

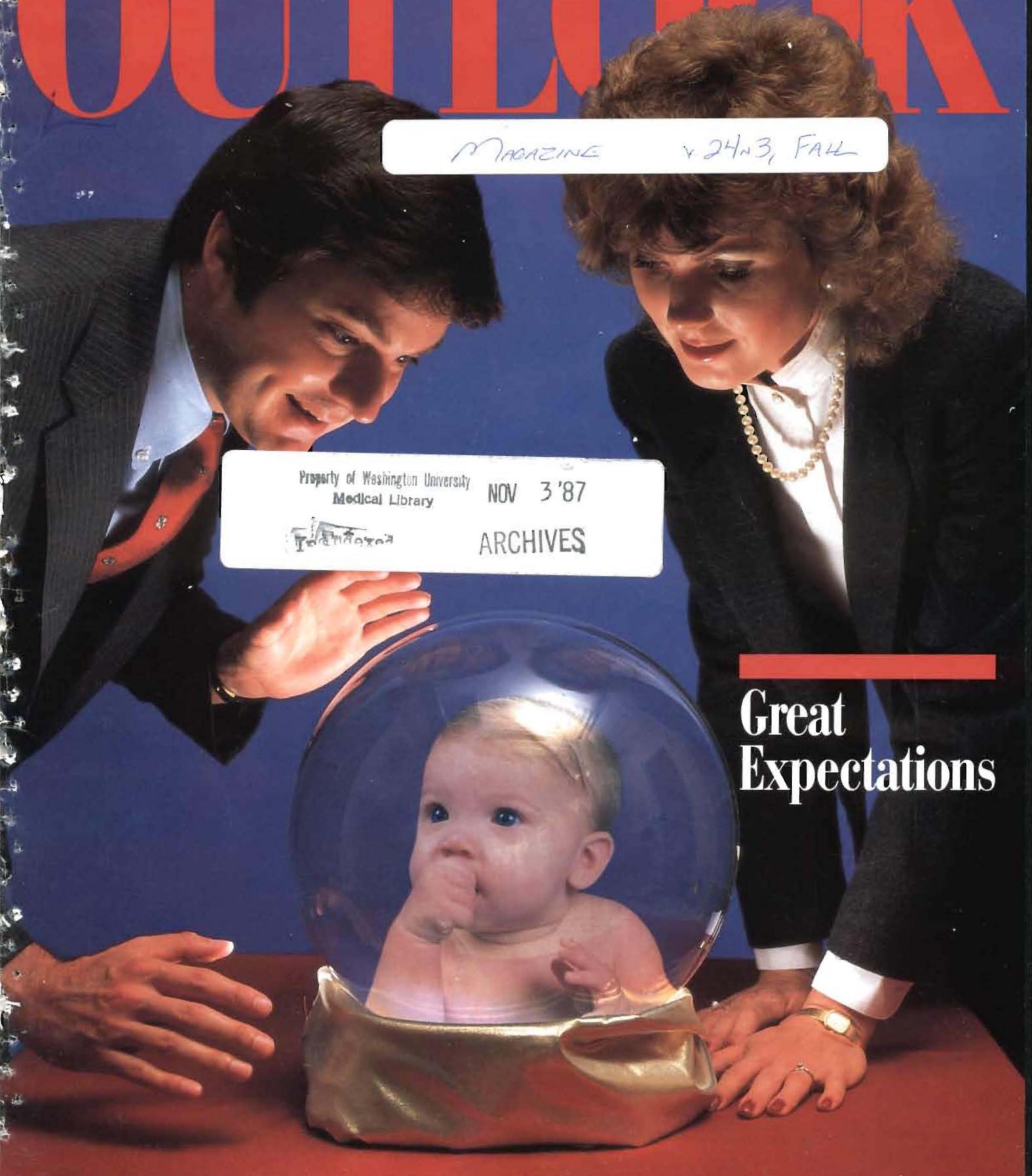
OUTLOOK

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**Great
Expectations**





The School of Medicine breaks ground this fall for a new, seven-story, \$14 million Library and Biomedical Communications Center slated to become one of the most advanced biomedical communications facilities in America. See story on page 26.

OUTLOOK

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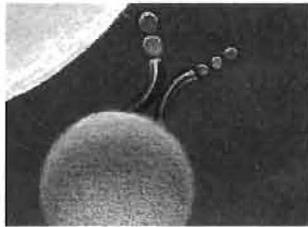
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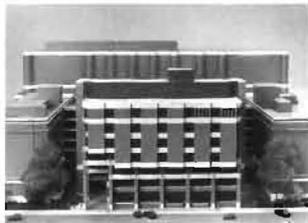
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Older, career-oriented parents are sometimes thrown for a loop when they take on their "management" roles as mom and dad. Such parents often learn the hard way that there's more to parenting than meets the eye.

NEWSBRIEFS

New heart monitoring device may save lives over the phone

A new, portable heart defibrillator under study at Jewish Hospital may, if approved by the Food and Drug Administration (F.D.A.), enable physicians to save lives over the telephone by triggering an electric shock that forces patients' fibrillating hearts into normal rhythm.

The patient unit, which looks like a briefcase, plugs into an electrical outlet and a telephone line via a modular jack. Once plugged in, a voice synthesizer instructs the patient or bystander to place

the self-adhesive electrodes on the patient's chest. A physician at a base station can then decide whether or not to administer a shock, and trigger an appropriate voltage through the phone line. Base stations provide voice communications with the patient, plus cardiac monitors and electrocardiogram readouts.

In a pilot study of this device, called Medphone, nine patients were successfully treated in the hospital with the Medphone station in one room and the patient unit several rooms away, according to

Rodolphe Ruffy, M.D., associate professor of medicine, who is testing Medphone for the F.D.A.

Ruffy says this device has the potential to be a major improvement over fully automated home units, because fully automated means that the machine makes the decision to shock or not. "That's a big decision for a machine to make, and they have problems distinguishing electrical noise from abnormal heart rhythm. That's why medical interpretation is so important."

By adding seasoned medi-

cal judgment to the decision, Medphone may help patients with abnormal heart rhythms during the course of their evaluations, which may take several weeks. Many of these patients spend this time in the hospital, often just being monitored. Medphone may provide a safe, effective and less costly alternative for such patients, by providing effective monitoring and emergency treatment at home.

Heart rhythm problems, or arrhythmias, are common heart problems that can be managed with drugs, surgical



The patient unit to the new portable defibrillator under testing at Jewish Hospital looks like a briefcase.



Rodolphe Ruffy, M.D., demonstrates the base station, which provides the physician with voice communications, cardiac monitors and electrocardiogram readouts.

treatment or electrical devices, according to Ruffy. "During an episode, the heart may evolve to a disorganized state. Instead of beating regularly, it quivers like a bag of worms, losing all pumping function."

Maintaining normal heart function can be accomplished in some patients, by implanting a pacemaker or internal defibrillator. The implantable defibrillator, which is placed under the skin of the abdomen, monitors the heart continuously and delivers a shock when it detects an abnormal rhythm. While it can be lifesaving for people with Sudden Cardiac Death Syndrome, the implantation requires a major chest operation and cannot be used in less robust patients. It also has the unfortunate side effect of

delivering shocks inappropriately to about one in five patients. Nevertheless, the device has proved to be lifesaving in nearly 30 percent of the study group.

While the permanent implantation of such devices may be the ultimate choice for some, the Medphone device may provide an interim measure of security until the best method of treatment is determined. A person who has had a large heart attack, for example, goes through a period of recovery which may be unstable, according to Ruffy. "Instead of having to make definitive decisions early—when the heart attack is still in evolution—we may be able to wait until the healing process is completed, and then attack the chronic problem." ■

Parkinson's researchers seek volunteers for two new drugs

Local researchers are seeking volunteers for a new national study to test two drugs that potentially could slow or halt the progression of Parkinson's Disease in patients who show early signs.

The School of Medicine is one of 30 American and Canadian medical centers participating in a \$10 million, five-year grant from the National Institute of Neurological and Communicative Disorders and Stroke. This is the largest federal grant ever awarded for Parkinson's Disease research.

Principal investigator of the local study is Joel S. Perlmutter, M.D., assistant professor of neurology, a neurologist at Barnes and Jewish hospitals.

Perlmutter needs at least 20 patients, aged 35-79, who have been recently diagnosed or show early signs of Parkinson's Disease. Eight-hundred patients will participate nationally.

The double-blind study will compare the effectiveness of two drugs, deprenyl and tocopherol. Neither drug is currently being used for treatment of Parkinson's Disease, but preliminary evidence suggests they may slow or stop progression of the disease.

Medicines currently available treat symptoms—such as slow movements, tremors, stiffness, stooped posture, drooling, lack of facial expression and unsteady balance—but do not arrest or

slow the progression of the underlying disease.

Parkinson's Disease is a progressively disabling illness caused by damage to nerve cells in a region of the brain called the substantia nigra. It's believed that the brains of Parkinson's patients do not produce enough dopamine, a chemical necessary for normal movement, walking and balance. No known therapy slows or halts damage to the brain cells, or the physical disability caused by the disease.

Estimates are that a million people in North America are affected by Parkinson's Disease. Older adults, especially over the age of 55, are most vulnerable.

People with early Parkinson's Disease frequently are not aware of mild symptoms for months or years. These early symptoms include mild shakiness in the hands or feet, slowed or small handwriting, decreased or blank facial expression, decreased swinging of arms or short steps when walking, softness of speech and general slowness.

For further information, call either 314-362-7148 or 314-362-6909. ■

School of Medicine researchers are awarded gifts and grants

The positron emission tomography (PET) research team at Mallinckrodt Institute of Radiology has been awarded almost \$7 million in a five-year grant from the National Heart, Lung, and Blood Institute.

The \$6,920,838 grant will support the research team's cyclotron project through its 29th year, making the grant one of the longest running at Washington University.

Cyclotrons produce the radioactive nuclides that are necessary for PET scanners to produce images. These images permit scientists to see metabolic changes as they take place in various organs, which is particularly helpful in understanding the basic biological processes of certain diseases.

The two cyclotrons supported by the grant produce radionuclides for PET use in chemical, neurological, cardiovascular and pulmonary research studies. The original cyclotron, now in its 25th year of use, was first in the nation to be located in a medical setting. Mallinckrodt is the only institution to house two cyclotrons.

The PET team is headed by Michel M. Ter-Pogossian, Ph.D., professor of radiology and director of radiation sciences for Mallinckrodt Institute of Radiology. Other members of the team include Marcus E. Raichle, M.D., professor of radiology, neurology and neurological sur-

gery; Daniel P. Schuster, M.D., assistant professor of medicine; Burton E. Sobel, M.D., Tobias and Hortense Lewin Professor of Cardiovascular Diseases in medicine; and Michael J. Welch, Ph.D., professor of radiology.

Joseph L. Price, Ph.D., professor of anatomy and neurobiology, recently became the 11th Washington University faculty member to receive a Javits Neuroscience Investigator Award, which will provide more than \$900,000 in research funding over the next seven years.



Joseph L. Price, Ph.D.

Price's work focuses on the anatomical organization of several related areas of the brain, including the olfactory system responsible for the sense of smell and the hippo-

campus and amygdala, which are believed to play key roles in forming memories and in producing appropriate emotional responses to environmental stimuli. These three brain areas are related to several diseases, among them epilepsy and Alzheimer's Disease, which are both being studied in Price's lab.

Two faculty members have recently received MERIT status for their latest grants, boosting the number of School of Medicine researchers to be awarded MERIT status to a total of six.

Harvey R. Colten, M.D., Harriet B. Spoehrer Professor and head of pediatrics, was given MERIT status for his research on the biochemistry, genetics and cell biology of inflammation in such disorders as cystic fibrosis, arthritis, asthma, juvenile diabetes, autoimmune diseases and inflammatory disorders of the intestinal tract.

Emil R. Unanue, M.D., Edward Mallinckrodt Professor and head of pathology, received his MERIT award for research on the interactions among immune system cells.

Employees of McDonnell Douglas, through their Employee Charity and Community Services Program, have donated \$10,000 to the School of Medicine to help support research on epidermolysis bullosa (EB) the "thin skin" disease.

The EB center is one of the few sites in the nation to

study this rare genetic skin disorder that blisters, scars and destroys the skin and mucous membranes. Sixteen varieties of EB threaten the lives of 25,000 to 50,000 Americans, most of them children.

Washington University's EB center is one of four centers taking part in a new massive national campaign to locate patients with EB. These centers are creating a national patient registry to compile information about various forms of the disease, and to provide a list of patients who may be interested in taking part in research projects.

Dennis D. M. O'Leary, Ph.D., assistant professor of neurology and neurosurgery, and anatomy and neurobiology, has received two awards that will provide some \$100,000 to support his research—an Alfred P. Sloan Research Fellowship, and a McKnight Scholars Award.

O'Leary's research focuses on mechanisms that bring out the regional specialization of the developing cortex, that area of the brain associated with higher cognitive function. His work suggests that the thalamus, a walnut-sized conduit of nerve cells through which sensory impulses pass before going on to the cortex, may play a key role in this process. ■

Researchers paint the heart by number with sound waves

A unique collaboration between researchers in the Departments of Medicine and Physics at Washington University has resulted in a new method of cardiac diagnosis that can be used to predict the actual extent of tissue damage during a heart attack.

A variation of conventional echocardiography, which uses sound waves to generate a television-like image of the beating heart, ultrasonic tissue characterization analyzes echoed sound waves to create a quantitative, paint-by-number-like rendition of heart tissue composition that may lead to earlier and more accurate diagnoses and prognoses following heart attacks.

As it stands now, when a patient comes to the emergency room with chest pain involving a heart attack, the acute effects of the attack can be detected almost immediately through conventional echocardiography, by observing segments of the heart wall as they fail to contract normally. Yet, the physician has no reliable way of knowing how much time has elapsed since the onset of the attack, or whether or not there has been irreversible tissue damage. Routinely, such information is only available way after the fact, using chemical analysis.

Tissue characterization fills in this missing blank much sooner by describing the intrinsic properties of heart muscle itself that predict its

death or recovery.

To determine these properties, Julio Perez, M.D., associate professor of medicine, and James Miller, Ph.D., professor of physics, fire sound waves of constant energy at the tissues, and then measure the energy of the echoes. Because energy is neither created nor destroyed, the energy of an echo should equal the energy of the original sound wave if it is aimed at a perfect mirror, say, a stainless steel plate. But because living tissues are not perfect mirrors, but rather absorb or otherwise alter energy from sound waves in ways that betray the

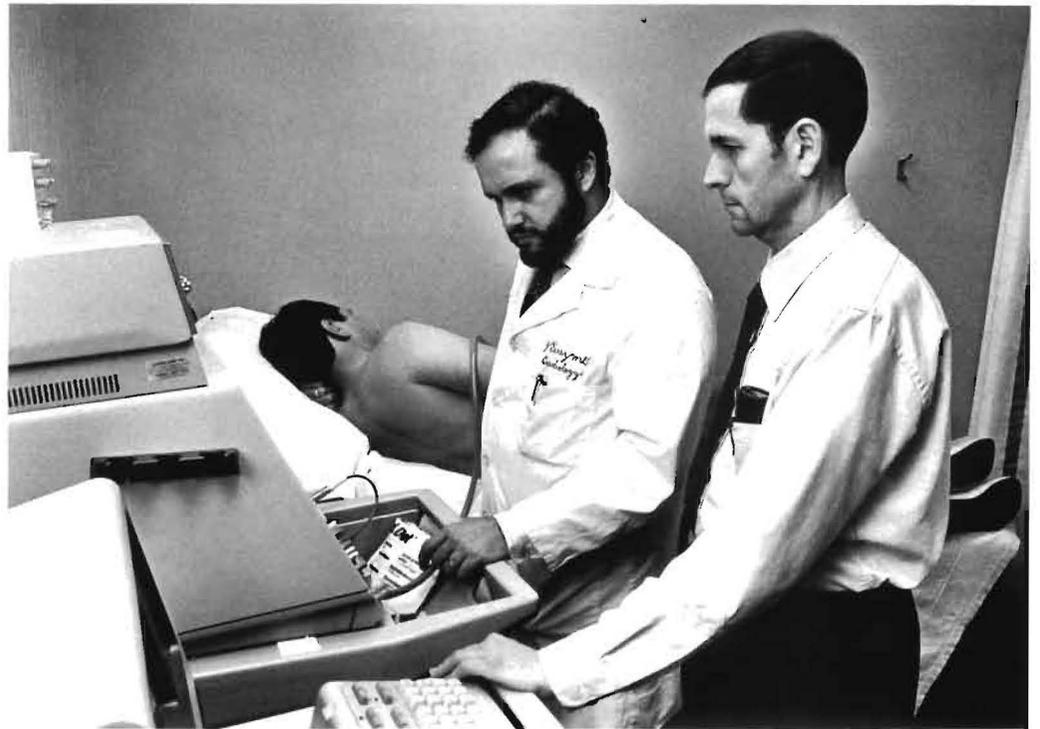
tissues' structural makeup, the constitutional differences among tissues can be quantified. Scar tissue, for example, contains unusually high amounts of collagen and is more reflective than normal tissue.

