diseases.

Jewish Hospital has four full-time physical medicine and rehabilitation physicians staffing a 55-bed rehabilitation unit that provides physical, occupational and speech therapies, psychological counseling and social work. In addition, rehabilitation nursing care teaches patients proper skin care (such as how to avoid bedsores), and spinal cord injury patients learn to accommodate their bowel and bladder functions. Jewish Hospital has the only residency program in St. Louis for physicians specializing in physical medicine and rehabilitation.



Mr. and Mrs. Cassius Lee relax for a moment before Mr. Lee’s physical therapy session starts.

BODY AND SPIRIT

New Specialty

"If we think about it, the effects of a physical disability on the human body are extremely complex, both physically and psychologically," remarks Steinberg, clinical professor of medicine and an internist by training. "Disability affects almost every aspect — muscle movement, bone metabolism, kidney function, the liver — everything is in some measure affected by immobilization. This is why we need physician specialists."

Physical medicine is a fairly new medical specialty, established in 1947, with rehabilitation added in 1949. And the need for rehabilitation services has increased dramatically. "Many more people survive serious injuries and accidents than they used to," says Steinberg, associate clinical professor of preventive medicine and public health. "In World War I, 50 percent of all persons with spinal cord injuries were dead within a year. Now, young adults who suffer a spinal cord injury can expect to have nearly a normal life expectancy. But unless something can be done to help them adapt to the disability, then the survival is not really worthwhile."

"Now, there are about 2,000 board-certified rehabilitation physicians in this country. It's estimated that we need about 4,000. For that reason, this is one specialty where there is still a lot of room for young doctors to enter."

Fortunately, interest in the field is growing. Steinberg says that there have been nearly 180 inquiries about the two residency positions available in July. And the doctors entering the field are much better trained and have a strong interest in research, he reports.

Steinberg comments on some of the changes he's witnessed during his 25 years in rehabilitation medicine at Jewish Hospital: "Surgeons used to amputate everybody above the knee. Now they have learned that a lot of amputees can get by with amputation below the knee."



Franz Steinberg, M.D., and therapist Patti Watson put patient James Hood through his paces on the parallel bars in Jewish Hospital's rehabilitation service.

And so, correspondingly, our methods of rehabilitating these people have changed.

"Some doubted that older amputees would actually use a prosthesis, but statistics say otherwise," comments Steinberg. "In a recent study of 100 below-knee amputees aged 65 and older, 73 percent used their artificial limb all the time. Since the survey was taken two to three years after these people were fitted, I think this indicates that these people *will* benefit from a prosthesis.

"But rehabilitation is more than just fitting people for prostheses," continues Steinberg. "We also have to work closely with other hospital departments and specialists, such as vascular surgeons who perform amputations. We collaborate with the division studying bone and muscle metabolism, and with orthopedic surgeons who rely on us to help exercise their post-operative and post-fracture patients. And we work very closely with the respiratory disease service because we help them rehabilitate patients with chronic lung disease."

New Attitudes

This interdisciplinary cooperation is also a departure from traditional medical care, in which singularity or fragmentation was the rule. Traditionally, says Brooke, director of IWJ and professor of neurology and preventive medicine and public health, "patients came to be treated at the hospital and we sort of waved goodbye to them at the doorstep." William M. Landau, M.D., co-head of the Department of Neurology and Neurosurgery, agrees: "At some point in the past, things got off the track. The acute care doctor would just tip his hat and walk away, leaving to somebody else the task of moving (the patient) on."

The differently-abled learned that traditional medicine wasn't interested in doing much for them. Even today, says Brooke, many medical schools don't offer courses on rehabilitation, and only half offer a lecture on the subject.



A young patient captures the attention of Michael Brooke, M.D., director of Irene Walter Johnson Institute of Rehabilitation.

"Most of orthodox medical practice hasn't been concerned with what happens to the patients after they leave (the hospital)," admits Brooke, professor of neurology at the School of Medicine. "We assume they can work things out for themselves, but that's not true. And if you can't even begin your day by dressing, there's not a lot of hope you can accomplish anything else. But if a loop sewn on the side of your pants allows you to pull them on with a stick, then you at least have a start.

"There's nothing very showy about the majority of rehab," continues Brooke. "However, it's pretty spectacular to the patient who's suddenly able to dress, unaided, for the first time, or cook a meal."

But Brooke, professor of preventive medicine and public health, laments the fact that it took the medical profession so long to learn the value of rehabilitation: "Muscular dystrophy was formerly regarded as a fatal disease. Patients usually ended up bent like pretzels in wheelchairs. The family had to be at their beck and call; no one got any rest. The orthodox medical dogma at that time was, 'don't do anything; it's not worth doing anything.'

"But we and others working in the late '60s found there were *many* things you could do. They weren't very dramatic, but you could keep people straight and walking. We ended up with kids who were *not* horribly twisted and we were very encouraged.

"When I came here a few years ago, it was with the hope of applying that same kind of knowledge to other problems. And within the past few years, we've seen some changes. Orthopedic surgeons now call and say, 'Look, I've got to get this patient out of the hospital — can you help me?' Neurologists call and say, 'I've got a patient who can't talk. Is there anything you can do about that?'"

Since the Rehabilitation Act of 1973, there have been some startling changes in the concept of rehabilitation, says Diana Reed, head of the department of social work at IWJ. "That's when the movement

for independent living really got its impetus," she says. "It began with the disabled becoming concerned about their position in society and their feelings about being treated as second-class citizens. Many were dehumanized by their medical care and rehabilitation, even after their hospital stay or medical care had ended. They began clamoring for attention to their problem and demanding some rights.

"The Act forced us to ask some difficult questions," remembers Reed, "like, 'Are we really rehabilitating people in a hospital?' 'Are we really recognizing that these are human beings who are going to be leaving to go out in the world?' It took

a lot of disabled people to say this to us to get any action," Reed continues. "There were also many able-bodied persons and professional people with these same concerns. This forced us to shift our thinking away from how well a person does in our ADL (Activities of Daily Living) kitchen, to how well they'll do in their own home."

"A surgical procedure, or a medicine, or a traditional medical intervention is not going to teach someone to get in and out of a bathtub," emphasizes Carolyn Baum, director of occupational therapy at IWJ.

Brooke comments: "We who perform rehabilitation are not involved in the medical cure of patients' illness — that is a



Gini and Joe Laurie, volunteer editors of the Rehabilitation Gazette, receive President Reagan's Distinguished Service Award last spring from Justin Dart, Jr., (right), Vice Chairperson of the National Council on the Handicapped, on the 25th anniversary of their journal's existence. "Gini is a real leader," says William M. Landau, M.D. "Her ideas about independent living really led the way for others." (photo by Stewart Halperin)

function of their physician. What we're interested in is taking patients with chronic illness and putting them back where they function best. That's done both here and at home."

Brooke arrived in 1975 to head the neuromuscular research center; in 1979, he assumed directorship of IWJ. Since Brooke's arrival, a number of changes have taken place. There's now a satellite IWJ center at Westport ("why should they come down here when their doctor's office is out on Ballas Road?" queries Brooke). And in 1982, a home health service was added so that skilled nursing care, physical and occupational therapy, medical social work, speech pathology, home health aides and nutritionists can bring quality care to the patient — IWJ makes house calls, just like in the olden days. (So does Jewish Hospital, which also has a home health service begun in 1953 to follow up patients with spinal cord injury, and other problems.)

Community Involvement

"It's my belief that we have to get out into the community — we have to treat the patients where they live," says Brooke. "If you had a bank that you had to drive 200 miles to get to, you wouldn't go."

"We find that by catering to the patient, we learn a lot," Brooke continues. "We have conferences every Friday. Last week, we presented a case of a severely disabled man who was being treated at home by a physical therapist and occupational therapist. The PT wanted to treat him here because of the equipment, but the OT needed to treat him at home — the patient needed to learn to use his own bathroom and kitchen. You can't rehab somebody in theory, you have to rehab them in practice."

Brooke and his staff extend their community involvement in other ways. For example, Carolyn Baum is one of the occupational therapists who volunteered for "Project Start," a Saturday program aimed at helping severely disabled per-

sons acquire social skills. About 60 disabled persons, along with 30 able-bodied volunteers, get together to learn everything from how to use a computer to putting on makeup to playing cards or chess, to participating in discussion groups on assertiveness or sexuality. Speech and occupational therapists volunteer to staff a once-a-month clinic to refer the disabled to appropriate community and medical services.



Carolyn Baum, head of occupational therapy at IWJ, assists Esther Cutler during her visit to IWJ's ADL kitchen.

OASIS, a program for older adults, brings them to Famous-Barr department stores all over the metropolitan area for a variety of experiences, including education. One of the high-interest topics is learning more about medical conditions prevalent among the older population, such as arthritis and stroke.

Work Capacity Evaluation, a new program at IWJ, assesses physical or behavioral aspects of work performance. Patients referred to it by their physician or a vocational rehabilitation counselor will have their job broken down into clusters of work. If they have difficulty performing these job clusters, OT can build "work hardening programs" to build the skills to enable return to work, if possible.

Resistance

But it's a wonder that rehabilitation gets off to any kind of start if what Brooke says is true: "Fewer than 10 percent of physicians will be able to tell you the difference between occupational therapy and physical therapy; only about 20 percent even know there are such professions. I think it's just that we're too undramatic and nonglamorous — we don't do medicine, we don't do surgery."

But what rehabilitation *does* do is to make possible the goal of the differently-abled: independent living. This doesn't mean that a person will suddenly be freed from using a wheelchair. Rather, with the assistance of electronic devices (and perhaps an attendant) — and with the skills learned from occupational therapists, strength gained from physical therapists, or speech enhancement from speech pathologists — a differently-abled individual can make the most of his or her life. "People sometimes complain about the charges for rehab," says Baum, "but it is (paying for) a very intensive, individualized approach that is very cost-effective. Later, the disabled person may be able to work, or not need attendant care, or not require family members to give up their lives in order to care for them."

"It's very frustrating when the outcome has so much potential for the individual's healthy status," continues Baum, "yet people determine that what we do is too expensive. And it has to be more than a 10-minute effort — if you don't look at the patient's life and environment, you're not doing rehab; you're just providing a service."

As Brooke pointed out, none of IWJ's patients tells tales of miracles. But it's obvious that the rehabilitation services at Washington University Medical Center have been a godsend to them, a small miracle of normalcy in their daily lives — the gift of hope. ■

Rehabilitation

Personal stories

There are many patients for whom the systems don't work, or who have to fight for their treatment. For example, it might appear that 76-year-old Cassius Lee doesn't have a thing going for him. His 40-year battle with diabetes culminated in typical fashion: amputation of his left leg below the knee, due to complications from the disease. Later, his right leg also had to be



amputated. But before the second operation had come a stroke, which left him partly paralyzed on his "good" side — making the former Pullman porter ineligible for a prosthesis. However, Lee had other ideas.