Because tissue characterization is such a strong measure of tissue damage and recovery, it is likely to play a major role in establishing the positive benefits and use of clot-dissolving drugs, such as t-PA, during heart attacks. And it may eventually eliminate the need for tissue sampling, or biopsy, in the diagnosis of uncommon, degenerative heart diseases, as well as for the monitoring of rejection in heart transplant patients and harmful side effects in patients undergoing

chemotherapy.

Clinical studies of the method, which began early this year, have already led to the detection of old heart attacks in more than 40 patients, and to the identification of 30 acute heart attack victims in the coronary care unit at Barnes Hospital, in collaboration with Allan Jaffe, M.D., associate professor of medicine.

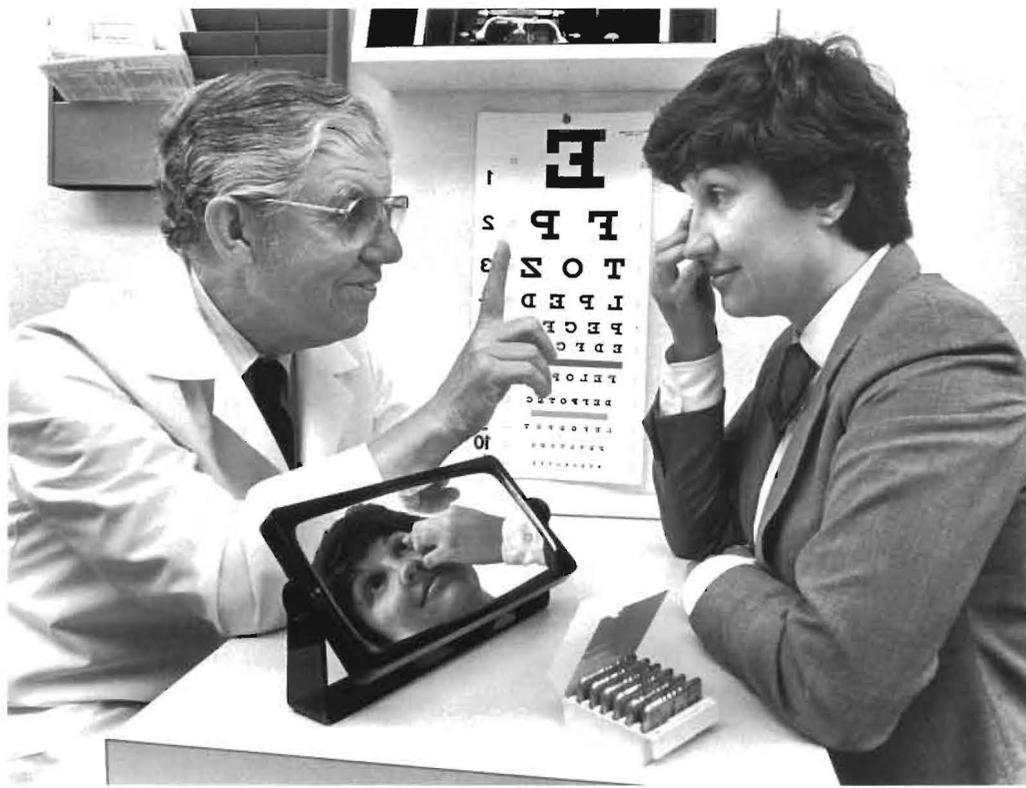
"The goal of all of our work is non-invasive diagnosis, using a tool which does not deliver any ionizing radiation to the patient, a tool which is absolutely without discomfort to him because he is not required to leave his bed, and his bed is not moved," Miller explains. "There are many other wonderful techniques, such as



Julio Perez, M.D. (near patient), and James Miller, Ph.D. (at machine) conduct ultrasonic tissue characterization in the Cardiac Diagnostic Lab. Clinical studies of the method began early this year.

magnetic resonance imaging, where very, very excellent imaging is obtained. But unfortunately, it requires transporting the patient from whatever critical care setting he's in to some remote facility, often many floors and many feet away. The beauty of ultrasound, in general, and ultrasonic tissue characterization, in particular, is that we come to the bedside. The patient can literally be asleep if need be, and certainly need not be asked to do anything."

When they first began their work on tissue characterization, Miller and Perez used ultrasound devices specially built for tissue characterization by machinists in the physics lab on the main campus. With time, they have learned to adapt and modify commercially available ultrasound equipment to include tissue characterization. They are currently working on a system that may one day superimpose a color image of tissue characterization onto a conventional greyscale ultrasound image. "An extremely important feature of all of this work is that even though it's based on some very quantitative physics, we have found ways to display our results in precisely the same format that cardiologists are already expertly trained to use and to interpret," Miller says. "So rather than our technique requiring everybody to give up the old and learn the new, which so often happens, our technique builds entirely upon all the strengths of the old, and doesn't even require any significant re-training." ■



Jack Hartstein, M.D., fits a patient with disposable contact lenses.

Disposable contact lenses are safer, more convenient, less costly than extended wear

Contact lens wearers throughout the nation got off their hands and knees this past September, when that all-too familiar crawl after those minute, see-through disks turned into a reach for a six-pack.

Disposable contact lenses hit the market this fall in handy six-packs that contain three-month supplies of lenses designed to be worn for up to two weeks, thrown away and replaced.

"Disposable lenses are safer, more convenient and will probably end up costing less than extended-wear

lenses," says Jack Hartstein, M.D., associate professor of clinical ophthalmology at the School of Medicine. Hartstein is one of several experts in the United States testing the lenses for Vistakon, a subsidiary of Johnson and Johnson. The lenses were fully approved by the Food and Drug Administration (F.D.A.) last January.

"We've found that disposable lenses are safer than conventional extended-wear lenses," says Hartstein, who has tested the lenses on 60 patients since March and reports that all but five have

successfully adjusted to them. "A major problem with extended wear is that protein deposits from tears can build up on lenses and cause everything from cloudy vision to potentially dangerous infections and ulcers. Cleansing solutions help somewhat, but most of them have a 20 to 30 percent allergy factor and can cause severe reactions. For these reasons, many ophthalmologists are increasingly reluctant to prescribe prolonged-wear lenses, and researchers have been looking for alternatives."

The very element that

makes extended-wear lenses possible can also make them dangerous: water. Many of these lenses contain as much as 70 percent water, which allows a steady supply of oxygen to pass through the lens to the cornea. Because the cornea can breathe, the lenses can stay comfortably in the eye, even during sleep, for weeks at a time.

But the watery lenses absorb protein, bacteria and chemical irritants more readily than do daily-wear soft lenses, which are only 30 to 40 percent water. "Even though we instruct patients to remove extended-wear lenses about every two weeks and cleanse them overnight, deposits still tend to accumulate, compromising vision and health," Hartstein says.

"When extended wears came out, I jumped at the chance to wake up every morning or in the middle of the night with clear vision," says Jerry Anthony, 38. "I liked the idea of wearing the lenses for weeks at a time without the daily hassle of putting them in, taking them out and cleaning them."

But three weeks after he popped in his first pair of prolonged-wear lenses, Anthony contracted a painful eye infection that wouldn't go away. "I went back to wearing glasses and took antibiotics for a year, trying to clear it up."

During the next several years, he tried three different types of extended-wear lenses, with no luck. Infections from protein deposits continued to plague him, complicated by allergic reactions to the preservatives contained in most lens cleansing

solutions. At one point, he developed corneal edema—an accumulation of fluid in the eye's outer layer caused by an insufficient flow of oxygen. Corneal edema causes temporarily blurred vision and, left untreated, can lead to blindness.

"In May, just when I was ready to give up and resign myself to glasses, Dr. Hartstein asked if I'd like to try the disposables," Anthony says. "So far, I've had no problems. My vision is crisp and clear, and I never knew a lens could be this comfortable."

For maximum comfort, Anthony inserts fresh lenses about every 10 days, instead of every two weeks as recommended by ophthalmologists. "I've adapted them to my own needs. It might cost me a little more, but it's definitely worth it. I make up for it by not having to buy cleansing solutions and other care products, not to mention medication to clear up those infections."

The lenses will cost about \$400 a year. The initial fee, which includes an exam, fitting and a three-month supply of lenses in a portable six-pack, is about \$175. Each subsequent six-pack of lenses costs about \$75, and Hartstein expects the price to go down as other companies besides Vistakon begin producing them.

Most extended-wear lenses cost from \$300 to \$350 a year. Because they wear out so fast from protein absorption and repeated washings, they usually need to be replaced once or sometimes twice a year.

Hartstein estimates that disposable lens wearers will save about \$100 to \$150 a year on cleansing solutions. And, because the six-pack assures the lens wearer of always having a spare, insurance to cover the cost of lost or damaged lenses is unnecessary. The insurance runs about \$40 a year in many parts of the country.

Disposable lenses, although thinner and more comfortable than prolonged-wear lenses, are sturdy: the Vistakon lens contains 58 percent water.

At first, disposable lenses will be available only for nearsighted people who don't have astigmatism, a defect in the shape of the cornea that interferes with its ability to focus. But Hartstein predicts there will soon be a dispos-

able lens to suit most of the 12 to 14 million Americans who wear contact lenses.

People who've already tried extended-wear lenses and are used to them are probably the best candidates for disposable lenses, although one of Hartstein's patients went right from glasses to disposables with no problems. Adequate tear flow and a normal blinking pattern, prerequisites for all contact wearers, are also necessary for disposable lens candidates.

"My patients are pleased with the high degree of comfort, visual acuity and convenience provided by disposables," says Hartstein. "Although I've prescribed extended-wear lenses for years, I feel a lot safer now that I have a disposable lens to offer my patients." ■

Two faculty members elected to National Academy of Sciences' Institute of Medicine

Michel M. Ter-Pogossian, Ph.D., professor of radiology, and Samuel A. Wells Jr., M.D., Bixby Professor and chairman of surgery, were among 40 new members elected to the National Academy of Science's Institute of Medicine in recognition of their contributions to health and medicine or related fields.

As members of the institute, which was established in 1970, Ter-Pogossian and Wells will help examine health policy issues and advise the federal government.

Ter-Pogossian is often described as the father of positron emission tomography (PET). Wells is known for his research on endocrine diseases, particularly the transplantation of endocrine tissues and the identification of tumor markers that are useful in the diagnosis and localization of endocrine tumors.

The institute's election of Ter-Pogossian and Wells brings the number of Washington University faculty who are members to 13. Total active membership nationwide is 468. ■

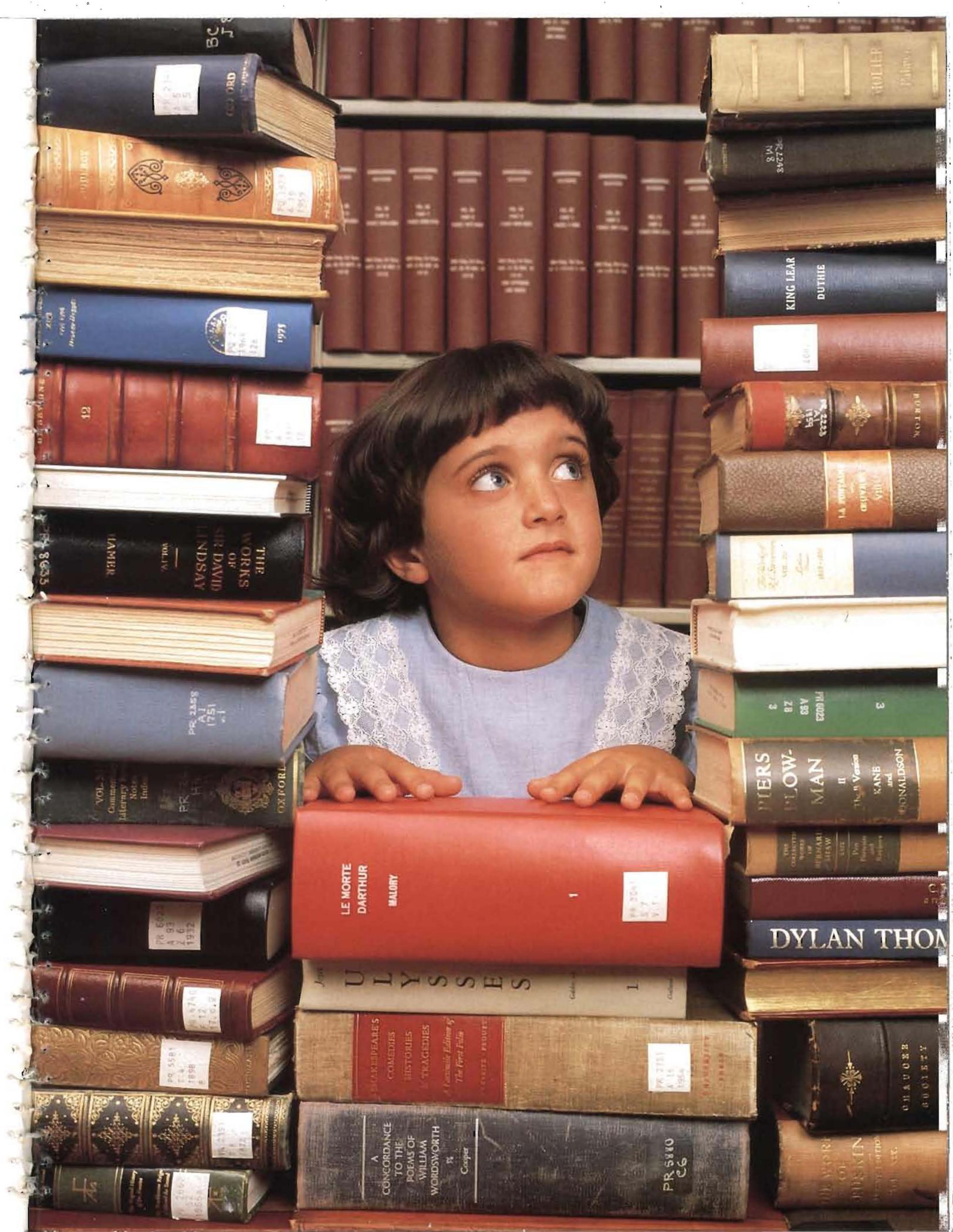
WHEN EXPECTATIONS ARE TOO GREAT

BY BRENDA MURPHY

The parents are among the best and the brightest.

In their 30s, both are usually professionals who have worked hard to attain a certain degree of success at an early age. Long hours in the courtroom or laboratory or board room, among other professional work stations, have paid off with the respect of colleagues and a comfortable home and lifestyle.

Their carefully conceived life's plan seems to be following a smooth course. Having reached both professional and personal plateaus, parenthood—which previously had been postponed or even rejected in favor of careers—becomes a much sought-after role.