"I want to be able to do things for myself," he explains, "even if it's just getting my own drink of water."

This fighting spirit led Lee from the Amputee Clinic at IWJ to the Home Health Unit. "The occupational therapist who came to our home was just wonderful," exclaims his wife, Frankie Lee. "She sewed Velcro on his shorts to make it easier for him to dress, and the physical therapist helped us with many things, too. They even made friends with our dog," she says, smiling.

Now, Lee receives outpatient physical therapy twice weekly at IWJ. Therapist Mike Mueller instructs him on gait training and that most difficult of tasks for a

bilateral amputee — getting up from (or back into) a wheelchair. In Lee's case, perceptual difficulties from the stroke have added to the normal degree of difficulty, but his spirit and determination are evident.

"Mr. Lee is especially fortunate in having such a supportive family," explains social worker Reed. "His wife has been by his side constantly, and his relatives drive him down here and work with him at home." In fact, Lee's cousin was trained by Shirley A. Sahrman, Ph.D., neurophysiologist and physical therapist at IWJ, to care for his former employer who was a 285-pound quadriplegic. Now, he uses that experience to help guide his relative in the techniques he needs to walk.

For some patients, struggling to learn rehabilitative techniques is secondary to fighting for the means to afford them. Although Medicare will pay 100 percent for skilled care, Mary De Benedetti (coordinator of IWJ's Home Health Agency) describes one patient who, as she puts it, tends to fall through the cracks of Medicare. "One of our patients with amyotrophic lateral sclerosis (ALS, sometimes called "Lou Gehrig's disease") is at home, not in a nursing home, because therapy has kept him somewhat mobile and out of the hospital."

This man receives OT and PT at home, and a home health aide comes in regularly to bathe him. But these services depend

on Medicare's continued funding, which is tenuous at best: "Medicare's criterion for paying for these services, which also has been adopted by most major insurance companies, is that the patient must show some sort of progress within three weeks," says De Benedetti. "Otherwise, they discontinue payments for services. Progress, at least for him, is keeping him from becoming bed-bound."

It might seem strange to consider that premature infants have occupations, but they do: eating, eliminating and emitting sounds. They also must open their eyes, respond to stimuli and, in general, become aware of the world they have so suddenly entered. Many preemies need to be on a respirator, which can make them irritable later on and have long-term effects on their behavior and development. All of these needs are within the realm of occupational therapy, says therapist Rosemary McLaughlin.

Bianca, aged 7 weeks, was born at 28 weeks' gestational age. Even though she's been in this world a month and a half, she's developmentally lagging behind her newborn peers outside the neonate ICU at Children's Hospital. McLaughlin has constructed a mobile — black shapes drawn on a white background — that she uses to stimulate Bianca's sensory awareness. While dangling the mobile in front of Bianca, McLaughlin handles her and talks softly to her, calling her by name.





To look at Jean Holtz, a 52-year-old homemaker, nothing seems out of the ordinary. Well dressed, attractive and ambulatory, her hands never seem to stop working. But in addition to her needlework, Holtz occasionally pulls out rather unusual items from her sewing basket — a lump of clay to begin working, or a stick to roll around with her hand. These and many other activities, designed for her by Marlene Coe, OT, are aimed at returning Holtz's arthritic hand to normal flexibility and range of motion following surgery to correct tightened collateral ligaments and tenolysis of the flexor tendons. In addition to activities to restore flexibility, Coe has designed a "night glove" that keeps Holtz's joints flexible.

"I had arthritis so bad for so many years that I couldn't even remember the right way to button a blouse," says Holtz. "After the surgery, it was like having to learn everything all over again. I couldn't make a fist or hold my fork the right way

to cut my meat. The little things ordinary people take for granted, arthritics never do."

Although their long-awaited daughter seemed as normal as her three older brothers, the parents noticed that something seemed unusual just as their beautiful little girl reached toddlerhood. Consultation with local physicians didn't help, even when the child began to suffer the series of seizures that left her weak and developmentally delayed. This southern family travels to IWJ because of the individualized attention they receive, plus the staff's knowledge of the latest in technological developments that assist the differently-abled to perform routine tasks.

"After seizures, she loses a lot of muscle tone, and I had to hold her to feed her. This was rather difficult, to put it mildly. Therapists at IWJ showed me how to use blue Dycem (a thin foam material) in her highchair to keep her from sliding out,"

explains her mother. "They also showed me what a bath seat was, and how to use it. That has literally saved my back."

Therapists also constructed a standing board (a special device to keep the little girl upright while she played) and used the blue foam on her tray to keep her toys in place. "She was so weak that she'd just flop over in a normal jumpseat," remembers her mother. "But the standing board helped keep her in a normal position, so she doesn't have to always sit while she plays. The Velcro straps allow us to adjust it with her growth.

"We want to continue to come to IWJ, at least semi-annually, to get new ideas of how to help her as she grows. And IWJ's evaluation helps the therapy center in our area, where we take her two or three times weekly, to know how to help her." ■

Glossary of services offered at Washington University Medical Center

occupational therapy (OT): teaches skills to enhance ability to perform tasks of everyday living, ranging from the simple (such as eating) to complex (such as driving)

physical therapy (PT): teaches procedures and exercises for attainment of stronger or more functional musculoskeletal system

social work: performs a variety of functions, including psychological counseling, case management, providing information about other services (such as rehabilitation), and acting as liaison for agency followup

speech pathology: synonymous with speech therapy; teaches a range of communication skills, from showing a child how to produce sounds to providing a non-verbal adult with an electronic communication device

Technology Enriches Rehab Efforts

One Way or Another

L. Andrew Oldroyd, Ph.D., assistant professor of computer science, uses a small tabletop robot to develop software enabling easier performance of simple kitchen and bathroom chores. "My interests are primarily in the person to robot connection," Oldroyd says, "and how to make robots work for and with people. The technology is there, all the components are present. It is a matter of putting the components together and getting the software developed, all at inexpensive prices. The value of a robot lies in the increased self-sufficiency it can provide."

But Saul Boyarsky, M.D., professor of biomedical engineering and surgery (urology), remembers one idea of the 1960s that just didn't pan out as intended: "People got the idea that they could adapt the cardiac pacemaker to stimulate other organs such as the neurogenic bladder (which refers to any neurologic disorder affecting the bladder). Although I was doubtful — and so was a granting agency — I organized a conference and invited all clinical and preclinical services, engineers, urologists, neurosurgeons, rehabilitationists, government officials, grants people, lab people — everyone who would have any expertise in this area.

"It turned out that this application was inappropriate — the cardiac pacemaker applied to smooth muscle organs never amounted to much. It was technologically rudimentary, it was naive in scientific concept — but it led to one heck of a lot of good research. We quickly learned that we didn't know enough about the physiology of the bladder. We later realized that physiologically speaking, the bladder was more like the bowel or uterus than the heart; because of the bundle of His, the heart is responsive every second, whereas the bladder, like the uterus, devoid of this built-in nerve network, is receptive to stimulation less frequently. The stimulus travel time and course are still unknown.

"So everybody got together researching for 15 years and came up with a new generation of instruments and, more importantly, new concepts. Soon, we had potential new drugs, new operations, and

new ideas on therapy — a whole new subspecialty was created, called urodynamics. And all because of our attempts to prompt the neurogenic bladder to empty.

"You know, it's better to do something wrong than not to start at all, provided you are quick to recognize mistakes," concludes Boyarsky, a staff physician at Barnes, Jewish and Children's hospitals.

As Boyarsky points out so well, research in one area often provides unexpected bonuses in another area. Carolyn Baum, OT, is grateful for space program research because it has provided many dividends for rehabilitation. "Velcro was developed for spacesuit closure and traction," says Baum. "That made it possible for people with very limited strength and grasp to be able to handle and manage clothing.

"Astronauts are seated for a long time," Baum continues, "and they need to avoid skin problems. So Temper foam was de-

"You know, it's better to do something wrong than not to start at all, provided you are quick to recognize mistakes."

veloped. It equally distributed weight, helping avoid pressure lesions. Now we have additional aids which help avoid bedsores: gel pads, foam pads — all of which were developed with the space program as a stimulus.

"The newest items from the space program are computers and electronic switches, which can be used even by someone who only has a capacity to blink their eyes or nod their head. They can use these electronic devices to answer the telephone, lock the door or windows, activate a nursing call button, or turn on a television or radio."

Edie Hapner, coordinator of speech pathology at IWJ, describes how patients are assigned electronic communication devices: "We provide a comprehensive team evaluation for persons who are un-

able to communicate by speech," she says. "And since many of these people also have a motor deficit, they may not be able to write or manage a hand-held electrolarynx. The team's speech pathologist decides at what level the patient can communicate: does it have to be pictures on a board, or can it be as complex as an electronic device that combines phonetic sounds into speech?"

The devices that IWJ speech pathologists choose from include very small, lightweight computers with built-in keyboard, printer and LCD display; electronic boards (with squares that can contain symbols, pictures, words/phrases, etc.) activated by a treadle switch or other device; and for weak or ventilator-assisted patients, a bedside device with push-buttons for specific needs.

But accusations that technological development has caused research on spinal cord regeneration to be neglected aren't true, says William M. Landau, M.D., Andrew B. and Gretchen P. Jones Professor of Neurology, and neurologist-in-chief at Barnes and Children's hospitals. "Research on nerves has been keeping people busy for 150 years. But regeneration as such is something unresearchable — you can't just cut the spinal cord and see what makes it go back together. However, you can investigate the growth of the nervous system, which is really the same problem. There are lots of people here doing just that, and of course, Levi-Montalcini's discovery of nerve growth factor was really epochal.

"But despite the fact that there's tremendous research activity on nerve growth, people are unwilling to face the fact that within our lifetimes, nobody's going to be able to sew the spinal cord back together. People whose children are affected don't see any of this (research) as pertinent — they want the spinal cord sewn back together tomorrow. The tragedy is that the patient sits around waiting for magic to come out of the sky. By the time he finally comes to realize that there isn't any magic, his life's all over." — Suzanne Hagan ■

NICOTINE & N

Medical investigators have already established a link between cigarette smoking and cancer. While the tars in smoke are known to be carcinogenic, the biological impact of other smoke components has not received equal scrutiny.

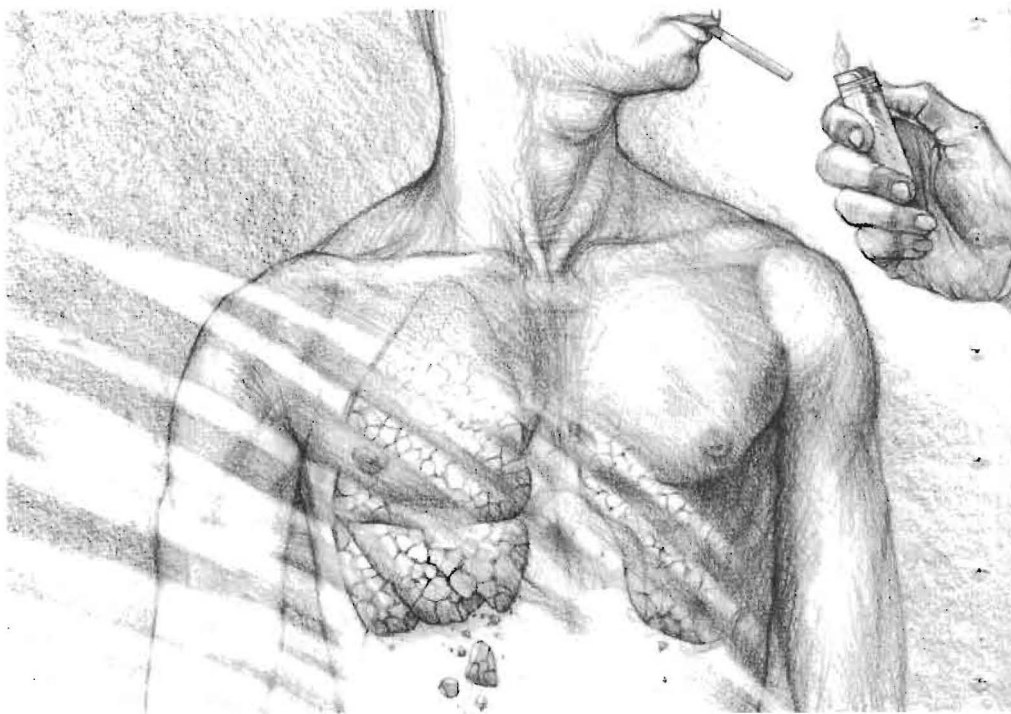
Recently, however, Jewish Hospital researchers at Washington University Medical Center conducted several tests with nicotine, another noxious component of cigarette smoke. They found that nicotine may be linked to the accumulation of destructive white blood cells in the lungs of emphysema victims who smoke.

These cells, polymorphonuclear neutrophils, are normally considered the "good guys" of the body's defense against invading bacteria. But when gathered in high concentrations, neutrophils wield their destructive force haphazardly, maiming not just outside invaders but nearby healthy tissues as well.

In a *Science* article describing their work, the researchers reported proof that nicotine strongly attracts potentially dangerous neutrophils. This group of researchers, led by Robert M. Senior, M.D., has previously shown that an accumulation of neutrophils contributes to the catastrophic tissue damage seen in the lungs of emphysema patients.

"In the lung, the high concentration of neutrophils becomes a hazard — too much of a good thing," explains Senior, professor of medicine. "We've demonstrated that the amount of nicotine needed to attract neutrophils is approximately what might be present in the lungs of a person who smokes cigarettes. This study is one more compelling piece of information supporting the theory that inhaling cigarette smoke harms lung tissue."

Research fellow Kevin McCusker, M.D., co-author of the *Science* article and instructor at the School of Medicine, says that while the effects of nicotine have been studied extensively in the nervous system, "nicotine's wider role in cell biology has never been addressed.



Bob Senior suggested that we look at what nicotine does to neutrophils, the inflammatory cells that destroy lung tissue in emphysema victims."

Neutrophils are the front-line patrol of the body's self-defense system. Spherical in shape, they speed with low resistance through the tiniest blood vessels. Yet when they sense an invader is near, they can change their shape, locating bacteria or viruses by slithering around other cells.

Once they meet their opponent, neutrophils unveil their formidable three-fold weaponry. They can release the potent toxin superoxide, exude enzymes which digest vital components of any nearby cells, or phagocytize any bacteria or renegade cell close enough to engulf.

"We were trying to demonstrate whether nicotine would cause an excessive accumulation of blood cells — particularly neutrophils — in the lungs," Senior explains. "That situation can lead to lung damage because these neutrophils carry very active enzymes which, if re-

leased, can digest lung tissue." The enzyme of concern is elastase, which preys upon its namesake, elastin. Elastin is the protein molecule which gives lung tissue its unusual ability to stretch in both width and length.

"Is the nicotine that's carried in cigarette smoke capable of attracting white blood cells to the lung tissue, where they might then go on to do their damage as a result of the enzymes?" poses Senior. "The outcome of this study was that nicotine does indeed have that capacity — at least when tested in a very special circumstance."

The "special circumstance" Senior mentions, is not the lung itself, but rather an ingenious yet simple laboratory test. During the test, varying concentrations of nicotine are placed in one side of a small chamber and white blood cells collected from volunteer nonsmokers are placed in the other side. The cells and the nicotine solution are separated by a small interchamber or "neutral zone" into which the cells will migrate if they are attracted

NEUTROPHILS

by Don Clayton

to the nicotine. To get their results, the researchers need only wait the specified time and then, using a microscope, count how many cells have migrated towards the nicotine.

McCusker notes that there is no way to know for sure if cells react to nicotine in the lung the same as they react to nicotine in the chamber, but says their results are "very suggestive." And he points out that these chambers, called Boyden chambers, are used by scientists worldwide as the standard technique for estimating attractions between chemicals and cells in the body.

"We proved that nicotine was chemotactic — that it is a powerful attractant of neutrophils," says McCusker. "Our tests also showed two other things. First, exposure to nicotine enhanced the white blood cells' response to other migratory stimuli, namely a peptide released by bacteria." McCusker believes this result is especially significant in emphysema research because most emphysema victims also suffer from chronic bacterial lung infections.

"It's feasible that nicotine and a lung infection may add up to a one-two punch," says McCusker. "Alone, the nicotine might attract a dangerous concentration of neutrophils, but even more may be attracted if the smoker has the kind of lung infection seen commonly in emphysema or chronic bronchitis."

The second finding is that, while the nicotine did attract neutrophils, it did not cause them to emit the enzymes which can digest lung tissue. Does that weaken the premise that nicotine may contribute to chronic inflammation of smokers' lungs?

"Not at all," says McCusker. "That line of reasoning is still sound. It's very possible that it doesn't really matter if the nicotine causes the release of the enzymes. There are more than 2,000 chemical compounds in smoke. Perhaps one or more of them cause enzyme release. I've already mentioned the possible one-two punch of bacteria and nicotine. Bacteria, for example, readily cause neutrophils to

expel their damaging enzymes."

And Senior suggests, "There could be any number of factors inside the lung to induce enzyme release once white blood cells are recruited by nicotine. These factors can have a cumulative, devastating effect."

McCusker and Senior also note further bits of evidence which paint a dismal picture for smokers. Other links between smoke and tissue damage include findings from experiments conducted by Aaron Janoff at University of New York — Stony Brook, which establish that smoking and components of smoke inhibit lung tissue's natural resistance to neutrophil enzymes.

"Smoking," McCusker explains, "appears to inhibit what little resistance lung cells may have to elastase. The nicotine causes neutrophils to migrate. Meanwhile, another smoke component cuts off lung cells' self-defense against the haphazard destruction of neutrophilic enzymes by deactivating plasma-borne elastase inhibitors. If elastase is released in the presence of nicotine, it could really go to town." The elastase inhibitor cut down by cigarette smoke is alpha-antitrypsin. Janoff and others found that smoke oxidizes and therefore neutralizes alpha-antitrypsin.

"Another group of researchers," comments Senior, "led by Ines Mandl at Columbia University, has shown that cigarette smoke hinders the repair of elastase-damaged tissue. Lysyl oxidase, the enzyme which knits elastin into sheets of flexible, resilient lung tissue, is deactivated by smoke. With no lysyl oxidase to cross-link elastin molecules, vital connective tissue in the lung remains destroyed."

Projects paralleling the work of Mandl and Janoff have been conducted in Senior's laboratories at Jewish Hospital. One of Senior's associates, assistant professor Edward J. Campbell, has done pioneering work showing that some cells found in lung tissue may act as vectors for neutrophil elastase.

The cells Campbell examined were alveolar macrophages, another type of

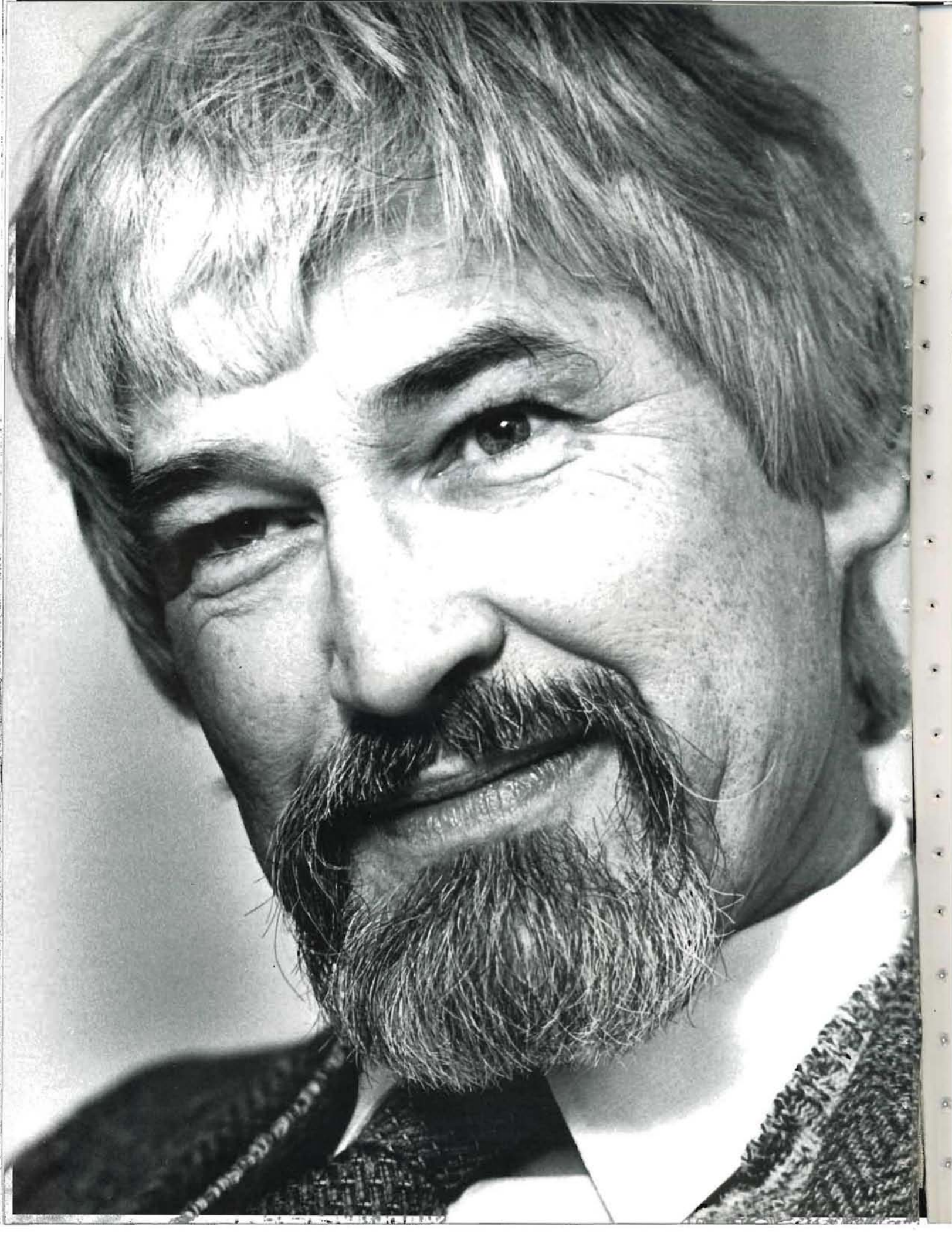
white blood cell that — like a vacuum cleaner — pulls in any elastase which binds to its cell membrane. If placed under duress, the macrophages will re-release all the active neutrophil enzymes they previously ingested. Much like ripping a hole in the vacuum cleaner bag, the dust — elastase — collected from all over is dumped in one place, in a high concentration. Like neutrophils, macrophages are duped into aiding smoke's assault on lung tissue.