LE MORTE
D'ARTHUR
MALORY

JAMES
JULYSSSES

THE COMPLETE
POEMS OF
WILLIAM WORDSWORTH
A Facsimile Edition of
The Firth Edition
EDITED BY
ROBERT
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A
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WILLIAM
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PIERS
THE PLOW-MAN
The n^o Version
KANE
and
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DYLAN THOMAS

THE WORKS
OF
MILTON
CHAUVESS
SOCIETY

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OF
SIR DAVID
LINDSAY
HAMILTON

KING LEAR
DUTHIE

LA COMPAGNIE
DES
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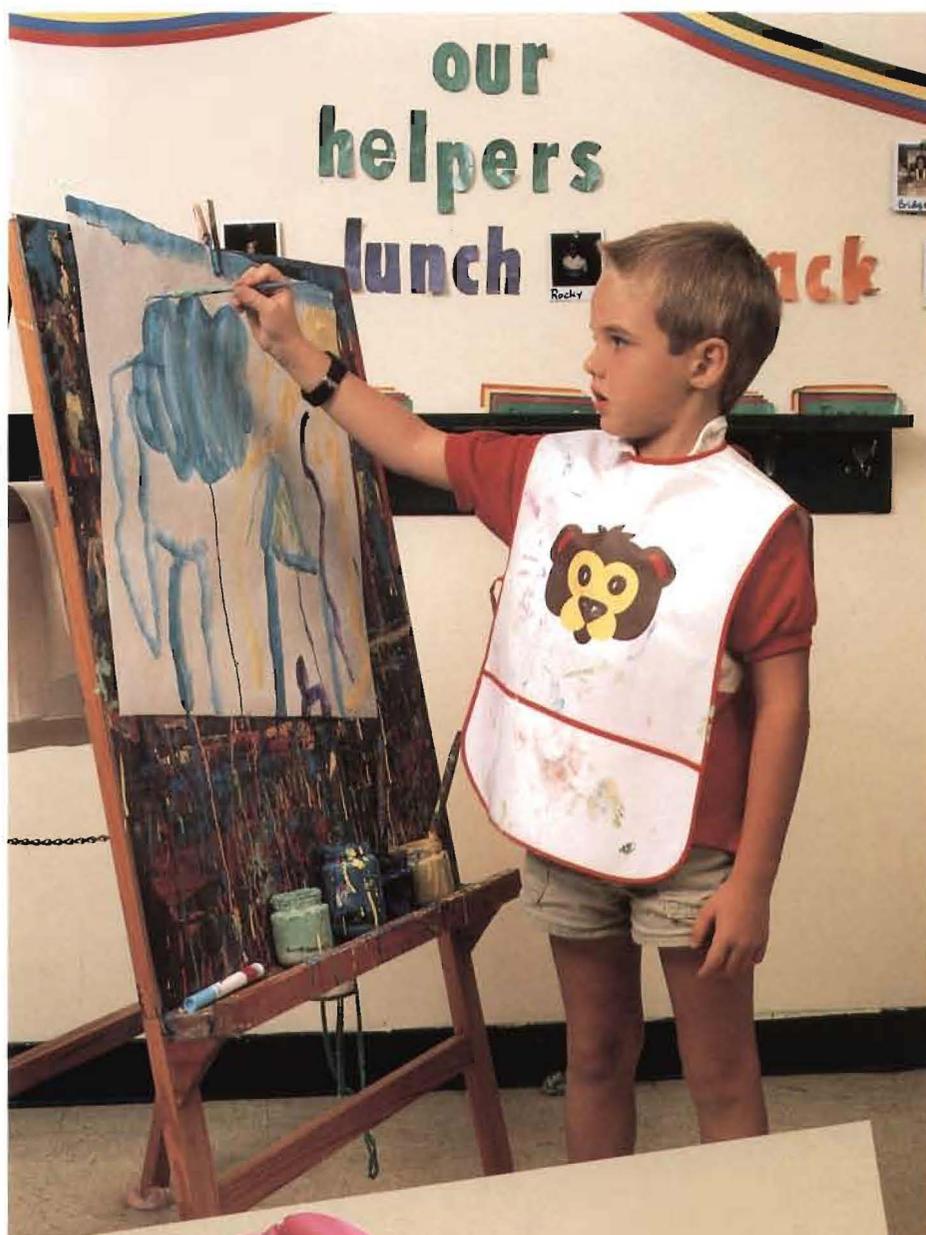
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THE
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Preparations for a child are made in much the same meticulous way as the parents would successfully tackle a career objective. Child care books are consulted, a pediatrician is selected, day care or private babysitting services are arranged, or one parent may choose to stay home with the child—all before the baby's birth.

Often inherent in these preparations is the assumption that if the parents are as successful in parenting as they have been in their careers, there should be no reason that their child won't be bright and well-adjusted in the family situation. Parents' expectations for themselves as well as for the child can run extremely high.

The child may have another course in mind.

Kids will be kids, or so the adage goes. But for some first-time, older parents, who are used to being in charge on the job, the time-consuming, somewhat unpredictable do-it-yourself aspects of child-rearing can leave them feeling out of control. Some older parents find themselves responding to their much-wanted offspring very differently than they thought they would.

"There must be something wrong with this child" and "there must be something wrong with me" are two common responses to the experience, according to Barbara Talent, Ph.D., a clinical psychologist in the Division of Pediatric Neurology of Children's Hospital at Washington University Medical Center.

Talent has seen an increase in her practice in recent years of first-time, older parents who need help in synchronizing their child's behavior with their own and, often, in adjusting their own expectations for the child.

"This is one of the most radical changes in life you can experience," says Talent of a child born into a previously childless family.

"Having a child is an awe-inspiring event," she says. "When they hand us that small, wiggly bundle, we look with wonder and awe. But we also suddenly become aware that there's no instruction booklet."

Adds Ruthmary Deuel, M.D., a pediatric neurologist in the Division of Pediatric Neurology of Children's Hospital: "Many of these parents haven't been

Ruthmary Deuel, M.D., suggests that parents back up their children's non-verbal, emotional bases for self-esteem, by letting them do things they are good at or enjoy.

Pushing Up Baby

First-time, older parents often have expectations for their child that include anticipations for a high intelligence level. With this expectation often comes the desire to push a preschooler into early academics.

The problems with pushing children to read and write at an early age can be many. Not only do young children need to concentrate their time on mastering language and motor skills, but early advances into academics have not been shown to produce long-lasting, positive effects and may even turn off a child to school.

"The child who is pushed, no matter how normal or super bright he may be, often loses the desire to use his ingenuity to get around the obstacles of daily living," says Ruthmary Deuel, M.D., associate professor of pediatrics and neurology. "Pushing a child may make life seem like one big obstacle to him. He has to fulfill assignments that are not interesting or self-motivating. It's too bad to turn off initiative at an early age, which can be done by excessive pushing."

Adds Barbara Talent, Ph.D., research assistant professor of pediatrics: "In a general way, pushing fosters distrust. The child knows inside what he can do. But the adults whom he looks to for support and guidance are putting him in a situation that's really inappropriate."

Often first-time, older parents themselves possess high IQs, and think it only natural that their offspring will be bright.

"Some parents know what they want in a child, but the child may never get a chance to show them what he wants to be," Deuel says. "By trying to predestine what the child is going to be like, it may turn out that no one will get what they want."

Although the child may possess a high intelligence level, that doesn't mean he'll be ready to read at an early age. "In order to read, you have to have a certain level of cognitive neurological development,"



says Talent. "That development happens as it happens."

Even if parents succeed in teaching their child to read at an early age, the effects have not been shown to be lasting, according to Louise Bates Ames, Ph.D., and Joan Ames Chase, Ph.D., authors of "Don't Push Your Preschooler."

The authors cite the findings of a New York City Board of Education study that found that "the brightest two-thirds of a group taught to read early did not maintain their initial advantage over their classmates who had not learned to read before first grade."

Ames and Chase also refer to "The National Impact Study of Head Start" report, which found no long-lasting effects in cognitive development of those disadvantaged preschoolers who attended the government-funded program.

Before parents put a child into a preschool that emphasizes formal academics, they should consider what the young child is not learning from missed playtime, according to Talent.

"Youngsters need to develop language, positive self-esteem,

problem-solving skills and a sense that they are worthwhile as individuals," says Talent. "Play is very important; children develop cognitive as well as social skills through play."

Adds Deuel: "If you only have an hour a day to spend with your 4-year-old, don't spend it writing and reading. Do things the child is good at or that you like. Back up the child's non-verbal, emotional basis of self-esteem."

If a child shows an early interest in reading or ability to read, by all means, encourage that development, Deuel says. "But don't excessively push him, and don't make it a major facet of your parental relationship."

Authors Ames and Chase suggest that parents let the child take the lead in their development. "If you keep in mind that your children learn to walk and talk pretty much by themselves, it may help you relax about the other, more complicated things they're going to need to learn later on," they write. ■

around small children for a long time, since their own childhood. Maybe they didn't come from large families where there were brothers or sisters. Perhaps it's a totally new and sort of frightening world to both parents. If they're heavily involved at work, they don't have time to become practical, hands-on experts. The commonsense aspect of the hands-on expert is missing."

According to a recent Associated Press story, the birthrate for American women aged 30 to 34 increased from 6 percent in 1980 to 7.2 percent in 1984. The Census Bureau noted that no other age group showed an increase.

While the demographics for first-time parents may be changing, the emotional-intellectual makeup of infants and preschoolers isn't.

"These parents are often verbal and they use those skills in raising their kids. But you can only use reason so much with a 2-year-old," says Talent. "Emotionally, they're still young children. It doesn't work.

"You can find yourself locked in endless discussions with the child. You feel out of control and think: 'I can't stand this child.' These are normal people who are

thinking: 'Why did I do this to myself? What did I do wrong?'"

Stressed to the limit, the parents may begin to respond emotionally; they become inconsistent, yell, threaten, argue. They find themselves doing all the things they saw their parents do and swore they wouldn't, according to Talent.

Others are quick to suggest that the child possesses a physiological problem—such as hyperactivity—and consult a pediatric specialist. According to Deuel, the physical problem may lie with the parent instead.

"The older parent doesn't have that much energy," says Deuel. "The baby may wake up twice a night, start walking at nine months and be into everything. Understandably, many people have difficulty simply due to the physical stress of having a bright and active, very young child around.

Deuel cites the extreme case of a very bright 2½-year-old being raised by his 50-year-old grandmother. The grandmother sought help for the child because the grandmother was chronically exhausted, and thought the child must be suffering from hyperactivity.

"He was not hyperactive at all. He just needed an 18-year-old mother with a lot of energy," says Deuel.

Particularly when no physical problem is found, Deuel often refers parents and child to Talent for counseling intervention.

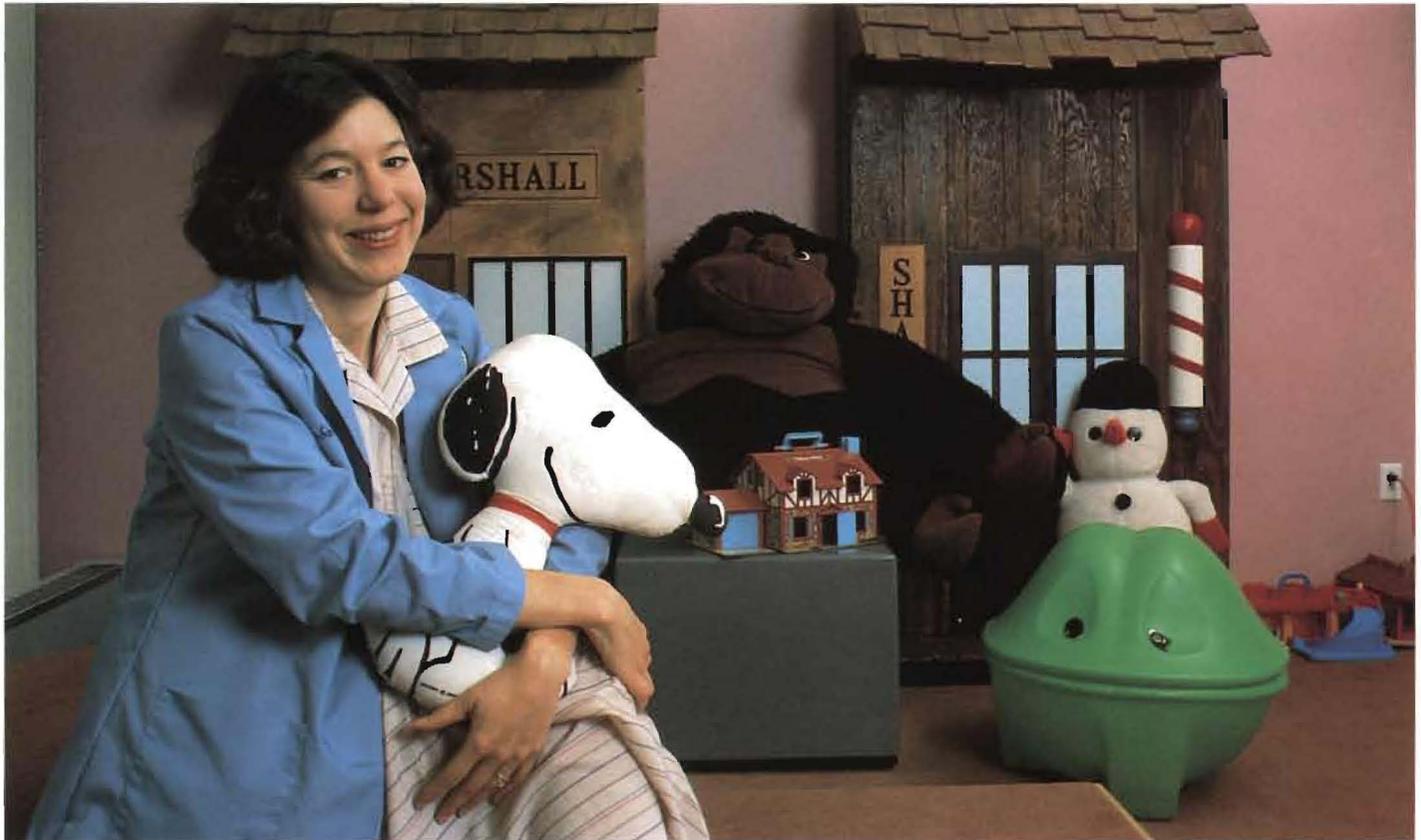
"Most of these children are not truly hyperactive," says Talent. "Parents complain that children won't play by themselves or that they need constant attention, they're always getting into things, they fight with their sibling, they whine and throw temper tantrums.

"These behaviors are fairly normal, but that doesn't mean they're not difficult to deal with. A family doesn't have to be a 'diagnosable problem' to warrant getting some help."

"Help" does not always mean a year of intensive psychotherapy sessions, according to Talent. "It means guidance," she says.

While the child care shelves in bookstores may be filled with advice from authors, the books are variable and relate to the author's point of view and how he or she perceives the needs of the audience.

"Often parents need tailor-made advice for their child, home and office situation,"



Children develop cognitive as well as social skills through play, according to Barbara Talent, Ph.D.

says Deuel. "There are little tricks to make discipline and child guidance by parents much more effective. The individual circumstances are very important."

Deuel suggests that parents faced with behavior problems in a young child should first consult the child's pediatrician and nursery school teacher. If their suggestions don't help improve the problem, behavior management counseling may be appropriate.

"It gets the parent and child's behavior in a synchronous pattern so the parent is in charge," says Deuel of the counseling sessions. "Sometimes parents become victims of children. Realistically, children can't have everything they want, and they don't possess the ability to make all decisions. . . . But often the child gets to training the parent rather than the other way around. It can easily happen to the older parent who's sensitive and very vulnerable to the much-wanted child."

By becoming involved in behavior management counseling, the parent is afforded the luxury of one hour each week to develop a consistent plan for child guidance, according to Talent. "It is very difficult to find that kind of time consistently, except at midnight, when you're exhausted."

Talent points out that the people who used to be available to offer support and guidance to parents are less available. The mobile society in which we live tends to uproot people and move them away from family and friends. Parents look to professionals for guidance when the more traditional sources are less available.

"We're not living in the same neighborhood with our parents or sister or best friend. The support system is not there," says Talent. "There's an increase in anonymity."

Talent says first-time, older parents are often reluctant to discuss their frustrations in child-rearing with friends and may believe calls to the pediatrician are bothersome. But, she says, "I think pediatricians are receptive and are encouraging people to call."

Both Talent and Deuel are quick to point out the positive aspects of first-time, older parenting, including the fact that these high-income professionals have experienced opportunities for travel and socializing not available to many younger parents, who may feel they're missing out on these activities.

"They have increased experience in life, and can often more easily recognize



Ruthmary Deuel, M.D., tests the motor skills of a young patient.

when things are not working and problems are beginning. They approach parenthood with less naïveté," says Talent.

"If the child has a real handicap, these are the kind of parents who know immediately. . . . They usually seek out good professional help," says Deuel. "But if it's a matter of style or personality development or intelligence, the child may be at odds with the parents, and this can be a source of problems for both parents and child."

To help decrease the impact of these differences, Deuel advises parents to keep pre-birth expectations to a minimum.

"As a very accomplished person who becomes a parent, it's important not to get

caught up in an anticipated timetable for the child. It is better to sit back and learn what the child is like and how he will deal with the world," says Deuel.

Parents also should not be so quick to blame themselves when behavior problems arise, according to Talent.

"Ambivalence and confusion are typical of parents who take their job very seriously," says Talent. "The goal is to see that child as an individual, and to remember that even when you do everything perfectly—you're cool, calm and collected—it still may not work. That's because the child is an individual, and a certain amount of friction is normal." ■

ON FINS & NEEDLES

Probing the Nerve of the Toadfish

BY KATHY WILL

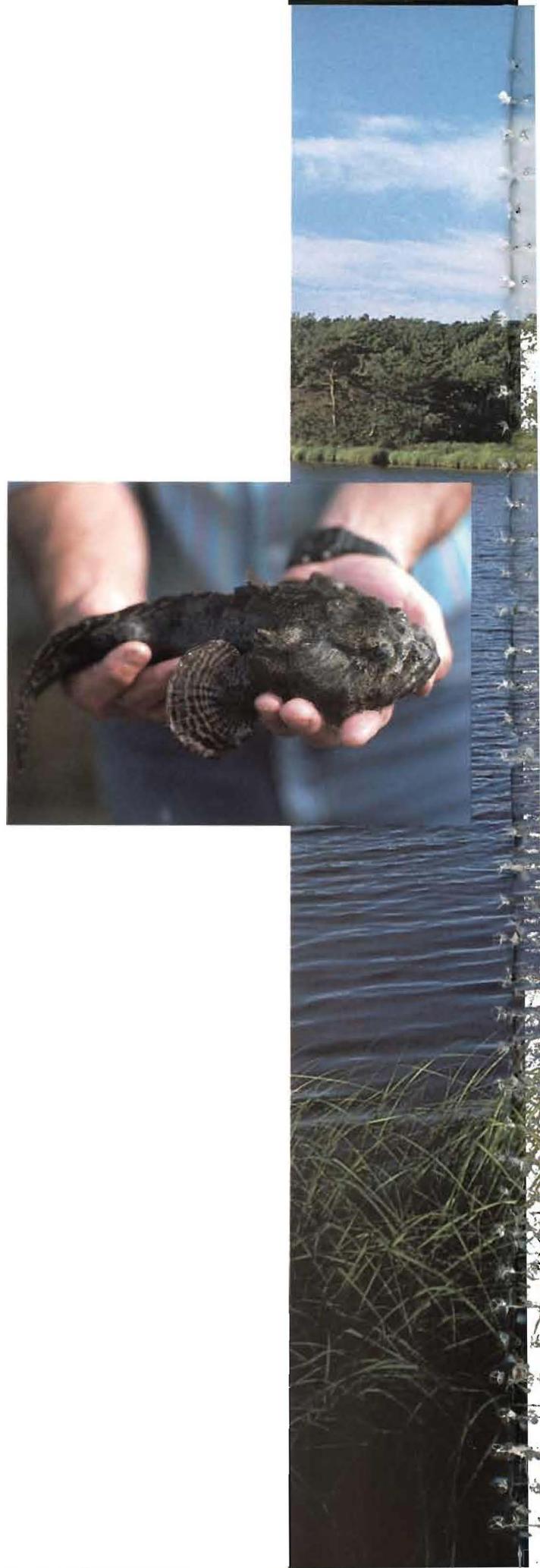
Hiding under a rusty tin can in a marshy estuary on Cape Cod, a somewhat smaller version of *Jaws* spots an unsuspecting minnow.

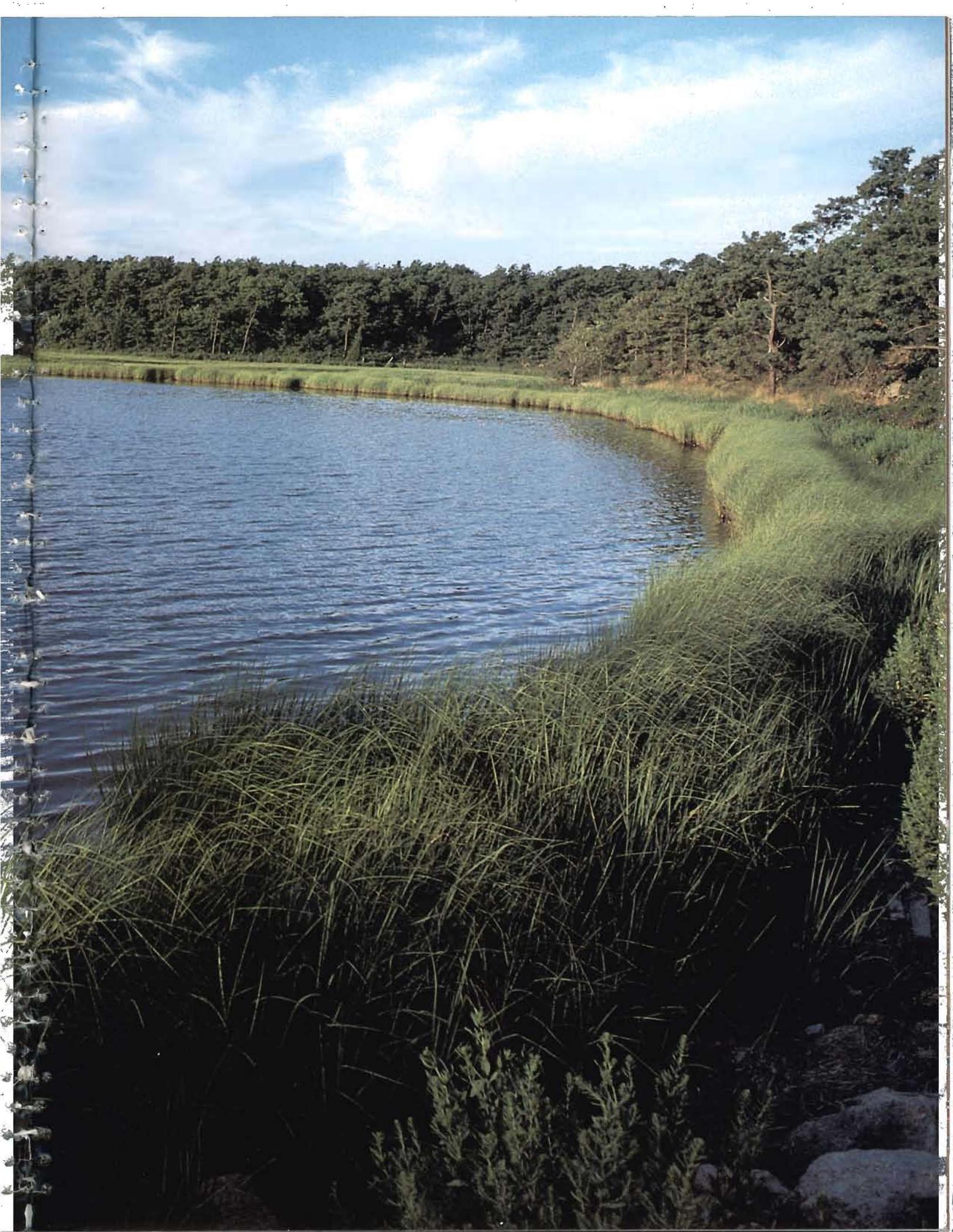
As his defenseless prey draws near, our miniature *Jaws* freezes in place, erects his dorsal fin and fans the fins of his pelvis back and forth. Da da, Da da, Da da, Da da . . . snap, crackle, gulp!

"You need a really big mouth to grab food with if you're not a fast swimmer," John Valois, manager of Marine Resources at the Marine Biological Laboratory (M.B.L.) in Woods Hole, Massachusetts, says of the toadfish. As if its big mouth, sluggishness and affinity for garbage were not enough, Valois adds that the toadfish has no scales. In lieu of a scaly armour against bacteria, the toadfish protects itself in thick layers of slime.

Looking something like an oversized tadpole dressed in seaweed, this homely teleost inhabits waters where a less hearty fish would not tread. The brackish waters of its natural environment are subject to vast fluctuations in pH,

Photos by Brendon Poh





salt, oxygen and nitrate levels, according to Valois, and that requires "one tough fish."

"You'd have to be really hard-up to eat a toadfish," says Steve Highstein, M.D., Ph.D., professor of otolaryngology, and anatomy and neurobiology, who has been studying this lowly creature for the past seven summers at the M.B.L. because, underneath all that slime, the toadfish embodies a near-perfect anatomy for studying how the brain controls its own sensory perception.

It's common knowledge that the brain relies on the sensory organs of sight, sound, smell, taste, touch and equilibrium, or balance, to tell it what's happening out there in the environment. This gathering and sending of information by the sensory organs has been well-documented and studied in detail. But although scientists have known for a long time that information also flows from the brain to the sensory organs, they are still very much in the dark as to what this information is and what it does.

The nerve pathways connecting the brain to its sensory organs can be likened to divided highways in which incoming, or afferent, nerves carry information from the sensory organs to the brain, and outgoing, or efferent, nerves send information from the brain back to the sensory organs. Information travels on either side of these sensory highway systems in the form of electrochemical signals that can be monitored by inserting electrodes into nerve cells and reading the traffic patterns on an oscilloscope.

In the vestibular, or equilibrium, systems of mammals, it is difficult, if not impossible, to visually distinguish afferent from efferent nerves, because the two nerves lie too close to one another. In mammals, the afferent and efferent nerves of the vestibular organs of the inner ear are bundled together, because they have to fit through small holes in the skull to reach the brain. Fish, on the other hand, have no such bony partitions separating their vestibular organs from their brains, so their afferent and efferent nerves are anatomically distinct, and can be observed and recorded individually.

Highstein, whose research on the vestibular system goes back 20 years, became interested in the efferent branch of the system about seven years ago. At that time it was believed that, since the afferent nerve is excitatory (it excites the brain to stimuli), the efferent nerve must

be inhibitory. The thinking was that the efferent nerve might shut down input from the vestibular organs if the brain, for one reason or another, wanted to pay attention to something else, say, an auditory stimulus. Observations of the toadfish, however, led Highstein to prove this assumption unequivocally wrong.

His work with the toadfish began when he noticed that the fish exhibits a characteristic behavior that entails its freezing in place, erection of its dorsal fin and fanning of its pelvic fins. This behavior occurs in a variety of situations, among them the presence of prey or the toadfish's natural enemy, the blue crab. Furthermore, Highstein observed that he could induce this

**"We don't
really know the
world as it is,
but as our
brains permit us
to know it."**

behavior in the lab by touching the fish on the lips or over the eyes with a glass probe.

These initial observations led Highstein to suspect that this behavior is some kind of alerting system that prepares the toadfish to capture food, fight or perform other behaviors that require a great deal of movement, hence equilibrium.

Single cell recordings from the efferent nerve of the toadfish's vestibular system uncovered an amazing fact: The efferent neurons of the vestibular system transmit signals continuously, even when the fish is not moving. That this constant activity of the efferent nerve could be inhibitory just didn't make sense to Highstein. Such constant inhibition would be like turning down the music in a concert hall so that no one could hear the pianissimo.

Highstein's recordings also uncovered another, equally surprising piece of evidence: The efferent nerve cells increase their activity when the fish's alerting be-

havior is induced with a glass probe. Recording from the afferent nerve, he discovered that it, too, increased its activity when the fish was touched with the probe. But if he severed the efferent nerve and then touched the fish with the probe, the afferent nerve showed no activity.

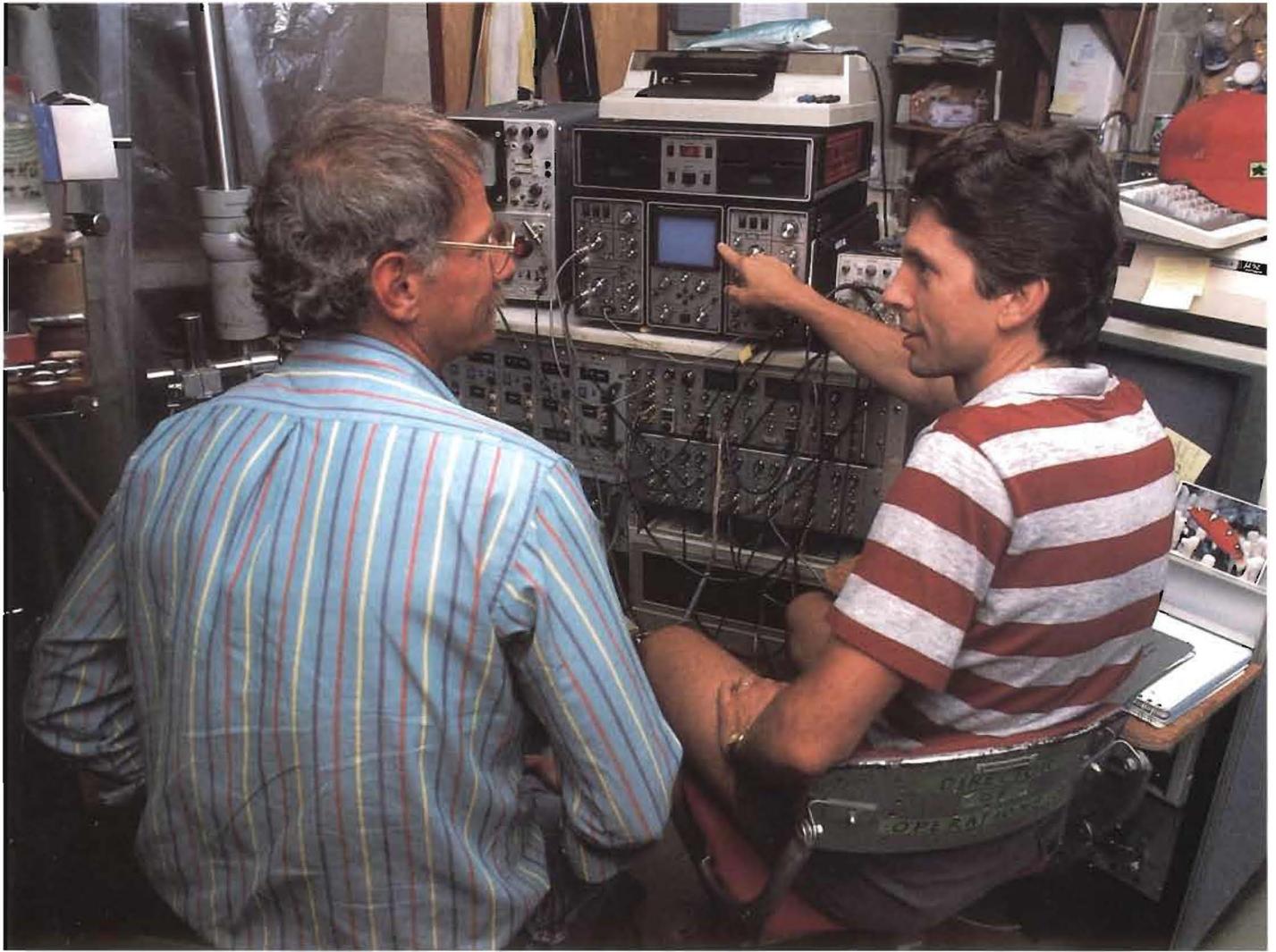
From these results, Highstein concluded that the efferent nerve is indeed excitatory, and that its excitatory effects increase the level of sensory input to the brain. Electron micrographs have demonstrated the actual, physical connection between the efferent nerve axons and the sensory hair cells of the vestibular organ. This junction, or synapse, between the efferent nerve cell and the sensory hair cell links Highstein's work with that of Antoinette Steinacker, Ph.D., who is his wife and assistant professor of otolaryngology, and anatomy and neurobiology, enabling them to work in the same lab and on the same fish.