"It looks like there are many facets to the mechanism by which smoke and its nicotine can contribute to emphysema," says McCusker. "Bob Senior and two other noted Washington University researchers, professors John Pierce and Charles Kuhn, were among the very first to propose that emphysema is the result of a complicated combination of causative factors. We're not trying to be narrow-minded and look just at this most recent experiment and say we've found the answer. We know that the pathogenesis of emphysema is intricate, but we also know that smoke's effects are very widespread.

"I think that there is a need for continued public education in the area of smoking and that the public is very much unaware of the dangers of emphysema associated with smoking," continues McCusker. "Most of the smokers I have in my clinics who deal rather flippantly with cigarettes say, 'I'm going to take my chances with lung cancer.'"

"Well, that's not the whole truth. They're taking their chances with kidney cancer, cancer of the pancreas, cancer of the esophagus, heart disease and emphysema. It affects virtually every organ of the body. I hope our study with nicotine, where we show its effects on basic blood cells, is going to help people realize that smoking causes disease in many systems of the body." ■

Co-authors of the Science article include research associate Gail Griffin, assistant professor Edward J. Campbell and research fellow Noel Totti III.



COLIN PAINTER

A Scientist in a World of Sound and Silence

by Mary Kimbrough

“We cannot do without communication, even if we are just saying ‘nothings’ all day. At least, we know there is another person out there in this big world.”

Colin Painter, Ph.D., was speaking of his own professional world of phonetics, a world of familiar cadence and alien accents, of language and the listening ear, of speech and sound and, sometimes, of silence.

It’s a world both scientific and social, a massive world ruled by the modest-sized larynx which has given man his voice. It’s a noise-filled world of Babel sounds and love songs, of casual “nothings” and eloquent pronouncements, of gaudy slang and solemn prayer. It’s a world that knows the anguish of the voiceless, the isolation of the deaf, the heart’s hunger to communicate with another human being.

For language and speech, says Painter, make man higher than the animals, give him his capacity to control the environment, to create and to conceive of the past and the present. “There can be no literature or drama, no science, no technology without language. It is the core of our civilization.”

Painter’s own words are scholarly but his manner is unaffected. His voice, amiable and precise, carries the warm, crisp echoes of his native English Midlands, but his sensitive ear is finely tuned to the nuances of a thousand tongues, whether they be as shrill as a shout or as gentle as a whisper.

Speech Science

The tall, genial University of London alumnus is a phonetician in the Department of Otolaryngology. A phonetician specializes in the science and study of speech sounds — their production, transmission and reception and their analyses, classification and transcription.

But he is also a generalist, a renaissance man in that academic discipline, using his many skills and expertise in his

dual role of researcher and clinical administrator of the new speech science laboratory in McMillan Hospital.

This laboratory, where man and science will search for answers to the myriad problems of human communication, has been designed, equipped and staffed to aid those with speech disorders throughout the Washington University Medical Center. The speech, language and hearing program will be administered via a joint agreement between the Department of Otolaryngology and the Irene Walter Johnson Institute of Rehabilitation.

In the laboratory, he has rejoined his former University of Toronto colleague, John M. Fredrickson, M.D., Lindburg Professor and head of the Department of Otolaryngology.

Fredrickson, a pioneer in the surgical skill of artificial larynx implants for cancer patients, successfully performed four such operations while on staff at the University of Toronto. He plans to perform this surgery again in St. Louis. Fredrickson implants a radio receiver beneath the collar bone and an artificial larynx in the pharynx. The receiver is connected to the artificial larynx. A power pack (worn on the patient’s belt) sends signals to a radio transmitter, which is worn externally near the implanted receiver.

The device can be adjusted to control voice volume and range. Future devices will contain an electronic chip that creates intonation patterns permitting the patient to speak in more natural tones than has been possible in the past.

Another advantage of the implantable artificial larynx is that it frees the patient from having to hold an external artificial larynx against the neck in order to speak. Besides being cumbersome, external devices also produce a poorer voice quality than the implantable larynx. In addition, the voice quality of the radio-controlled, artificial larynx implant will be an improvement over that produced by a patient who wears the simple prosthetic implants currently available.

Such improvement, which not only

aids communication but also eases the patient’s trauma of struggling to be understood, is Painter’s special concern in the laboratory. Here, he will work with engineers, the third component of the laboratory, to continue to refine the artificial larynx. And with the staff of physicians and speech pathologists who treat or diagnose voice disorders (whether physical, neurogenic or psychogenic), he will work with those who, because of surgery or impaired hearing, have been doomed to a muted or a silent world.

“The sound produced by an artificial larynx,” he said, “is similar to that produced by a speech synthesizer. One of my major roles will be to suggest ways in which the artificial larynx can be engineered to raise the voice quality.”

Then he added, with a grin, comparing voice timber with stereo sound, “You need a deep, rich woofer, but an artificial larynx is a tiny tweeter.”

A Phonetician in the Making

Just as he would give the human voice, natural or restored, a wider range of pitch and resonance, so has he constantly added depth and scope and substance to his professional career. A schoolboy fascination with languages has moved him around the myriad facets of phonetics, via a circuitous route from the Midlands of Great Britain to the Midwest of America.

He left England in 1962 to teach four years at the University of Ghana in Africa, then came to North America, with appointments at Indiana University, Massachusetts Institute of Technology and the University of Toronto.

“Like most linguists,” he said, “I wanted to go out and work on languages which were different from the European languages I had studied. It could have been South America or India or any other place, but it turned out to be Africa where I found a job.”

There he not only taught but continued to study, learning three of the 1,140 languages spoken on the continent. He con-

ducted phonetics classes and authored two primers, writing down obscure African languages which never before had been transcribed from sound to symbol.

"American speech," he said, "has some roots in African languages. For example, the American's habit of saying 'um um' for 'yes' and 'uhn uhn' for 'no' is a derivative of African speech patterns."

He met his wife Diann after coming to this country. She is an economist who as a young woman was a tenured associate professor at Wellesley College. During the Carter administration, she held a high post in the Department of Commerce and later, in Toronto, became senior economist in the Dominion Bank.

At 50, Painter still is an enthusiastic soccer player and an avid mountain hiker — "the higher and tougher, the better, as long as I am on my own two feet and not using my hands." But his quiet hours are spent listening to grand opera, in the original language, of course.

He speaks 20 languages but points out that phonetics is, in some ways, more than linguistics, rather than part of it. "Alexander Graham Bell was a phonetician," he said. "So was Pitman, who invented his system of shorthand."

"Phonetics is anything that has to do with the sounds people make, the kind of language they speak. It is also concerned with the anatomy and physiology of the body, the muscles that contract as you speak. It's part of acoustic physics because you must know what happens to the disturbed air between the speaker's lips and the listener's ear.

"Now that takes us from linguistics to anatomy to physics. Then you come full circle. When the message gets as far as the listener, you have to know how the ear receives this, and the kind of sense it makes to the receiver."

Helping Patients Communicate

But Painter is a humanist in a scientific ambience, a philosopher in a computerized climate, a pragmatist with the soul

of a social worker. The individual is the ultimate beneficiary of his concern.

"The purpose of the laboratory," he said, "is to help that one human being, regardless of the problem, to communicate better. This is what we want to do clinically."

"Ten years ago," he said, "there weren't many ways you could look at the larynx and see what was going on except with a tiny mirror. Now there are fiberoptic video systems which let us see the larynx in action. And sometimes, when you least expect it, you find a breakthrough."

"There is a tiny bump on the larynx. People have ignored it, thinking it was just left over from primeval days. But I am beginning to wonder if that bump isn't playing a very important role in voice quality."

Painter's research also will study the important contributions of other parts of the anatomy, such as the pharynx and subglottal muscles, to voice production. But he is concerned also with the intangibles of human attitudes and the heartache of those who can neither speak nor hear clearly.

"Take yourself back 200 years," he said, "when the deaf, with no other problems, were sent to insane asylums simply because they couldn't communicate. Nowadays, we think with special appreciation of the stresses and problems a patient with a speech or hearing disorder can have."

But whatever the cause, he added, "a very large part of your life goes if you cannot communicate. It could be economic, the loss of your job. It sounds odd, but your friends could leave you. It could even destroy your marriage."

Even among those with no such difficulties, language is more than a utilitarian link between one person and another, and speech is more than the operation of the larynx or the physics of disturbed air which carries words from lips to ear.

"There is the important social aspect to it," Painter said. "After all, we don't

carry on high-powered, intellectual conversations all day long."

Reaching back to his English culture for an example, he continued, "We say sweet nothings even in a railway train. If you are traveling in a carriage, the longer time goes by without anyone saying anything, the more uncomfortable everyone is. People start hiding behind their newspapers. Then someone says something about nothing in particular and everyone feels much happier even if they stop talking and go back to their newspapers. The ice has been broken and you feel you are all human beings in the same little predicament for a couple of hours."

This seemingly trivial talk, he said, is exemplified by the need to say "Good morning" even if it's a terrible day. "And when we ask, 'How are you?' the other says 'fine' even if he feels awful. It is terribly awkward to be with someone and not be able to communicate."

Still, even if he were some kind of master linguist with absolute power over man's speech, Painter would not want a bland sameness in language patterns. "If everyone spoke the same language, we would miss a great deal of the variety and spice of life."

On the other hand, he added, "You always have conflict if a country is divided on linguistic grounds. In Belgium, for example, half the country speaks something like Dutch and the other half speaks French. So the country is divided down the middle on religious and political grounds as well as linguistic. To a much smaller degree, you find that same thing in Canada where I came from to St. Louis. You find it all over the world.

"Language is a cultural identifier. It's an open mark of the group to which you belong."

Mary Kimbrough is a former staff writer at the St. Louis Globe-Democrat.

personal OUTLOOK

by Peter G. Tuteur, M.D.
Associate Professor of Medicine

Recently, two landmark works have focused a great deal of attention on the rise of commercialism within the health care system. In 1980, Arnold S. Relman, M.D., editor of the *New England Journal of Medicine*, penned an article depicting "The Medical-Industrial Complex." This was followed by a scholarly analysis of the commercialization of American medicine in the 1982 Paul Starr book, "Social Transformation of American Medicine." Both comment on the adverse effects of the rapid rise of investor-owned hospitals and profiteering by commercial entities throughout the \$300-billion health care industry.

In a recent Medical Grand Rounds at the Washington University Medical Center, Visiting Professor Arnold Relman continued to emphasize the need to counter this trend by responsible professionalism among physicians. Under this mandate, physicians are required to deal with the problems of medical staffing, develop relative value scales for medical fees, insure quality control of health care and technology assessment, promote efficient and appropriate health care delivery systems, and cut a clear financial distinction between the medical profession and the health care industry. On the other hand, for-profit hospital systems attempt to neutralize the Relman point of view by emphasizing that the inherent control system of the market place is at least as effective as the traditional regulation and professionalism.

Evaluating these arguments requires a few basic assumptions:

- Making a profit is not necessarily inherently wrong, devious, or deleterious to the system or the product.

- Not making a profit does not ensure high quality, social responsibility, or meaningful research and development.
- The goal of the American health care system must be to efficiently provide a high quality health status to all Americans.
- The health care industry must be able to exploit, in a meaningful and effective way, scientific and technological advancements that have been supported by the entire community.

It seems to me, then, a four-cell grid can be developed that simply says that there is a potential for both good and bad among entities regardless of their profit status:

	Profit	Not-for-Profit
Professionally responsible	X	X
Professionally irresponsible	X	X

We see, then, that one can not necessarily use the financial intentions of an entity to determine whether or not it meets the overall social goal.

Accepting this grid doesn't render Relman's argument moot: the main purpose of a for-profit entity must be to maintain its existence and therefore a profitable mode of operation; United States corporations, large and small, regularly have emphasized short-term profits over long-term research and development goals. Therefore, it is understandable how bias against for-profits in the health care industry may develop. It is, indeed, appropriate to express concern whether for-profits, as a group, will make a fair share contribution to the research and development of this industry over the long term. Assuming that both for-profit and not-for-profit entities operate with equal efficiency and assess similar fees in a

market-influenced industry, proportional net incomes are likely to be distributed in a distinctly different way. The not-for-profits must return excess funds into research and development; the for-profits are most likely to distribute those funds to stockholders as dividends, to be thus forever lost to the industry.

This pattern already is true for some socially accepted for-profit health care providers: private practice physicians. Here at Washington University Medical Center, voluntary (part-time) staff enthusiastically accept the responsibility to contribute to the community and industry through participation in the educational and clinical activities of the institutions of the medical center. In so doing, they substantially contribute in a most positive way to community health care and development for upcoming generations. This is not as often true for their counterparts, who exclusively practice in community hospitals, regardless of that entity's financial arrangement.

To condemn an individual provider, facility, or corporation solely because of its profit orientation may be an oversimplification of the adverse effects of commercialism in the health care industry. Instead, these entities must be judged by the quality of their service, and by how well their research and development activities contribute to the future viability of the industry. ■

This is the opinion of the author, not necessarily shared by Washington University, Washington University School of Medicine, Washington University Medical Center, or the policy of any of these entities. Outlook welcomes replies to this editorial and invites contributions from its readers on other subjects.

STUDENT STAGE

"Old" Antigen, New Molecule

An unusual molecule associated with lymphocyte Ia antigens has been discovered by Andrea J. Sant, a predoctoral fellow in the Department of Microbiology and Immunology. Research on this molecule may lead to a better understanding of cellular interactions that regulate the immune response. Sant has isolated a sulfated proteoglycan — a sulfated complex of carbohydrate and protein — from mouse, guinea pig and human lymphocytes. B-cells and macrophages (two groups of lymphocytes which are important participants in the immune response) as well as EBV-transformed lymphoblasts display the unusual molecule. But a third type of normal lymphocyte — T-cells — do not, suggesting that the molecule may play a key role in the intercellular communication required for the immune response.

"Sulfated proteoglycans are normally found in non-lymphoid tissue, such as cartilage," explains Sant. "Naturally, we're curious why such an unusual molecule is part of the Ia complex on the lymphocyte surface."

"We're just beginning to learn how incredibly complex the immune response is," Sant continues. "We know that there are lymphocytes that help B-cells manufacture antibody, and others that 'turn off' this ability. Researchers believe that the Ia complex on a lymphocyte probably activates a T-cell, which in turn will be able to recognize the 'right' B-cell and signal it to begin antibody manufacture."

Sant's first hunch was that the Ia molecule itself was sulfated. But it turned out that the sulfated glycoprotein is part of the Ia complex — in gel electrophoresis experiments with radiolabelled, immunoprecipitated Ia preparations, the molecule showed up near (but not in) the Ia molecule. Now the important question: Does this unusual molecule play a role in the synthesis or function of Ia antigens?

"In the near future, I'll be most interested in disrupting the synthesis of the sulfated proteoglycan to see how it affects Ia antigens," says Sant. "I also want to try and pinpoint what role the molecule



Andrea Sant and Benjamin Schwartz, M.D.

plays in cell-to-cell interactions."

Sant's discovery of the molecule won her top honors from among 39 entrants in the competition sponsored by the Midwest Section of the American Federation for Clinical Research. "The AFRC bases the award on the abstract, the presentation, and the supporting letter from the research supervisor," says Benjamin D. Schwartz, M.D., Associate Professor in the Departments of Medicine and Microbiology and Immunology, one of Sant's thesis supervisors. "This is a brand new competition to encourage young researchers to enter and remain in research," continues Schwartz, who is also Howard Hughes Medical Institute Investigator and a staff physician at Barnes Hospital. But in Sant's case, Schwartz needn't

worry — her decision to enter a basic research area like immunology was made long ago, after she became disenchanted with veterinary medicine.

"I originally thought I'd like to be a veterinarian," says Sant. "But after I graduated from college, my year of working at a horse breeding farm convinced me otherwise. I saw that the decision on how to treat animals was based on economic considerations, not on what was best for the animal. That wasn't for me."

After she earns her Ph.D. this spring, Sant plans to continue her research on the Ia antigen and other factors regulating the immune response. And if her past is any indication, Sant's future research seems a sure bet for more winner's circles. ■



On December 6, the School of Medicine sponsored an Awards Luncheon to honor members of the First, Second, and Third Year classes whose work during the academic year 1982-83 merited special recognition. John C. Herweg, M.D., Associate Dean of the School of Medicine, was host for the luncheon, held in the Penthouse of the Olin Residence Hall.

◀ *Members of the First Year Class and their awards are: (l-r) front row: Jerry A. Menikoff (Dr. Robert Carter Medical School Prize); Rebecca Davis Peck (George F. Gill and Kehar S. Chouke Prizes in Anatomy); O. Clark West (Edmund V. Cowdry Prize in Histology); Michael Apkon (Richard S. Brookings Medical School Prize); Charalabos S. Chrysikopoulos (Dr. James L. O'Leary Neuroscience Prize); Antoinette Frances Dames Prize in Physiology and Biophysics); Forbes D. Porter (Carl F. and Gerty T. Cori Prize in Biochemistry); Antoinette F. Dames Prize in Physiology and Biophysics). (l-r) second row: Troy G. Scroggins, Jr. (School of Medicine Academic Achievement Award); Eric E. Stevens (Carl F. and Gerty T. Cori Prize in Biochemistry); James A. Schiro (Dr. James L. O'Leary Neuroscience Prize).*



▲ *Second Year students honored for their academic achievements include: (l-r) front row: Craig A. MacArthur (Oliver H. Lowry Prize in Pharmacology); Anne V. Hutchinson (Dr. Margaret G. Smith Award). (l-r) second row: Dennis M. Willerford (Oliver H. Lowry Prize in Pharmacology); Todd V. Swanson (Dr. Robert Carter Medical School Prize); Anthony C. Pearlstone (Howard A. McCordock Book Prize in Pathology); Richard S. Brookings Medical School Prize).*



▲ *Third Year students Mark D. Cooper (Medical Center Alumni Scholarship Fund Prize) and Michael A. Kolodziej (Dr. Robert Carter Medical School Prize) were on hand to receive their awards.*

Not present at the luncheon, Joseph Francis, Jr., was honored for his work by the Richard S. Brookings Medical School Prize.

Newsbriefs

Brown Serves As First Becker Professor

Joel E. Brown, Ph.D., has been named the first Bernard Becker Research Professor in Ophthalmology at Washington University School of Medicine in St. Louis. In addition to the professorship in ophthalmology, Brown serves as professor in the Department of Physiology and Biophysics and the Department of Anatomy and Neurobiology.

The chair in ophthalmological research which he holds was created by friends, students, trainees and patients of Bernard Becker, M.D., who for 25 years has been professor and head of the Department of Ophthalmology. The endowed chair honors Becker for his contributions



Bernard Becker, M.D.

to the science of ophthalmology and his dedication to research, and provides continued support for the department's internationally recognized programs.

Brown holds two grants from the National Eye Institute and is widely recognized for his work on the physiology of vertebrate and



Joel E. Brown, Ph.D.

invertebrate photoreceptors. His major interest is in the mechanisms by which retinal photoreceptors react to light. For the past several summers, Brown has pursued his research at the Marine Biological Laboratories in Woods Hole, Mass. He has served on the Visual Sciences Study Section of the National

Institutes of Health and as a Councillor of the Society for General Physiology.