Steinacker, who had been studying how motor neurons and muscle talk to one another through their synapses, had been looking for a more complex system in which she could integrate her knowledge of receptor kinetics into a larger research project encompassing behavior.

Her study of the synapse between the efferent nerve and sensory hair cell in the vestibular system of the toadfish is at a very basic level. Because nerve cells talk to one another through ion channels in their cell membranes, Steinacker began her work with two basic questions: What type of ionic channels do the efferent nerve cells and sensory hair cells use to communicate with one another, and what are the properties of these channels?

Steinacker has already learned the answer to her first question—potassium channels—and is now working on the second. "In the large scheme of things, the brain is going to send out information through that channel, through the synapse, through the sensory receptor, the hair cell, and try to modify information that the cell is taking in from the periphery and sending into the central nervous system," she explains. "You can think of this efferent system as the conductor of an orchestra," she continues. "The orchestra is trying to play, but there's this conductor trying to bring up this or that section. My question is precisely at the molecular level—what is this conductor doing, and how does he do it?"

By figuring out what the conductor does and how he does it, mankind may



Steve Highstein, M.D., Ph.D., and Tim Tricas, Ph.D., record the efferent nerve of the toadfish in their laboratory at the M.B.L.

one day become the conductor of its own orchestra. The Office of Naval Research, for example, is quite interested in “conducting” the vestibular system, as motion sickness is a major problem in both air and space travel. “It’s most likely at the level of the ion channel that one will be able to modify motion sickness,” according to Steinacker. And, since it is also very likely that efferent control of sensory input operates in other sensory systems as well, our knowledge of efferent control may eventually place an individual’s perception of the world under more conscious control. “We don’t really know the world as it is, but as our brains permit us to know it,” Steinacker says.

Even more important to this team than the what and the how, is the why. “The vestibular apparatus, the labyrinth, does such an elegant job of analyzing head movement and head position,” he says. “It

seems to do a beautiful job. It seems to have all the information that the brain could ever need about head movement and head position, so it’s unusual that the brain would go out and modify that information before it comes to the brain. The question is why? Why, under certain circumstances, is it desirable to have some central control of the peripheral apparatus? You would think the peripheral apparatus is doing fine on its own, and yet under certain circumstances, the brain goes out and modulates it.”

Highstein would like to know what these circumstances are. “The vestibular system does many, many jobs. It doesn’t do just one thing; it interacts with every function of the body. And the efferents are not going to modify every one of those functions; they’re only going to modify some of them, and that’s probably a clue to what the efferent system is doing for a

living. It’s not going to change all the vestibular input; it’s only going to change some.”

To determine the conditions under which the efferent nerve modifies vestibular input, Highstein and postdoctoral fellow Tim Tricas, Ph.D., are developing a system they can use to record the activity of the toadfish’s efferent vestibular nerve in the wild. By electronically recording from vestibular fibers and observing its behavior in its natural habitat, Highstein and Tricas hope to sort out those behaviors that occur during increased activation of the efferent nerve from those that do not.

Tricas, who has spent the past 15 years electronically tracking the movement patterns of sharks and coral reef fishes in the Pacific, explains that the toadfish’s sedentary lifestyle should be fairly easy to observe, compared to other fishes. Accord-



Kathy Will

LIFE AT THE M.B.L.

Highstein, Steinacker and Tricas study the toadfish at the Marine Biological Laboratory (M.B.L.), a biological research institution on the southwestern tip of Cape Cod, Massachusetts, which grew up, so to speak, around squid.

The exceptionally large neurons of the squid make it an ideal candidate for studying the nervous system. But because squids do not ship well, scientists have traditionally had to go to the squids.

Founded 100 years ago as a summer station for research and teaching by some of America's first experimental biologists, the M.B.L. each summer draws approximately 1,000 scientists and advanced students from nearly 200 institutions throughout the world, and supports the research of 150 investigators year-round.

While the squid retains its status as the most popular experimental animal at the M.B.L., which is apparent by the number of squid theme T-shirts that are printed and sold each summer (Who is Squid Vicious by the way?), researchers at the M.B.L. actually study a wide variety of marine species, among them snails, worms, crabs, turtles, fish and even mammals.

Yet the people are really the main attraction. Here, one can meet a nobel laureate walking down the street, play baseball with a department chairman and have dinner with someone who's developed a

new technique in one's field. One can work in the lab until midnight, yet spend an hour or two, midday, at the beach. And one can bring the whole family along, enrolling the kids in the Children's School of Science, which offers courses in geology, nature photography, ornithology, fishing and entomology. Strolling along M.B.L. Street, one can actually feel the brain power of a place that is intellectually stimulating, yet relaxed and friendly at the same time. Where else could one go to the library and, if the book one wants is already checked out, have the librarian call and ask the person who checked out the book if they could spare it for a day or two?

For some, the M.B.L. is a place to pursue intense research. For others, it is a place to get away, perhaps to complete a writing project. Still others come to the M.B.L. to learn or to share the latest methods and laboratory techniques in their field. The M.B.L. currently offers a number of summer courses lasting from eight to twelve weeks, among them a neurobiology course directed by the School of Medicine's own Gerald D. Fischbach, Edison Professor and head of anatomy and neurobiology.

Washington University was well-represented at the M.B.L. this past summer by at least nine investigators, one library reader, one student and one reporter. ■

ing to Tricas, early each spring the male toadfish sets up house in a small hole under a rock or other piece of debris, such as a can. The male then sits in this home-made nest and sings a tune called a "boat-whistle." The song attracts the female, who lays her eggs in the nest. Then, like the perfect homebody, the male toadfish remains near the nest, guarding the progeny even after they hatch into small fry. "The nice thing about the toadfish is that he sits in one spot, so you don't have to follow his movements over great distances," Tricas says. "It should be fairly easy to observe this animal's behavior, while electronically recording its neural activity."

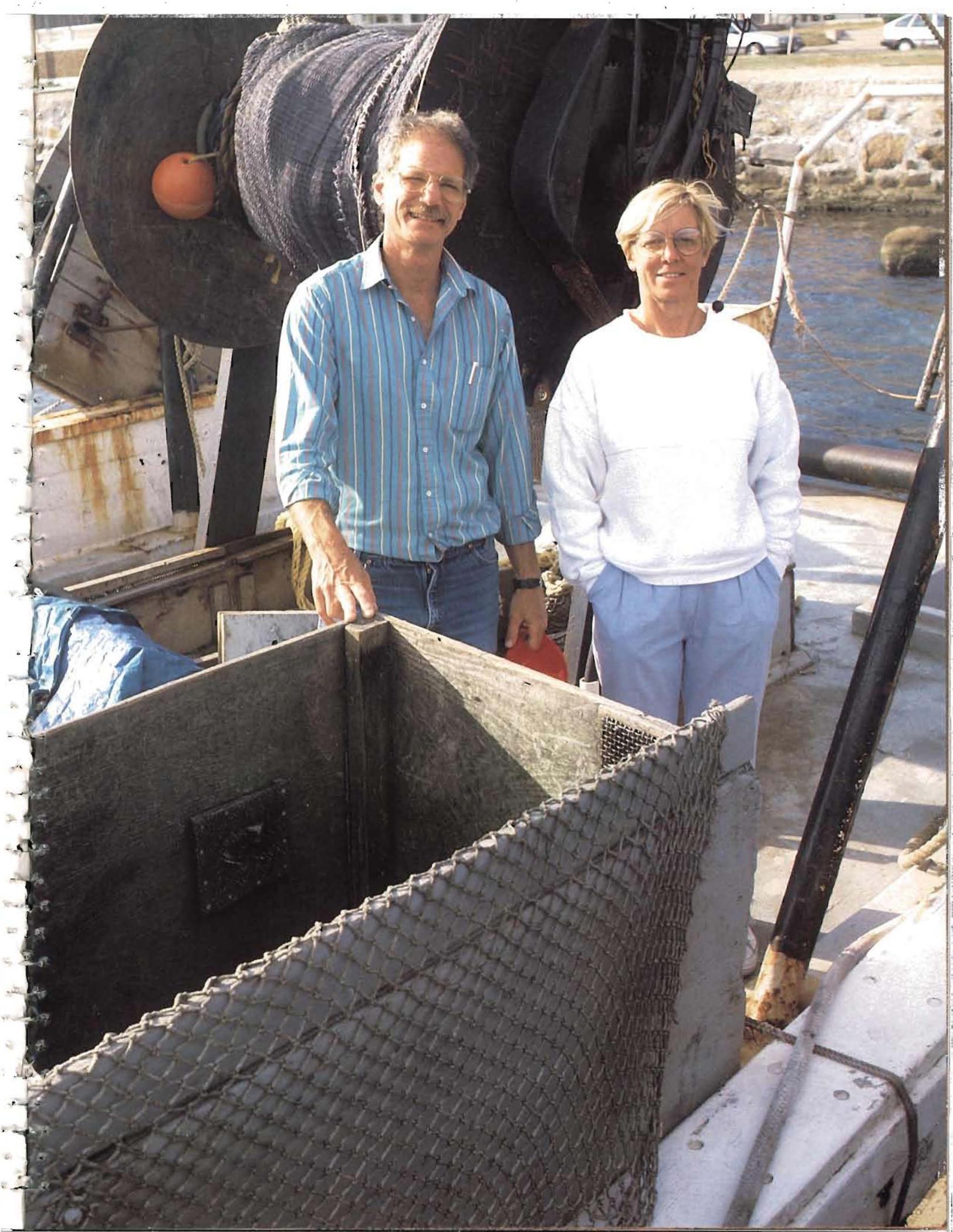
Tricas and Highstein are working the bugs out of their electrical hook-up system. If all goes well, they hope to be recording the activity of the toadfish's efferent nerve from fish in the salt marshes of the Cape sometime next summer.

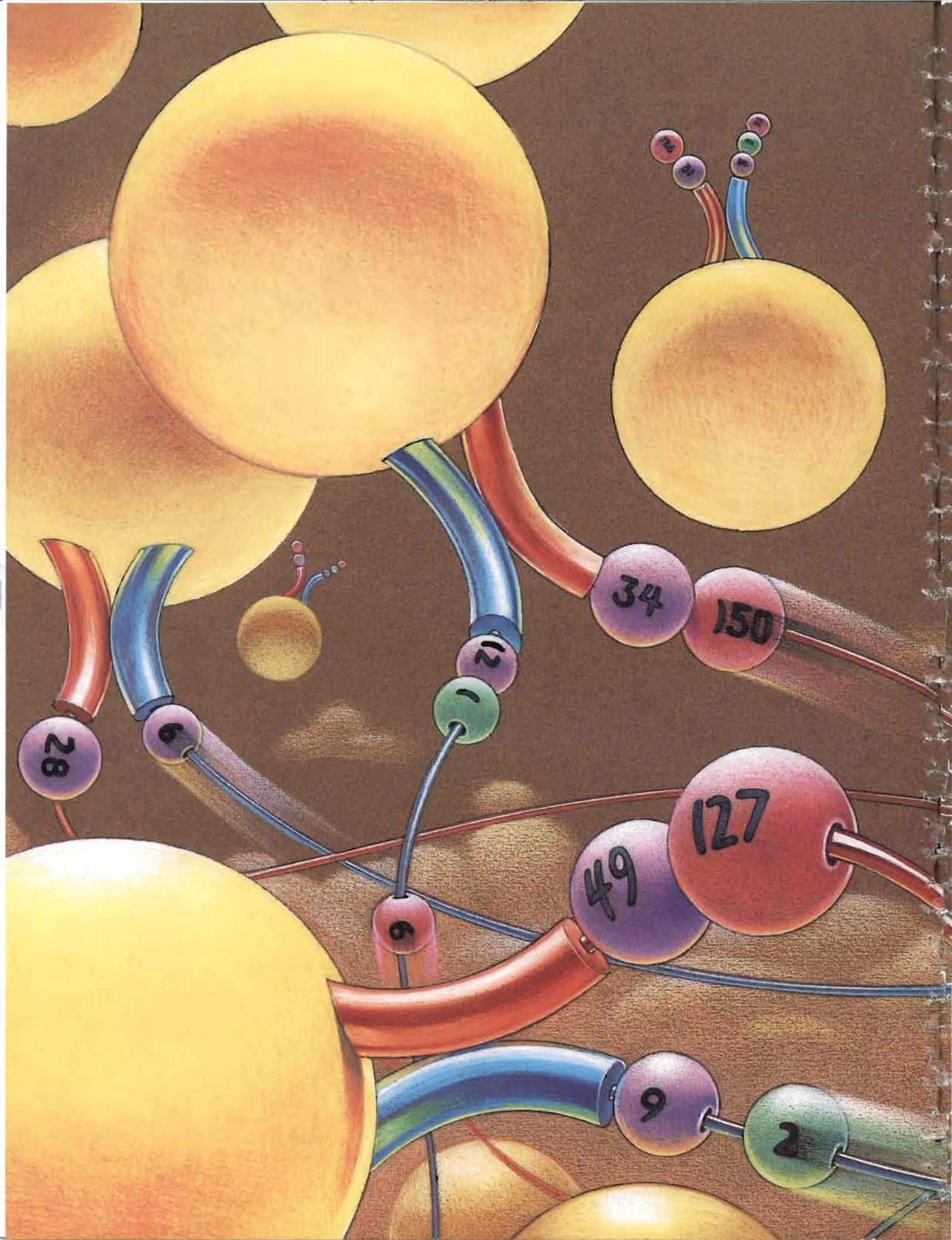
A neuroethologist, Tricas is approaching these experiments from a somewhat broader point of view. He not only wants to know what behaviors are influenced by the efferent nerve, but why they evolved. "I'm more concerned with the adaptive value of efferent control and why it evolved in the first place," he says.

"What's neat about science is that you can take something like the toadfish and study it at so many different levels—from the level of a single hair cell to the level of much larger evolutionary processes."

Most amazing is the fact that Highstein, Steinacker, Tricas and, from time to time, laboratory guests, study this one fish at so many levels in only one, tiny, 20-by-13-foot room. And they are in this room almost every day of the summer from nine in the morning until way past the dinner hour, sometimes well into the night. Such hours are the norm at the M.B.L., which each summer draws hundreds of researchers from all over the world to pursue intense research. "You have to love it," Tricas says of the long laboratory hours. But love it or leave it, somehow everyone manages to make it to the beach at least once in awhile. ■

Steve Highstein, M.D., Ph.D., and Tony Steinacker, Ph.D., stand aboard the boat used to collect experimental animals for the M.B.L.