Brown received a doctorate in physiology, and master's and bachelor's degrees in electrical engineering from Massachusetts Institute of Technology. Brown has been on the faculty at State University of New York at Stony Brook, Vanderbilt University and Massachusetts Institute of Technology. ■

Furthermore

New members of Alpha Omega Alpha Honor Medical Society, elected in '82-'83, are the following members of the class of 1983: Robert Edwin Benedett, Mark R. Boothby, James J. Clanahan, William C. Dunagan, Neil A. Ettinger, Carl E. Fulwiler, John A. Harsh, Ethan J. Haskell, Sandra L. Hoffmann, Thomas J. Hubbard, Thomas R. King, Arthur M. Krieg, Daniel L. Lips, Christine M. Parker, Katherine A. Parker, Benjamin Schwartz, James E. Schwob, Lynne M. Seacord, Daniel W. Spaite, Mark E. Stark, Hazel J. Vernon. John E. Krettek, M.D. '76, is also a member.

Faculty of WUMS elected to AOA are: Morris D. Marcus, M.D. '34, professor of clinical surgery (cardiothoracic surgery), and Charles L. Roper, M.D. '53, associate professor emeritus of clinical medicine (dermatology). ■

LINC Developers Honored

The ACRF Amphitheater at NIH was the site of the 20th anniversary of the development of the laboratory instrument computer (LINC) project commemorated with a symposium on November 30, 1983, honoring Wesley A. Clark and Charles E. Molnar, D.Sc., two developers of the prototype of today's personal (small) computers. (See "A Linc with the Past; A Rap with the Future," *Outlook*, Spring 1982). Clark and Molnar were key members of the development team for LINC, along with Howard C. Lewis, Kenneth W. Lewis, Severo M. Ornstein, William N. Papiian, Thomas T. Sandel

(deceased), Mishell J. Stucki, Constance F. Towler, Joseph C. Towler, and Mary Allen Wilkes, who were all at Washington University as of June 1965. Other WU staff who figured prominently in the laboratory usage of LINC were A. Maynard Engebretson (Biomedical Computer Laboratory and CID staff), Jerome R. Cox and Harold Shipton (BCL). Sidney Goldring, M.D., and James L. O'Leary, staff members in the Department of Neurology at WUMS, were among the investigators selected for participation in the evaluation of early LINC's.

The DRR and NASA provided funding for the devel-

opment of LINC, which was the forerunner of modular small computers usable in the laboratory. In the Foreword to Samuel Rosenfeld's "LINC: The Genesis of a Technological Revolution," Edward N. Brandt Jr., M.D., Assistant Secretary for Health, Department of Health and Human Services, wrote: "The ubiquity of the 'mini' and so-called 'personal' computer of today is substantial evidence of the importance of this development . . . the LINC saga provides a cogent example of what can be accomplished in partnership involving the government, academic institutions and industry." ■

Physicians for Social Responsibility, Inc., organized a symposium on "The Medical Consequences of Nuclear Weapons and Nuclear War" last fall at the Chase-Park Plaza Hotel in St. Louis.

The conference was presented by Washington University School of Medicine, St. Louis University Medical Center and the St. Louis Metropolitan Medical Society.

Faculty members on the program outlined the prompt and delayed effects of nuclear war and the medical community's past experience with a thermonuclear explosion. They also discussed medical-surgical injuries and psychosocial trauma that would occur if a large metropolitan area such as St. Louis was the site of a nuclear explosion, and the ability of the surviving medical community to respond. Other sessions covered effects of the arms race on health care, the current state of world arsenals and arms control efforts, and their effect on the probability of nuclear war.

An article in the Winter 1982 issue of *Outlook Magazine* has received the Award of Merit in the 1983 writing competition sponsored by the Society for Technical Communication, St. Louis Chapter. The article, "Toward Ultrasound Biopsy," by Casey Croy, explains recent developments in intracardiac Doppler echocardiography to image heart tissue.

A new transducer and computer system produce "ultrasound biopsy" of heart tissues. Researchers include Julio Perez, M.D., and James G. Miller, Ph.D., in conjunction with engineers and scientists in the Biomedical Computing Institute.



G. Lee Judy, Executive Director of the Child Guidance Clinic (CGC), announces the expansion of a comprehensive program to treat victims of sexual abuse and their families. CGC's program combines features from a program established by Henry Giaretto in California and an earlier collaboration between the clinic and the Masters and Johnson Institute. CGC's program aims to protect the victim, strengthen family members, help the victim recover from the trauma and develop normally, and rehabilitate the family.

The treatment program begins with a five-hour evaluation of the child and family

by the clinic's staff of child psychiatrists, psychologists and social workers. Results of this comprehensive evaluation are shared with the parents, and a treatment plan is developed. The treatment plan, which generally takes six months, includes group therapy for the victim, spouse and offender, as well as marital and family therapy.

Judy plans to expand the clinic's program of treatment and research. The goal of this research is to increase the body of knowledge concerning sexual abuse and to profile characteristics of abusing families and victims so that preventive measures can be undertaken.

Anyone desiring more information should contact Judy at the clinic, 369 N. Taylor, 63108; (314) 361-6884.

The Deafness Research Foundation has awarded a \$10,000 research grant for 1984 to Washington University School of Medicine, with **Duck O. Kim**, D.Sc., as principal investigator, it was announced by George L. Ball, chairman of the DRF and chief executive officer of Prudential-Bache Securities, Inc., New York City.

Kim, associate professor of physiology and biophysics, will conduct research to help improve the performance of the cochlear implant by learning how the hair cells of the inner ear respond to electrical stimulation.

Kim received his B.S. degree from Seoul National

University, Korea, and his D.Sc. from Washington University. Kim is associate professor of biomedical engineering at WU. He is a fellow of the Acoustical Society of America and a member of the Association for Research in Otolaryngology and the Society for Neuroscience.



J. Neal Middlekamp, M.D., professor of pediatrics and director of ambulatory pediatrics at Children's Hospital, was elected to the American Board of Pediatrics. His term will run through 1988. The Board consists of 12 pediatricians from all over the United States and one public member.

Middlekamp has been an oral examiner for the Board since 1972 and has served on the Board's committee for the National Written Exam from 1979 through 1985.

The Board celebrated its 50th anniversary last year in Chapel Hill. The first president of the Board and a charter member of the ABP was Borden Veeder, M.D., formerly professor of pediatrics at Washington University.

Letters

BANDITS

Dear Editor:

I have just returned from a visit to China with a group of urologists sponsored by the People to People organization.

While in Beijing, I was asked to give a paper on "Bladder Chemical Carcinogens" and was presented a certificate of appreciation from the Capitol Hospital of the Chinese Academy of Medical Sciences. I did not realize that this had been the PUMC facility. As Dr. Anderson so aptly put it, "the institution continues to serve the people of China and attract an occasional visitor or two from Washington University."

Sincerely,
W.F. Melick, M.D. '39

"THE FIRST 101"

Dear Editor:

Dr. John Anderson and I served on the Admissions Committee from 1970 to 1977. In our travels around the country, it was quite obvious that Washington University was a pioneer in this field. Other schools literally deceived the students and 'planted' black representatives on their campuses as 'bait.' The students soon realized that these people were far-removed from the selection process. This information was quickly disseminated throughout the country and the black students realized the 'fraud' and reacted accordingly.

John and I had equal status with every other Committee Member's rights and privileges. We examined students of all races and creeds, and our on-site campus interviews of white and black students were a signal to everyone that Washington University was truly integrated. The black students could identify with us and we could honestly answer any questions about their chances at the University and their potential success. On-site campus visits told everyone that we cared and were anxious to get the best students available, black and white. Many students were very grateful for this experience as they were not financially able to make a trip to the University. It was amazing to me that several schools openly discriminated against women and told them in no uncertain terms that their applications were not advisable. Washington University was never a part of this nefarious practice and John and I can look back on our tenure with pride, knowing that we were personally responsible for the admission of many qualified black and white female students.

I can honestly say that Washington University never accepted any student, black or white, that the Committee did not feel had the potential to graduate four years later. In some cases, the student required tutoring in some subjects and this was gladly provided by the University. This was in direct contrast to some universities which accepted minority students with marginal grades only to meet a cer-

tain quota to achieve federal subsidies. Many of these students were quietly let out at the end of their first or second year. They were simply used as 'bait' to achieve financial remuneration from the government.

Very sincerely yours,
H. Phillip Venable, M.D.,
FACS
Assistant Professor, Department of Ophthalmology
Washington University,
School of Medicine

Dear Editor:

Washington University can certainly be proud of its record in educating black physicians. However, the article suggests that other medical schools in Missouri, two of which are state supported, are not doing as good a job as Washington University.

I can speak only for the University of Missouri-Kansas City School of Medicine where I have served as Dean since 1978. As of December 31, 1981, our School of Medicine had 344 graduates. Of these, 34 are black. This equates to a 10 percent graduation rate of black physicians. As of December 31, 1981, Washington University graduated 4,730; 101 black physicians amounts to slightly more than two percent.

I think your article, therefore, has unfairly treated a relatively new state-supported medical school in Missouri. The University of Missouri-Kansas City School of Medicine has, since its inception, maintained a strong effort to recruit, retain, and graduate minority physicians. We are not happy with our accom-

plishments to date and are making additional efforts to increase the total number of minority students admitted to our School of Medicine.

Sincerely yours,
Harry S. Jonas, M.D. '52
Dean
School of Medicine
University of Missouri-
Kansas City

NEW TIME

Dear Editor:

I thoroughly enjoyed your article, "Medicine and the New Time." The concept that "imagines hominis" reflect cultural attitudes and value systems of the respective epoch was not only educational and interesting but in many ways still relates to the practice of medicine today. In my own private practice of family medicine, it seems as though I spend inordinate, but enjoyable, amounts of time lowering my patients' own expectations of how they should be feeling. The "last man" syndrome is truly prevalent and it is interesting to note that somehow patients feel more reassured to know that the chronic afflictions to which we are all heir are in fact a normal part of our tragic inheritance. I find that patients who are able to accept this notion in fact seem to do well "medically" as well as achieving a certain peacefulness and tranquility about their own lives and their destinies.

Sincerely,
S. Gregory Hipskind, M.D.

The Alumni REPORT

Hagemann Chairs New Committee

Paul O. Hagemann, M.D. '34, chairs the Committee on Planned Gifts, a new committee at the School of Medicine. Joining Hagemann are committee members Drs. Eugene Bricker ('34), Harold Cutler, Robert Elliott ('36), Jerome Flance ('35), Neville Grant, Stanley Hampton ('34) Michael Karl, Austin Montgomery, and Ernest Rouse ('43 March).

The committee plans to inform fellow alumni, colleagues, and friends of the School of Medicine about a

variety of methods of giving. Several donors already have made gifts through a number of life income plans. Their generosity provides income for the school and rewards them by reductions in taxes on capital gains, income, and their estates — in other words, donors receive a return while contributing significantly to the School of Medicine.