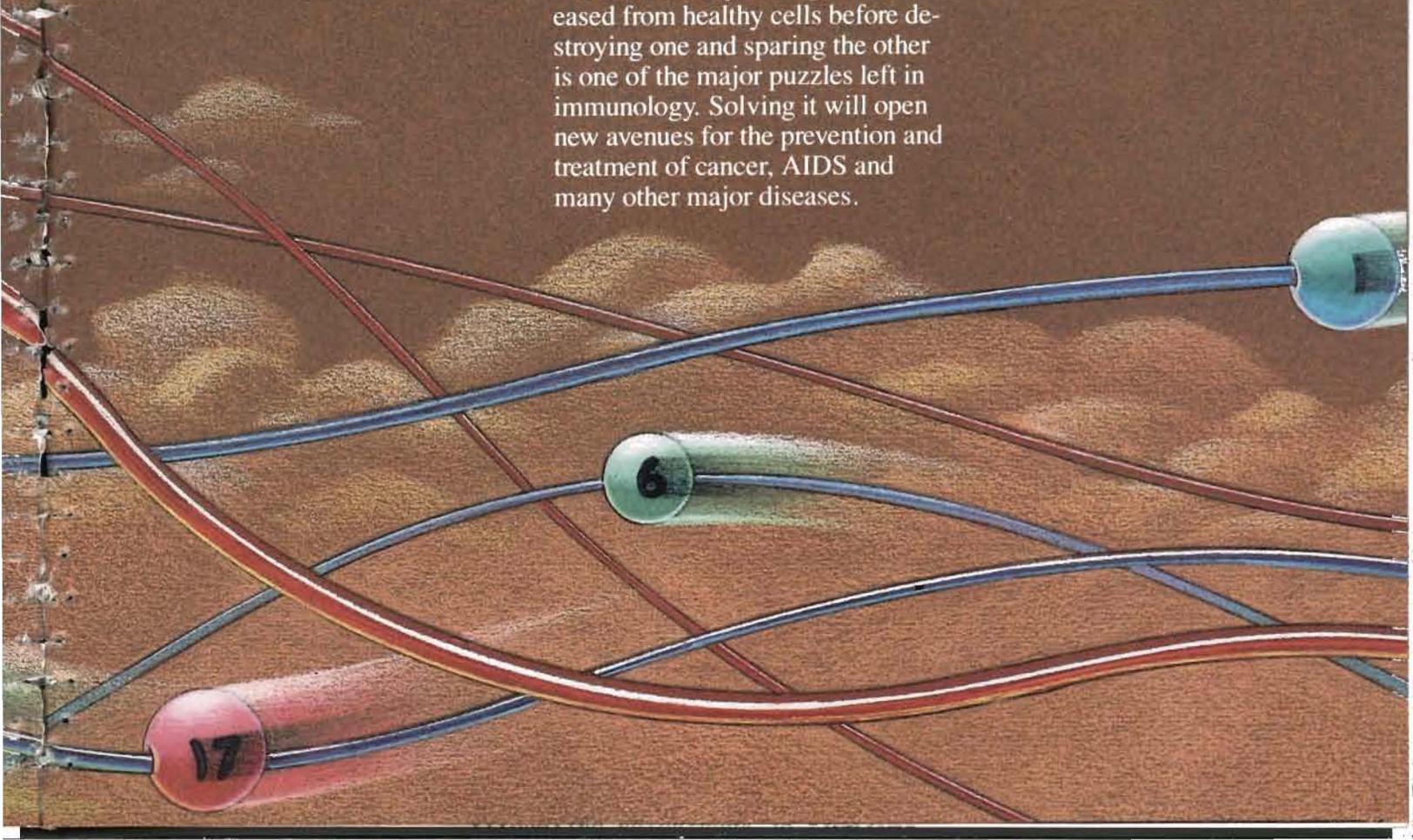


HOW T-CELLS SEE CELLS

BY LINDA SAGE

When a 'flu' virus slips into a cell, sheds its spiny coat and commands the cell to make new virus particles, how does the immune system know the virus is within? When a cell becomes cancerous and goes on a destructive rampage, how does the immune system detect the change?

How the body distinguishes diseased from healthy cells before destroying one and sparing the other is one of the major puzzles left in immunology. Solving it will open new avenues for the prevention and treatment of cancer, AIDS and many other major diseases.



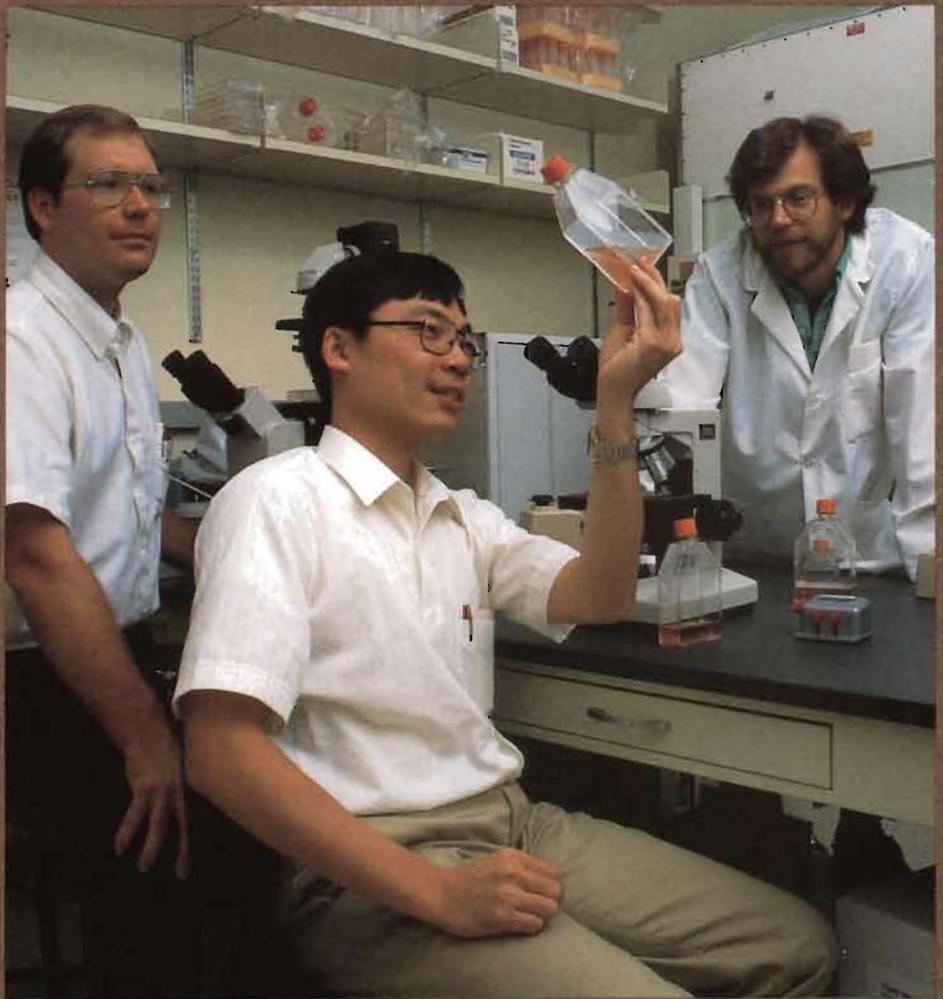
The T-cell Regiment

Essential pieces to this puzzle are T-cells, white cells that recognize and destroy cancerous and virus infected cells.

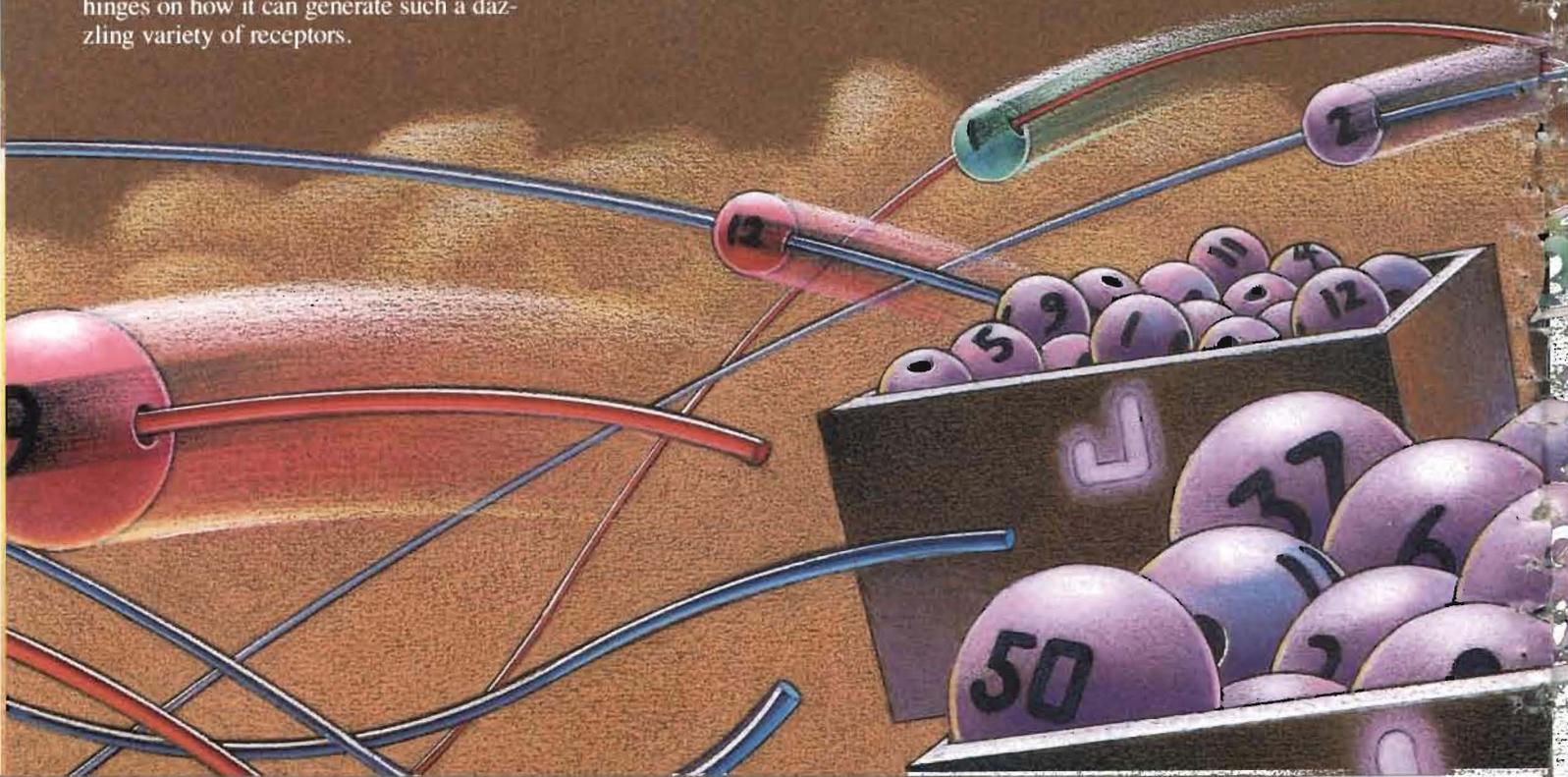
Many millions of battalions make up the T-cell regiment of the lymphocyte army. Some are able to recognize cells infected with influenza virus, while others can identify only cells infected with measles virus. Others are specific for melanoma cells, while others can only see other types of tumor. Healthy individuals have cells that can recognize any type of abnormality—any type of cancer cell or cells infected with any intracellular pathogen that has ever evolved. When the body is threatened by infection or cancer, the appropriate battalion enlarges, and the immune system begins to wage its battle.

As a further refinement, each T-cell battalion contains several types of T-cells. Within the influenza battalion are killer T-cells that destroy cells infected with the influenza virus and helper T-cells that can do some killing but mainly secrete hormones that prompt other lymphocytes to proliferate. Measles-specific T-cells, polio-specific T-cells and the other millions of battalions also come in these three varieties.

T-cells recognize abnormal cells with protein complexes called receptors that stick out from their surfaces like cross-linked antennae. Since these receptors interact with the surfaces of abnormal cells and read their labels, the puzzle of how the immune system can recognize so many different types of abnormal cells hinges on how it can generate such a dazzling variety of receptors.



Loh's work on the T-cell was facilitated with the help of postdoctoral fellow Jeffrey P. Tillinghast, M.D. (back) and M.D./Ph.D. students Mark A. Behlke (left) and Hubert S. Chou (right).



The T-cell Receptor

Working first with mouse DNA and then with human DNA, the laboratory led by assistant professor of medicine Dennis Loh, M.D., Chief of Allergy and Immunology in the Department of Medicine, who previously worked on antibody genes at M.I.T. with David Baltimore, Ph.D., has contributed much to the understanding of T-cell receptors.

Each of the receptor's antennae—the alpha chain and the beta chain—has two regions. One is a constant portion that is the same for every T-cell, and the other is a variable portion that remains the same for a given T-cell and its descendants but differs from one T-cell to another. In each chain, the constant region is nearest the T-cell surface and the variable region is furthest away. Stationed at the end of the antennae, the variable regions can easily interact with the surfaces of other cells.

The variable region of the beta chain is coded for by variable(V) genes plus short sections of DNA called D(diversity) segments and J (joining) segments. In a major paper in *Science* in 1985, Loh and his colleagues described the sequencing of this DNA in mice. By analyzing DNA fragments from different T-cells, they were able to reconstruct the possible sequences available to the variable region of the precursor cells that make T-cells in the thymus. In all, they discovered that only about 20 different V genes, plus two

D segments and 12 J segments generate beta variable regions for the receptors of all the battalions of T-cells.

In another *Science* paper a year later, the researchers described a similar finding for the human T-cell receptor's beta variable region. Thus humans, like mice, also generate millions of different beta chains with an incredibly small number of genes.

The model to explain how so many different polypeptides can arise from so few genes is based on the widely accepted model for the generation of antibody diversity. During the development of a mature T-cell, the individual variable gene segments undergo DNA rearrangements to the diversity and joining regions in a randomly assorted manner. Thus, many combinations and permutations can be generated from a relatively small number of basic building blocks.

According to Loh's calculations, more than 3 million different receptors can be generated from the couple of hundred T-cell receptor genes that are known to exist in mice.

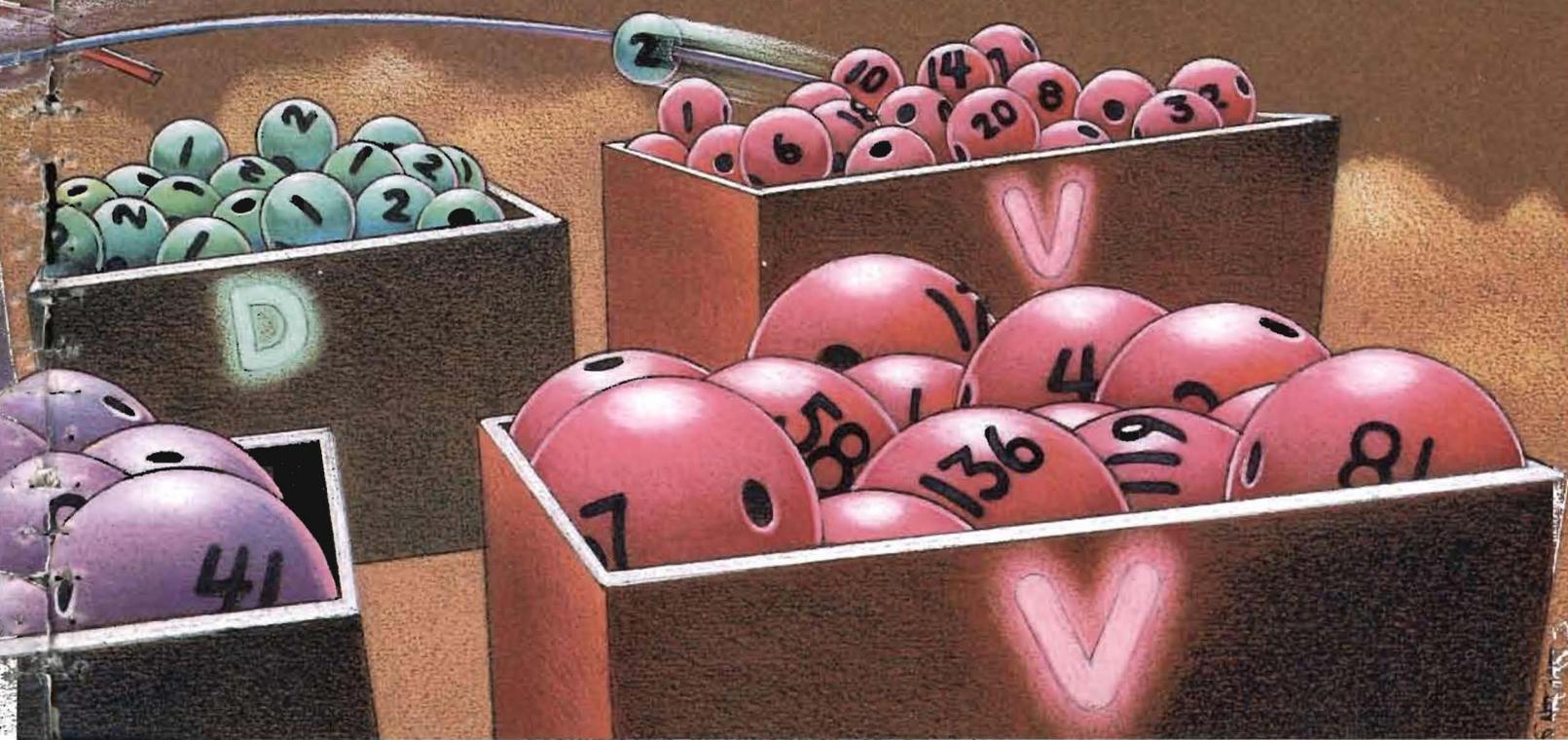
Since the variable region of the beta chain is coded for by one V gene plus one D segment plus one J segment, generating beta variables is like making three-bead necklaces from three boxes of colored beads. If the first box contained red beads (V genes) marked with the numbers 1 to 20, the second box contained white beads (D segments) marked 1 to 2, and the third

box contained blue beads (J segments) marked 1 to 12, one necklace might carry a red 6 bead plus a white 1 bead plus a blue 9 bead. A second necklace might have a red 12 bead plus a white 2 bead plus a blue 8 bead. In all, it would be possible to make $20 \times 2 \times 12$, or 480, different combinations.

The variable region of the mouse alpha chain is coded for only by one V gene and one J segment, and there are about 150 alpha V genes in the precursor cell and about 50 different alpha J segments. This makes for $150 \times 50 = 7,500$ variations on the alpha chain. Since the receptor has both an alpha and a beta chain, the possible number of complete T-cell receptors is at least $7,500 \times 480$, or 3,600,000.

The actual number of possibilities seems to be even greater, however, because the V and D segments are imprecisely copied during the generation of T-cells. Sometimes one or two bases are missed off the end of the V gene or the beginning of the D segment, and sometimes short random sequences are inserted between them. "There is increasing evidence that this junction is important in determining the fine specificity of the T-cell receptor," says Loh, who has looked at the effect of imprecise junctions on the recog-

The illustration below depicts how different gene combinations generate a wide variety of T-cell receptors.





Dennis Loh, M.D.

nitiation by T-cells of beef insulin.

Loh's latest *Science* paper, published in September 1987, provides the first definitive evidence for the arrangement of the receptor genes on the chromosome. Using mouse DNA, Loh's group analyzed the overall structure of the beta chain locus by isolating and sequencing overlapping segments. They discovered that at one end of the locus the V genes are clustered very close together. At the other end are two copies of the gene for the constant region of the chain, each preceded by D and J segments. The surprise was that a length of DNA almost as large as the V region lies between the two ends, widely separating the V genes from the D and J segments.

"This raises the very interesting question of why it evolved that way," says Loh. His current hypothesis is that the separation of the V genes from the D and J segments makes the V region inaccessible to the rearranging enzyme when it moves a D with J, a step that occurs before V. D and J segments are combined together. Loh speculates that this might be an important regulatory mechanism to insure ordered rearrangements.

Now that much of the structural basis for the T-cell receptor genes has been elucidated, Loh emphasizes the need to find out how T-cell receptor genes and their products are regulated during mouse and human development. He hopes that studying the generation of T-cell diversity will lead to better understanding of the immune system in general.

"We are trying to understand the development of the T-cell," he explains, "because that is probably crucial in understanding tolerance (the discrimination of self from non-self), autoimmunity (where tolerance breaks down), transplant immunology and T-cell immunity in general. Presumably the molecular mechanisms of autoimmunity account for diseases we don't presently understand, like diabetes, lupus, multiple sclerosis and rheumatoid arthritis." ■

STUDENT STAGE

Setting Kids Straight

On one outing, they passed around HEALTHMAN coloring books while explaining the dangers of smoking and the benefits of good hygiene to a class of giggling seven year olds.

The next day, they discussed AIDS with a solemn group of junior and senior high school students, some of whom admitted to being sexually active and scared.

They are members of the Youth Health Education Project (YHEP): 20 students from the School of Medicine who want to do more with their education than just take tests and wait for the moment when they finally get to write "M.D." after their names.

Last November, with help from the local division of the American Cancer Society, they formed a speakers bureau. Their goal? To share what they know about preventive health care with young people in the St. Louis area.

Alternating speaking assignments and usually working in groups of two or more, YHEP members discuss everything from generally health care to specific concerns—such as drug abuse or how to conduct self-exams for breast and testicular cancer—with health classes, after-school groups and scouting troops.

"We wanted to apply our classroom knowledge to real-life situations," says Rudy Fedrizzi, a second-year student and YHEP's founder. "We wanted to have a positive impact on community health and a taste of what it's like to relate to patients—things we don't have a chance to do in school. Medical students are a resource just waiting to be tapped."

These feelings led Fedrizzi

and his wife, third-year student Heidi Rinehart, to offer their ideas and services to the American Cancer Society, which agreed to handle their bookings and provide them with support, educational literature and materials such as coloring and comic books.

Next, Fedrizzi sent a recruitment letter to his fellow students.

"The idea appealed to me, but I didn't respond right away," says Kenny Adams, a second-year student. "I mean, between being in school all day and studying all night, who had the time? But I couldn't pass up the chance. I figured, I've got some medical know-how and I'd like to put it to use."

Matt Cary, also in his second year, agrees. "It was positive, and I really wanted to do it. In college, I did lots of volunteer work with kids—I was a Big Brother and worked with church groups. Once I got to med school, though, there was so much work that I stopped doing community service stuff. I missed it. When Rudy's letter came, I was ready."

The medical school faculty also pitched in by donating slides that show the long-term effects of smoking on lungs. "Dr. Peter Tuteur is our biggest booster, and other faculty members have been very helpful," says Fedrizzi. "It shows that there's a deep interest in public health, not just theoretical matters, among the faculty."

YHEP presentations are tailored to the age levels, needs and interests of each group. "No two talks are alike," says Adams. "Each member brings his or her own style and talents to the presentations. We talk, show slides and answer questions. And



Rudy Fedrizzi (left) and Ken Adams spread the word about good health habits to local grade school children.

the kids are great: the older ones are sharp and well-informed; the younger ones are sometimes very concerned about how to convince parents or older brothers and sisters to stop smoking or abusing alcohol."

It's the younger children that YHEP particularly wants to reach. "If we can talk to them before they reach junior high, when they're old enough to start making decisions but before they've been overwhelmed by peer pressure, we probably have a better chance of getting through," says Cary. "By the time you're in high school, chances are you've already been smoking down at the mall. It might be too late."

"Kids are impressionable," adds Adams. "There's a lot of misinformation out there, a lot of negative influences. Who's to set them straight? We hope we can help when parents, teachers and doctors can't. We're not that much older than they are, and we make it clear that we're also students, still learning. Because we're not authoritarian or threatening, maybe they're

a little more willing to listen to us."

YHEP is now booked until April. Eventually, Fedrizzi hopes that all 20 members will be doing at least one presentation per month, thus reaching about 2,500 kids each year. He also hopes that YHEP survives long after he and his friends graduate.

"What we're trying to do," says Fedrizzi, "is to excite kids about their health, to let them know that by respecting themselves and making responsible choices, they can take control of how they feel right now and later on. That's our message."

Evidently, that message came across loud and clear to a fourth-grader at Keyser Elementary School in Kirkwood. "Dear YHEPs," she wrote. "Thank you for sparing your time to talk to us. I now know that I will never smoke, and I wonder why people do. Thank you for the HEALTHMAN coloring book and telling us how to take care of ourselves. Your friend, Karen. P.S. I know you will be great doctors."

Tony DiMartino

B R E A K I N G GROUND *for* KNOWLEDGE



Dr. Henry G. Schwartz, August A. Busch Jr. Professor of Neurological Surgery, remembers when his trips to the Medical Library entailed wading through the pages of cumulative indexes for some dusty old volume that he would read at a long table with light so dim he could hardly see. "Now, rather than searching through the cumulative indexes, you just push a button and get more information than you can shake a stick at," he says.

The medical school library of today is much more than a place for books. In addition to its roles as an educational tool for students and information clearinghouse for researchers, the modern medical school library is called upon to serve as a vital resource to an entire community of health care professionals and institutions in day-to-day patient care, providing life-saving information rapidly and accurately.

To fulfill all three important responsibilities, a medical school library must be a communications center with the physical resources to manage a half-million documents and the technological capability to rapidly search millions of scientific papers. It also serves as a catalyst through which faculty, students and the community can interact with one another, interface with other computers and communicate with other professionals throughout the world.

These are the objectives that underlie the Medical Center's plans for a new, long-awaited, seven-story Library and Biomedical Communications Center, slated to become one of the most advanced biomedical information facilities in America.

Construction of the library, which begins this fall, is made possible in large part by a \$10 million gift from an anonymous benefactor. With more than 113,000 gross square feet, the library will significantly expand its programs and better cope with the increasing problem of space.

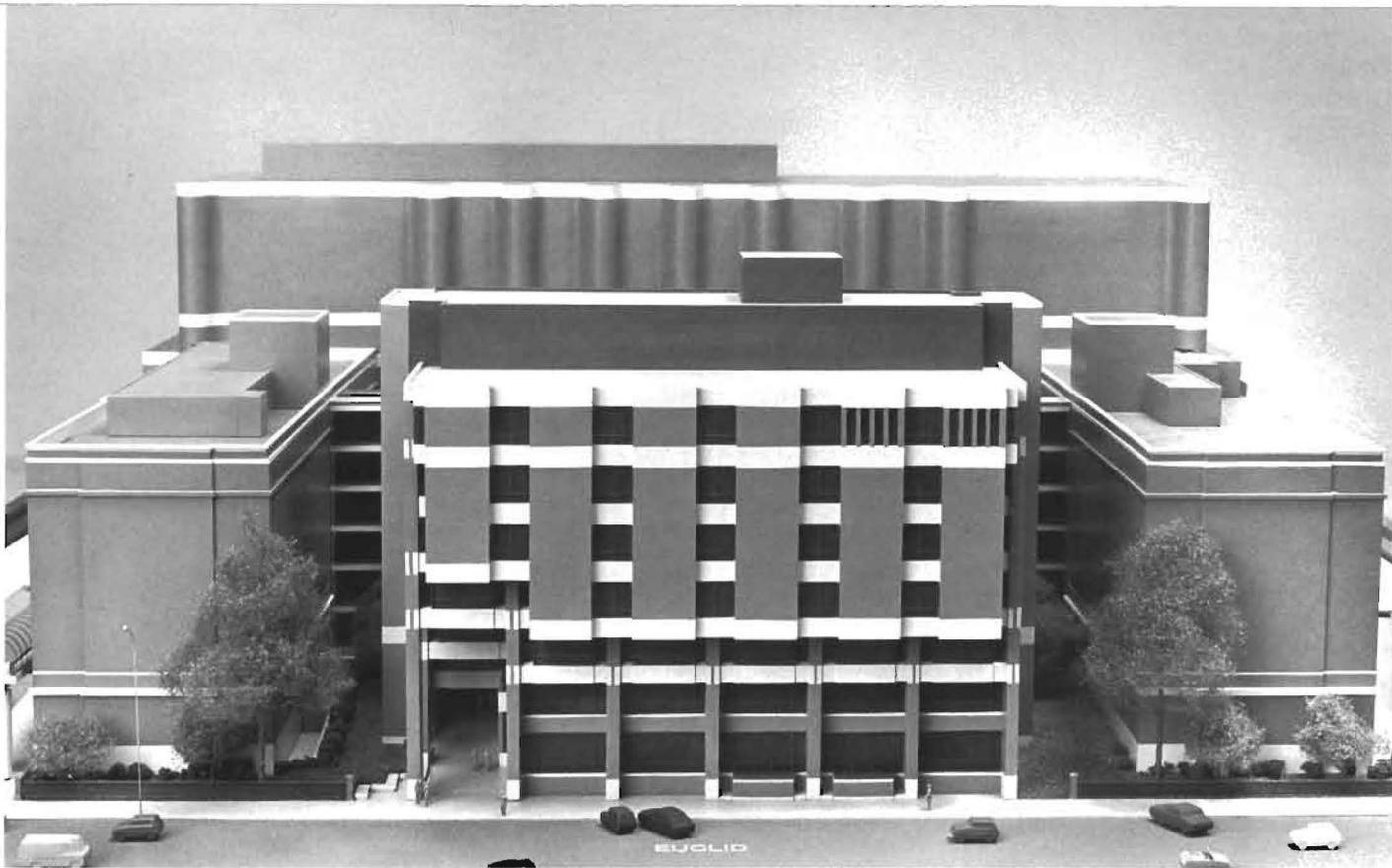
"The library at Washington University School of Medicine has a distinguished history and one of the most comprehensive and actively utilized collections of medical books and journals, yet the severe limitations of the current physical

facilities have become increasingly apparent," according to library committee chairman Bernard Becker, M.D., professor and head of ophthalmology. "We now face the exciting opportunities afforded by a new, up-to-date and enlarged facility that will provide the hub of the entire medical school complex—the place where all diverse components of this great center can come together to share and gain knowledge."

Built 75 years ago to accommodate 40,000 volumes, the original library in the North Building is literally bursting at the seams with its current total of more than 210,000 bound volumes and audiovisual titles and 3,000 journal subscriptions. Overcrowding has made it necessary for the library to house its rare books collection in another building blocks away, and to store an additional 65,000 volumes in an old warehouse seven miles from the Medical Center.

The new library building, which will take two years and \$14 million to construct and furnish, will provide for long-term growth in the library's collections. But even more important than the additional space will be the new library's emphasis on state-of-the-art information management.

Located on Euclid Avenue in the courtyard formed by the Cancer Research, North and South buildings, the new library will build upon the current library's already highly advanced state of automation. The application of computer and communications technology to information management has been a primary goal of the library's director and professor of biomedical communication, Susan Crawford, Ph.D., since her arrival at Washington University in 1981. "Our plan," she



In the 1920s, the Medical Library was lit by gas lamps (opposite page). The new library (above) will feature a health information network that will link it

with local, regional, national and international information sources. It is scheduled for completion fall 1989.

explains, "is to create a new information framework for organizing knowledge and supporting scholarship in this electronic age. In such a system, the user will access the universe of knowledge through the library in one step." Washington University's success in this area has already earned for the library the Medical Library Association's Frank B. Rogers Award for Information Advancement in 1985.

In addition to maintaining and providing medical professionals with computer access to the library's own extensive collection of books and journals, the new center will enable physicians in the medical school, associated hospitals and the St. Louis metropolitan community to locate additional information, to seek expert consultation and to share resources through a health information network that will link them with local, regional, national and international information sources. Not only will the center search for such information upon request, but it will also provide a computer center for teaching students and faculty how they themselves can use the available electronic systems, access medical data bases and manipulate data. This computer center will come complete with 50 terminals open to students, faculty, staff and library guests.