Through a life-income plan, the donor (and possibly a second beneficiary) receive income from the gift throughout their lives; upon the death of the last beneficiary, the School of Medicine receives the principal or remainder interest. Thus, alumni and friends who have felt the urge

to make a contribution to the school can now do so while receiving tangible financial benefits for themselves and their families.

Committee members also point out that those whose wills have provided for a gift should consider making the University aware of their intentions. Through the Alliance for Washington University, the Danforth Foundation will match future bequests with a current grant to the University endowment on a 3-to-1 basis.

Staff members assisting the committee are: Jack Siefkas, Director of Medical Alumni and Development Programs (362-3258); Jean Quinlan, Director of Special

Funding programs (362-3256); and Mark Roock, Associate Director of Planned Giving (889-5348). For further information, call one of these staff members or a member of the committee. ■

Medical Center Alumni Association

Box 8049
660 S. Euclid
St. Louis, MO 63110

Charles C. Norland, M.D. '59
President

Jack Siefkas, Director
Medical Alumni and Development Programs

Chris Owens, Director
Medical Alumni Programs

Ruth Moenster
Secretary

Members of the School of Medicine Committee on Planned Gifts chat before their meeting on January 20. From left to right are: Stanley Hampton, M.D. '34; Mark Roock, Associate Director of Planned Giving; Paul Hagemann, M.D. '34; and Eugene Bricker, M.D. '34.



CLASS NOTES

'30s

The John Howland Award and Medal will be presented to **Henry L. Barnett, M.D. '38**, by the American Pediatric Society during its annual meeting in San Francisco in May 1984. Barnett, Medical Director of the Children's Aid Society, founded the Department of Pediatrics at Albert Einstein College of Medicine at Yeshiva University in 1955, where he now serves as an Emeritus Professor.

The Howland Award, the most prestigious in American academic pediatrics, was established in 1952 "to honor those who, by their contributions to pediatrics, have aided in its advancement." Previous recipients have included Bela Schick, Rustin McIntosh, Samuel Z. Levine, E. Emmett Holt, Jr., Albert Sabin, Henry H. Gordon, Charles A. Jane-way, Saul Krugman, and Horace L. Hodes.

'40s

Gordon F. Moore, M.D. '40, was awarded the National Voluntary Service Award from the National Recreation and Park Association during the 1983 Congress for Recreation and Parks, the nation's largest conclave of the parks and recreation movement. This award is presented to Moore for his 18-year effort to establish a park, which was named in his honor. Moore suc-

ceeded in obtaining over 700 acres of land from the state, then enlisted the help of citizens to build the park. Besides gathering more than \$1 million worth of materials and equipment, Moore succeeded in persuading 20 labor unions' members to donate their skills to the construction effort.

Moore, an Alton, Illinois, surgeon for 37 years, has been president of the Park Commission and Recreation Commission since 1962. Under his leadership, several parks and beautification areas have been added to the municipal system, as well as a nine-hole golf course and an arboretum.

'50s

Marvin E. Levin, M.D. '51, professor of clinical medicine and associate director of the Diabetes and Metabolism Clinic at WUMS, was awarded honorary membership in the American Dietetic Association at the 1983 annual meeting in Anaheim, California. Levin advocates registered dietitians as primary providers of nutritional information for diabetics because of the paramount importance of diet and nutrition in the treatment of diabetes. Levin has also been appointed to the Medical Advisory Board of DIABETES SELF-MANAGEMENT, a new quarterly publication for the diabetic, published by Imagimed Productions in New York.



John M. Dietschy, M.D. '58, professor of internal medicine at the University of Texas Health Science Center at Dallas, was awarded the Heinrich Weiland Prize for his work on cholesterol metabolism. Named for a Nobel Prize winner who died in 1957, the prize is awarded annually for research on the chemistry, biochemistry, and physiology of fats and lipids.

Dietschy's research is directed toward discovering why atherosclerosis and gallstones occur. In the course of investigating factors which regulate cholesterol throughout the body, he is examining particular organs with respect to their synthesis of cholesterol and their ability to take up cholesterol from the bloodstream. His research methods include using radiolabelled precursors to examine the rate at which these molecules are synthesized into cholesterol in particular organs compared to the rate of whole body synthesis. Once information is gained about cholesterol

synthesis and uptake, better drugs can be designed to control both atherosclerosis and gallstone formation.

Dietschy is director of the Gastroenterology Unit at University of Texas Southwestern Medical School. A member of the Clinical Sciences Study Section at the NIH, he has served on the editorial board of many scientific publications. In 1978, Dietschy was awarded the Distinguished Achievement Award of the American Gastroenterological Association, and in 1982, he was president of the Southern Society for Clinical Investigation.

Wayne O. Buck, M.D. '55, medical director of the *Los Angeles Times*, will assume the added responsibilities of corporate medical director for the Times Mirror Company. He will oversee and provide advice and counsel to the Times Mirror subsidiaries on health care and related subjects.

Buck will continue to have full responsibility for the *Los Angeles Times*' medical program.

Buck joined *The Times* as medical director in January 1979.

'60s

John H. Stone III, M.D. '62, was given the Thomas Jefferson Award by Emory University at the opening convocation of the 1983 academic year. A professor of medicine and community health, Stone also serves as associate dean and director of admissions for Emory University's



School of Medicine. Cardiologist, emergency medicine specialist and poet, he has produced a number of medical and literary works, including two books of poetry, *The Smell of Matches* and *In All This Rain*. He is one of five editors of "Principles and Practice of Emergency Medicine," the first comprehensive textbook in the field. Since 1979, Stone has served as editor of the medical school's magazine, *Medicine at Emory*. A popular lecturer and teacher, Stone has delivered three of the medical school's valediction addresses, as well as the 1981 convocation address. The medical school senior class has voted him as "Outstanding Professor" three times.

Born in Jackson, Mississippi, Stone graduated from Millsaps College in 1958. He took his postgraduate training at Strong Memorial Hospital of University of Rochester Medical School in New York and Grady Memorial Hospital

in Atlanta. He has been associated with Emory University for the past 18 years.

R. Christie Wray, Jr., M.D. '63, has been appointed professor and chairman of the Division of Plastic Surgery at the University of Rochester School of Medicine. He will also be chief of plastic surgery at Strong Memorial Hospital. Wray was formerly professor of plastic and reconstructive surgery at Washington University School of Medicine.



William N. Neubauer, M.D. '69, has been elected president of the Pima County

Medical Society. A general surgeon in private practice in Tucson, Neubauer is a member of the Arizona Medical Association board of directors and has served on its finance, legislative and resolutions committees. He is chairman of the Arizona Medical Political Action Committee and a member of the steering committee of the Tucson Program for Affordable Health Care, which is a coalition representing business, labor, government and health care providers. Neubauer is a Diplomate of the American Board of Surgery and a Fellow of the American College of Surgeons, the International College of Surgeons and the American Society of Abdominal Surgeons. He is a member of the Tucson Surgical Society and chief of staff-elect of El Dorado Hospital. His father, Darwin N. Neubauer, M.D. '39, served as president of the Pima County Medical Society in 1966-67.

'70s

Patricia A. Newton, M.D. '75, M.P.H., was mentioned as one of the 100 most influential Baltimore women in a recent issue of *Baltimore Magazine*. Chief of psychiatry at Provident Hospital in Baltimore since 1979, Newton is one of few women who chair medical specialty chairs in the U.S. She is assistant professor of psychiatry at Johns Hopkins and a psychiatric consultant to Bon Secours Hospital's renal dialysis division. Newton

is also a consultant to the Pan American Health Organization.

Michael F. Finkel, M.D. '73, was recently elected secretary-treasurer of the Wisconsin Neurological Society. Finkel holds the same office in the west central Wisconsin chapter of Physicians for Social Responsibility and is a member of the Midelfort Clinic in Eau Claire, Wisconsin.

FORMER HOUSE STAFF NOTES

Robert J. Glaser, M.D., house staff 1944-47, and a trustee of Washington University, has retired as President and Chief Executive Officer of the Henry J. Kaiser Family Foundation on December 31, 1983, after 11½ years in that post. He is now Director for Medical Science for the Lucille P. Markey Charitable Trust and will be responsible for the development of a grant program in basic medical research. The trust, created by the will of Lucille P. Markey, will be one of the nation's largest foundations devoted to the support of basic medical research.

Glaser received the M.D. degree *magna cum laude* from Harvard Medical School in 1943. The recipient of several honorary degrees, Glaser trained in internal medicine at Barnes Hospital and at The Peter Bent Brigham Hospital. At Washington University, Glaser served on the faculty as associate professor of medicine. He later received appointments to the faculties at

the University of Colorado, Harvard University, and Stanford University, where he is now consulting professor of medicine.

During a long and productive career, Glaser has served as consultant to the NIH and to the Secretary of Health, Education and Welfare. He was the first Chairman of the Executive Council and of the Assembly of the Association of American Medical Colleges. Glaser was a founding member of the Institute of Medicine at the National Academy of Sciences, and he served on various commissions including the Sloan Commission on Government and Higher Education.

Leslie M. Greenberg, M.D., is a staff anesthesiologist at St. Barnabas Medical Center in Livingston, N.J. St. Barnabas is the largest private hospital in New Jersey, according to Greenberg. A graduate of Harvard Medical School, Greenberg was an otolaryngology resident at Washington University and completed an anesthesiology residency at Brigham and Women's Hospital in Boston. He is board-certified in otolaryngology and board-eligible in anesthesiology.

HEALTHPROS

Marion Beesley Thomas, OT '47, was honored last spring by the Dallas VA Medical Center for 31 years of service, 21 of which were spent as chief of occupational therapy. Thomas retired in 1983 and moved to Garland, Texas.

Kendra Smith, PT '82, has received a \$200 award from the Dr. Hildergard C. Landecker Memorial Endowment Fund at Southern Illinois School of Medicine. Smith is the first recipient of the award, which will be given annually to a first-year female medical student of high academic standing.

H A P E N I N G S

Donna M. Chambers has joined the staff of Whitesburg Appalachian Regional Hospital (KY) as administrative assistant. She was formerly associated with Masonic Home and Hospital in Wallingford, CT. ARH is a not-for-profit health care system with hospitals, primary care centers and other services providing care for persons living in areas of Kentucky, West Virginia and Virginia.

Jeffrey M. Fried is assistant vice president at Lancaster General Hospital (PA). Fried is a member of ACHA. Before joining Lancaster General's staff, he was assistant vice president at Sinai Hospital in Baltimore, Maryland.

Benjamin F. Holland has been appointed senior vice president of Grant Hospital, Worthington, Ohio. He has been associated with Grant Hospital since 1965.

Richard H. Chandler has been appointed as the first administrative resident at Marion Memorial Hospital (IL). Chandler holds master's degrees from both the school of health administration and the school of architecture. Formerly, Chandler com-

pleted an externship at Baylor College of Medicine in Houston. A registered architect, Chandler spent four years in the design of the \$35 million School of Veterinary Medicine in Raleigh, N.C.



Charles F. Stumpf, executive vice president of Worcester Hahnemann Hospital, has announced a reorganization of the corporate structure of the hospital. Stumpf will be a member of the Board of Trustees of Worcester Hahnemann Health Services Inc., and chief executive officer and a trustee of Worcester Hahnemann Hospital, Inc. (MA).



Phillip M. Zsoldus has been named as administrative vice president at the hospital.

Stumpf, a fellow of the ACHA, has been associated with the hospital since 1976. Zsoldus joined the hospital staff in 1980 and is a nominee member of the ACHA.

H. Richard Grisham, '73, president and chief executive officer of St. Anthony's Medical Center in south St. Louis County, was recently elected to the board of trustees of the Missouri Hospital Association. Grisham has been president and chief executive officer at St. Anthony's since 1981. Before joining St. Anthony's, he was a vice president for Barnes Hospital. A member of the ACHA, he serves on the Missouri Hospital Association's council on research and policy development, the Hospital Association of Metropolitan St. Louis' council for human resources, council on planning and shared purchasing committee, and the Catholic Health Association's committee for member services.

Michael E. Schrader has been elected president of Bridgeport Hospital (CT). Schrader was formerly director of planning for United Health Care, Inc. (UHC), the parent corporation of the hospital. Prior to his association with UHC, Schrader was vice president for planning at Iowa Methodist Medical Center in Des Moines. He is a member of the long-range planning committee of the Society for Hospital Planning of the American Hospital Association. He also holds memberships in the American Society for Hospital Planning, the



ACHA, and the American Association for Hospital Planning.

Robert T. Broadhead has been named senior vice president/operations for Ball Hospital. Before accepting this position, Broadhead was executive vice president at Highland Park (IL) Hospital. A member of ACHA, he served on the task force of the Illinois Hospital Association for alternate delivery systems, its council on research and development, and as a regional IHA representative. Broadhead served on the planning and cost index committees for the Chicago Hospital Council and the Health Systems Agency project review committee. He has also served on the board and executive committee of the Lake County Cancer Society and was vice chairman of the Medical Records Advisory Committee of the College of Lake County.

Raymond F. Crerand has become a fellow of the ACHA. In 1982, Crerand became a member of the staff at Saint Joseph Medical Center in Burbank (CA). He was formerly associated with Pro-

vidence Medical Center in Portland. In addition to the ACHA, Crerand is a member of the Association of Western Hospitals.

Stuart Raynor has been named assistant executive director at Sunrise Hospital Medical Center in Las Vegas. Raynor formerly was on the staff of Metropolitan General Hospital in San Antonio (TX).

Robert J. O'Brien has been named executive vice president of Wesley Corporation in Wichita (KS). The corporation oversees Ambulatory Care of Wichita, Inc., Health Strategies, Inc., Minor Surgery Center of Wichita, Inc., and Gynecologic Pathology, Inc. O'Brien had served a one-year residency at Wesley before joining the staff in 1964. He is a member of the executive committee and Board of Directors of Blue Cross/Blue Shield of Kansas and is on the board of the Kansas Hospital Association. He also serves as vice-chairman of the board of the Midway-Kansas Chapter of the American Red Cross, is a Fellow in the ACHA, and is currently serving a three-year term as Kansas Regent for that organization. O'Brien is a personal member of the American Hospital Association as well as holding office or membership in several other professional organizations.

Jim Francis served an externship last summer at Marion Memorial Hospital (IL). He is the first to serve an externship at that hospital. While there, Francis developed a patient information booklet.



Edward Maguire, M.H.C.A. '71, has been promoted to associate administrator at Grossmont District Hospital, East San Diego County Regional Medical Center. Formerly associate administrator at Santa Barbara General Hospital, Maguire is a member of ACHA and president of the Health Care Executives Association of San Diego and Imperial Counties.

Robert S. Curtis has been named president and executive director of Clara Maass medical Center in Belleville, NJ. Curtis, formerly executive director and vice president of operations at Clara Maass, joined the center in January 1983. Clara Maass Medical Center is an acute care hospital with a School of Nursing, School of Radiologic Technology and a medical staff of 450 physicians.

Curtis' past positions have included serving as vice president, patient care services, at North Carolina Baptist Hospital in Winston-Salem. He was also an administrator with Hospital Affiliates International in Nashville and assistant administrator at Easton Hospital (PA).

Curtis graduated from the University of Connecticut

before attending WU, where he received his degree in 1973. He is a Fellow of the ACHA and a member of the AHA. He also serves on various committees of the New Jersey Hospital Association.

Ball Hospital (IN) has created a new vice presidency for **Don R. Gibson**, who is now the hospital's vice president for marketing. Formerly, Gibson was administrative director of corporate services at Holmes Regional Medical Center, Melbourne, Fla. There, he was responsible for marketing and strategic planning activities. Before assuming that position, he was assistant to the president there on all assigned hospital and corporate administrative functions. In addition to his degree from WU, Gibson has bachelor's and master's degrees in biology from Southern Illinois University (Edwardsville). He is a member of the ACHA and the AHA and was active in the Florida Hospital Association.

Thomas H. Gee has been appointed vice president and administrator of Methodist Hospital North (TN). Formerly, Gee served as administrator of Biloxi (Miss.) Regional Medical Center. He had also been an assistant vice president of operations for Methodist Hospital of Memphis after having been an administrative assistant there.

Gee was graduated from DePauw University before earning his MHCA at WU. He served his administrative residency at Methodist Hospital. His professional associations include membership in the ACHA and the AHA. ■

Sonnenwirth Given Award Posthumously

Alexander C. Sonnenwirth, Ph.D., professor of microbiology and immunology and of pathology at Washington University School of Medicine and director of the Division of Microbiology at Jewish Hospital, is the 1984 recipient of the Becton-Dickinson and Company Award in Clinical Microbiology.

David Schlessinger, Ph.D., professor of medicine and microbiology and immunology, accepted the award for Sonnenwirth during the opening session of the American Society for Microbiology's annual meeting, held March 4 at the Clarion-St. Louis Hotel. The award honors a microbiologist for outstanding research accomplishments, clinical or non-clinical, that have led to important applications in clinical microbiology.

Sonnenwirth died March 1, 1984, after a long illness. He was a leader in the development of methods for isolating and identifying bacterial pathogens and in the interpretation of laboratory findings for clinicians, and was recognized internationally as an expert on Gram-negative anaerobic bacteria and on automated clinical microbiology.

Sonnenwirth's contributions and accomplishments have added prestige to this distinguished award. Sonnenwirth was a native of Romania who survived the horrors of a Nazi concentration camp during World War II. After the Allied victory,

Sonnenwirth remained in Germany working for the Allied forces to help repatriate displaced Nazi prisoners. He finally emigrated to the United States with a scholarship to the University of Nebraska, where he received his A.B. in bacteriology in 1950 and he earned an M.S. from Purdue University in 1953. He was then appointed Assistant Director of the Division of Microbiology at the Jewish Hospital in St. Louis, Mis-



souri. In 1955 he became Director of the Division.

In 1958 he joined the faculty of Washington University as an instructor in bacteriology for the School of Dentistry. He became an assistant professor for the microbiology department in 1962, and for the pathology department in 1968. He became an associate professor in 1970 for the Departments of Microbiology and Immunology and of Pathology, and was named to full professorship of both departments.

Sonnenwirth was a consultant to the U.S. Food and Drug Administration and the Veterans Administration, and directed one of five Referee Laboratories for the Centers for Disease Control's proficiency testing program. He was a diplomate of the American Board of Medical Microbiology, and a fellow of the American Association for the Advancement of Science, the New York Academy of Sciences, the American Academy of Microbiology and the American Public Health Association. He was a member of a number of other societies, wrote or edited many books, and was author or co-author of more than 200 journal articles. ■

IN MEMORIAM

1923

William Leslie Bradford, M.D.
November 11, 1983

1927

Moyt W. Kerr, M.D.
June 17, 1983

Arnold G. Klein, M.D.
Date unknown

Alexander Patterson, M.D.
September 22, 1983

Carl M. Rylander, M.D.
September 30, 1983

1928

Robert H. Riedel, M.D.
October 13, 1983

1929

Charles H. Appleberry, M.D.
January 11, 1984

William A. Marmor, M.D.
January 2, 1984

1930

Benjamin F. Byland, M.D.
October 21, 1983

1932

Isaac Lorberblatt, M.D.
May 24, 1983

1933

Robert T. Terry, M.D.
December 4, 1983

Lawrence M. Wilson, M.D.
April 2, 1983

1935

William K. Wilson, M.D.
October 28, 1983

1937

Paul A. Brenner, M.D.
September 8, 1983

1938

James F. Nolan, M.D.
June 17, 1983

1946

Victor B. Kieffer, Jr., M.D.
Date unknown

1949

Donald C. Greaves, M.D.
January 9, 1984

1950

Robert D. Burchfiel, M.D.
January 12, 1984

1954

Edward S. Reynolds, Jr., M.D.
November 12, 1983

1956

Richard H. Spitz, M.D.
January 21, 1984

Erratum

The Fall 1983 issue of *Outlook* omitted the name of John Porterfield, M.D., chairman of the committee to endow a scholarship in honor of Florence E. Moog, Charles Rebstock Professor of Biology at WU. The editorial staff regrets the omission of Porterfield's name from the roster of the fund-raising committee.

Springtime "Seaforms"

The beauty of springtime resides year-round in the foyer of the McDonnell Building, thanks to the sculpture pictured on the back cover. Family and friends of David S. Copio, (pictured), a former student at Washington University, have donated "Seaforms" in his memory.

At the time of his death three years ago, Copio was a Ph.D. candidate in the neural sciences program in the Department of Anatomy and Neurobiology.

The sculpture, dedicated in formal ceremonies last fall, is the creation of Dale Chihuly, a prominent artist. It was commissioned by Mary Bartlett Bunge, Ph.D., professor of anatomy and neurobiology, as an appropriate representation of David Copio's life and presence here at the University. "This sculpture combines art and biological form so beautifully," says Bunge. "Our hope is that those who see this sculpture will be refreshed and uplifted, just as David was, by viewing the beauty in biological form and in our environment. When David was here, he enriched the lives of those who knew him. Through this gift of sculpture, he will enrich the lives of all those who pass through this foyer."



Washington University
School of Medicine
660 South Euclid Avenue
St. Louis, Missouri 63110



"Seaforms," a new addition to the McDonnell Sciences Building. See inside back cover.



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