In its role as teacher, the center will offer audiovisuals, media support services and equipment and media production in one, central location. This area will also offer the videotaping of surgical procedures, medical illustration, and a library of films, tapes and computer-assisted instruction.

A gateway to knowledge for the Medical Center and its surrounding community, the entrance to the new Library and Biomedical Communications Center will form an impressive main entrance to the School of Medicine. Library visitors will enter the new facility, which was designed by Murphy, Downey, Wofford and Richman Architects, through its main entrance on Euclid Avenue.

A slate walkway will lead visitors through a seven-story, landscaped atrium, made possible by the generous gift of \$1 million from Mrs. John Lehmann, past a permanent history wall exhibit of the School of Medicine, contributed by C. Barber Miller, M.D., to the main information and circulation desk, the reference collection, the periodical index, staff offices and work rooms, a small conference room, a microfilm room and public service offices.

A broad, spiral staircase will wind down to a lounge on the lower level, where the library's more than 200,000 li-

brary volumes will be shelved. This lower level will also contain five reading areas, a small copy center and a staff lounge with kitchen.

The same circular staircase will also connect the main floor with the second story, where a number of the library's journals will be kept. The library director's office areas, student carrels, an atrium lounge area, study and browsing areas will also be located on the second level, from which one can view every level of the library.

The remainder of the library's journal collection will be housed on the third and fourth floors, which will each provide a copy center and ample study space.

The biomedical communications center will be situated on the fifth floor, with the audiovisual and computer centers on the sixth. The library's archives and rare books will be on the seventh floor. Overlooking Forest Park, an archives and rare book exhibit gallery will display interesting items from these collections on a rotating basis.

"The new center is the culmination of more than 25 years of effort," Dr. Crawford says. "And we are pleased to bring to the Midcontinental Region this important resource for both the health sciences and the general community." ■

THE ALUMNI REPORT

Richardson assumes new role as Alumni President

Donald Sessions, M.D. '62, handed the reins over to his successor, Thomas Richardson, M.D. '63, who will serve his one-year term as President of the Medical Alumni Association through next spring.

An associate professor of clinical psychiatry with a special interest in affective disorders and geriatric psychiatry, Richardson completed his undergraduate medical education and training in psychiatry at the School of Medicine, after which he served as an airforce psychiatrist for two years.

Since his return to the School of Medicine in 1969, Richardson has been a highly active member of the Medical Center Alumni Association, having served as chairman of his reunion class since 1973, as Chairman of the Medical Alumni Executive Committee for three years, as Chairman

of the Century Club for two years and as Chairman of the Dean's Committee last year.

In his new role as President of the Medical Center Alumni Association, Richardson plans to continue the emphasis on former housestaff programs started by Sessions, as well as to coordinate a vigorous continuing education program for next spring's reunion.

Regardless of the amount donated, Richardson would like to see an even greater number of alumni actively participating in the association. "One of the great satisfactions of being active in your alumni association is seeing your contributions used to help students and future doctors obtain their education and training," he says. "An active alumni association is of real assistance to both current students and new grads." ■



Thomas Richardson, M.D.

Stupp Foundation establishes neurology professorship

The School of Medicine was recently awarded \$1 million from the Norman J. Stupp Foundation to establish an endowed neurology professorship for research on Alzheimer's Disease and related cognitive disorders in aging.

"This endowment appropriately honors Norman J. Stupp's total commitment to relieving the suffering of those afflicted with Alz-

heimer's Disease," according to Cornelius Stueck, spokesman for the foundation, which is trustee by the Commerce Bank of St. Louis.

During his lifetime, Stupp was actively involved in supporting the improvement of health, treatment and quality of life among the aging population, following his father's death in 1926 from a dementing illness, apparently Alzheimer's Disease.

The Norman J. Stupp chair follows previous contributions to Washington University supporting research and education in geriatric neurology, and supplementing long-term research support from the National Institute on Aging. Contributions from the Norman J. Stupp Foundation has enhanced the productivity of the university's Alzheimer's Disease Research Center, one of only ten centers across the

country established by the N.I.A.

"Support from the Stupp family dates back to the early 1930's," says Chancellor William H. Danforth. "We are grateful to Commerce Bank, as trustee of the foundation, for continuing this support. The endowment accelerates our progress against the afflictions of our elders, to whom we owe so much." ■

CLASSNOTES

'30s and '40s

James R. Amos, M.D. '32, recently received the "Outstanding Alumnus Award" from Southwest Missouri State University. Amos, who served 43 years in the area of public health, currently enjoys his work with the Boy Scouts of America. He has three daughters and eight grandchildren. His only son was killed in action during the Vietnam War.

Bernard S. Clark, M.D. '32, retired from general practice. He now enjoys trout fishing, pheasant hunting and gardening. He has three children and six grandsons.

Clark G. Porter, M.D. '35, retired from his practice in Michigan, and now lives on St. George Island with his wife Betty, a retired nurse. He writes that he would appreciate hearing from former classmates, who can write him at St. George Island, East Point, Florida 32328.

Morton W. Adler, M.D. '37, is on the courtesy staff of St. Vincent Hospital in Toledo, Ohio. He plays violin in an amateur symphony orchestra and is a ham radio operator.

Sam Day, M.D. '37, is an emeritus professor of clinical surgery at the University of Florida School of Medicine. Although he retired two years ago, he still does minor surgery in his office and at the university HMO clinic. Day has four children and four grandchildren, and cultivates orchids and camellias.

Leslie H. Hubbard, M.D. '37, has been raising cattle since he retired from Shelby Medical Center in Alabaster, Alabama. He has three children and two grandchildren.

James W. McMullen, M.D. '37, a retired radiologist, writes that his twin sons Bard and Craig are also both radiologists. His daughter Ann is a physical therapist at the University of Michigan, and his daughter Peggy is a nurse at the University of Northern Colorado.

S. Ross Melgaard, M.D. '42, is a retired anesthesiologist, formerly at Baptist Medical Center in Kansas City. He is interested in ecology, woodworking and oil painting.

George L. Watkins, M.D. '42, retired from general surgery in 1986. He is currently President of the Whispering Palms Golf Association in Rancho Santa Fe, California and a board member of the San Diequito citizens group in San Diego County.

William A. Abele, M.D. '47, is an associate professor of family and community medicine at the University of Missouri. He also serves on the Board of Trustees for Kemper Military School and College, on the Board of Directors for United Missouri Bank of Boonville, and is Medical Director of Valley Hope Rehabilitation Center. He retired from active practice this July, and writes that his three grandchildren are the greatest.

William W. Regan, M.D. '47, was elected President of the Richmond Academy of Medicine. He is co-chairman of internal medicine at Johnston Willis Hospital in Virginia, and also on the faculty of the Medical College of Virginia.

J. Neal Middlekamp, M.D. '48, is President-elect of the American Board of Pediatrics. A professor of pediatrics at the School of Medicine, Middlekamp assumes the presidency this coming January.

'50s and '60s

W. Edward Lansche, M.D. '52, is an orthopedic surgeon at Barnes, Missouri Baptist and St. Luke's hospitals. He enjoys game hunting, Upland bird hunting, fishing, photography and boating. He has two children ages 23 and 26.

Amos H. Lieberman, M.D. '52, is director of medical education at Kaiser Hospital in San Francisco, California and clinical professor of medicine at University of California—San Francisco. His two sons are in residency training—one in medicine, and one in surgery.

Robert E. Neu, M.D. '52, is an assistant clinical professor of surgery at University of California-Irvine. He enjoys world travel and cinematography, is President Mystick Krewe of Komus, a 32nd degree Mason of the Scottish Rite and Shrine and President of the Orange County Surgical Society.

Brent M. Parker, M.D. '52, was recently presented with an honorary alumni membership from the University of Missouri-Columbia School of Medicine's alumni association. Parker is director of the cardiology division at that school.

Paul E. Siebert, M.D. '52, a professor of radiology at the University of Colorado Health Sciences Center, won the Presidents Award for Teaching Excellence and the Kaiser Award three times. He is a faculty member of the AOA.

Robert C. Packman, M.D. '56, was elected as part-time faculty representative to the Executive Faculty at the School of Medicine. A professor of clinical medicine, Packman is on staff at both Barnes and Jewish hospitals.

Linda Beatie, M.D. '57, formerly Linda Zahnnow Sunseri, is an anesthesiologist at Petaluma Valley Hospital in Petaluma, California. Her husband, Jerome, is an orthopedic surgeon in a small town north of San Francisco. They have seven children and two grandchildren.

Edward P. Cohen, M.D. '57, is a professor of microbiology and immunology at the University of Illinois College of Medicine. He has four children and four grandchildren.

Robert C. Meredith, M.D. '57, writes that military medicine and neurosurgery were nice, but that private practice is better. Practicing in industrial neurosurgery, Meredith specializes in spine surgery.



New housestaff members enjoy a welcoming dinner hosted by the Medical Center Alumni Association this past August. The Association sponsors a variety of events and programs for housestaff and former housestaff, among them specialty conference receptions and a New Alumni Program that provides relocating former housestaff with alumni and former housestaff contacts in other cities.

Lawrence C. Pakula, M.D. '57, is an associate professor of pediatrics at Johns Hopkins University School of Medicine. He is also President of the Maryland Chapter of the American Academy of Pediatrics, a consultant for special schools and on the Baltimore County Board of Education for the Baltimore Health Department.

Donald F. Terry, M.D. '57, is chief of cardiology at Wichita General Hospital. He has three children.

James Wittmer, M.D. '57, was sorry he couldn't make it to the reunion, but sends warm regards to all of his classmates.

Albert L. Rhoton Jr., M.D. '59, was recently named Vice President of the American Association of Neurological Surgeons. Rhoton is R.D. Keene Family Professor and Chairman of Neurological Surgery at the University of Florida College of Medicine in Gainesville. He is particularly well known for his expertise in microsurgical anatomy and microsurgery of stroke.

Clay Armstrong, M.D. '60, professor of physiology at the University of Pennsylvania School of Medicine, was recently elected to the National Academy of Sciences. Armstrong is inter-

nationally known for his work on the control of ion flow across the cell membrane during nerve impulses.

Alan L. Bisno, M.D. '62, is a professor of medicine and Associate Dean for Faculty Affairs at the University of Tennessee College of Medicine. He has two children ages 19 and 21.

Barbara Shaw Clark, M.D. '62, is a pediatric oncologist at Children's Hospital in Seattle, with a clinical appointment at the University of Washington. She has three children, and enjoys cooking and traveling.

Bruce L. Dunn, M.D. '62, is a urologist on the clinical faculty at Stanford University. He is chief of the medical staff at Dominican Hospital, has four children and enjoys sailing and skiing.

Bruce Horwitz, M.D. '62, is a pediatrician at Childrens, Samuel Merritt and Providence hospitals in Oakland, California. He is also a licensed real estate mortgage broker, the Oakland Marathon Director and Medical Director and team physician for the Oakland A's baseball team. An avid marathoner, Horwitz has run 19 marathons, including ones in New York, Boston, London and Athens.

Richard H. Jacobsen, M.D. '62, is an orthopedic surgeon at El Camino Hospital in Mt. View, California. He has two children ages 18 and 20.

Edward L. Kaplan, M.D. '62, is a professor of pediatrics at University of Minnesota Medical School. He has three children.

Christine L. Mackert, M.D. '62, is an anesthesiologist at Providence-Milwaukie Hospital in Milwaukie, Oregon. In her spare time, she skis and mountain climbs.

John Stone, M.D. '62, is a professor of medicine and community health at Emory University School of Medicine, where he is also Associate Dean and Director of Admissions. He founded and was the first director of the school's emergency medicine residency program, and has authored three books of poetry and prose. His wife Lu, who is a first grade teacher,

recently received her master's degree from Emory University. His older son John is a freshman at Harvard Medical School, and his younger son Jim is a sophomore business major at Emory.

David A. Williams, M.D. '62, has a busy radiology practice in Los Alamos Medical Center in Los Alamos, New Mexico, where his wife is a nurse. They have two sons: David and Kevin, both in college.

Peter W. Broido, M.D. '67, is a general surgeon at Central Dupage Hospital in Winfield, Illinois. He has two children, and enjoys art collecting.

'70s and '80s

Bette Rae Bonder, O.T. '70, was named to the American Occupational Therapy Association, one of the highest honors of her profession. Bonder is a visiting professor of occupational therapy at the University of Illinois in Chicago.

Dixie J. Anderson, M.D. '71, was recently elected Vice President of the American Association of Women Radiologists, as well as to membership in the Alpha Omega Alpha Society.

Bruce Hertel, M.D. '72, is Director of Pathology at Sacred Heart and St. Mary's hospitals. He sails, skis and coaches Little League baseball.

William Virgil Roberts Jr., M.D. '72, is a psychiatrist at Eastern Washington State Hospital. He has two children, and enjoys scuba diving, skiing and home remodeling.

David C. K. Hu, M.D. '74, of Vancouver, Canada, was recently elected to the American College of Cardiology.

Mark Stitham, M.D. '75, won \$10,000 this spring on the television show, Jeopardy. He writes: "Fortunately did well on 'Anatomy!'"

David H. Collier, M.D. '77, is an assistant professor of medicine at the University of Colorado Health Sciences Center. He is chief of rheumatology at Denver General Hospital, a first degree Black Belt of Tae Kwan Do and the father of 14-month-old daughter Alison Elizabeth.

Paul Feil, M.D. '77, is a pulmonary specialist in New Mexico. In his free time, he is a Chile farmer and cross country skier.

Elliot Kraus, M.D. '77, is chief of clinical chemistry and an associate pathologist at Robert Wood Johnson University Hospital. He lists his major accomplishments as being able to put three children to bed at the same time, mastering Lotus 123 and Wordstar and being able to change the diaper of a moving child.

Robert R. Kulesher, M.H.A. '77, Vice President of the Germantown Hospital and Medical Center in Philadelphia, was recently awarded fellowship status in the American College of Healthcare Executives, which

is the highest level of professional achievement in the college.

Victor Schuster, M.D. '77, is an assistant professor of medicine at the University of Iowa. He has two children, and plays the piano.

Pamela Gallin, M.D. '78, is a pediatric ophthalmologist at Columbia Presbyterian in New York. She has two daughters: Laura (5) and Abby (2).

Barry J. Sidorow, M.D. '79, of Hinsdale, Illinois, was elected to the American College of Cardiology.

Robert A. Gross, M.D., Ph.D. '81, was recently honored with the American Academy of Neurology's S. Weir Mitchell Award for research. A professor of neurology at the University of Michigan, Gross received the award for his research on the effects of barbituates and their use in anesthesia, and on the drug nifedipine, used to treat stroke and migraines.

Debra A. Halladay, M.H.A. '86, has been named Chicago PPO Director for Private Healthcare Systems Ltd., a partnership of 18 commercial health insurance carriers in Lexington, Massachusetts.

FORMER HOUSE STAFF NOTES

A. Basil Harris, M.D., was named to the Board of Directors of the American Association of Neurological Surgeons. Harris is a professor of neurological surgery at the School of Medicine. He is particularly known for his research on epilepsy.

St. George Lee Jr., M.D., was elected President of the Newport News Medical Society in Newport News, Virginia. He is a clinical assistant professor of medicine at the Medical College of Virginia, and associate director of cardiology at Riverside Hospital.

IN MEMORIAM

Frank K. Bosse, M.D. '33, died November 11, 1986.

Rosellen E. Cohnberg, M.D. '47, died April 10, 1987.

Sam L. Hutchison, M.D. '27, died March 28, 1987.

Samuel A. Levy, M.D. '42, died March 20, 1987.

Lewis E. Littmann, M.D. '37, died July 7, 1987.

Israel D. Newmark, M.D. '30, died March 31, 1987.

Bernard Schwartzman, M.D. '35, died April 16, 1987.

Walter W. Tillman Jr., M.D. '42, died June 21, 1987.

Orville W. Towers, M.D. '39, died January 7, 1987.

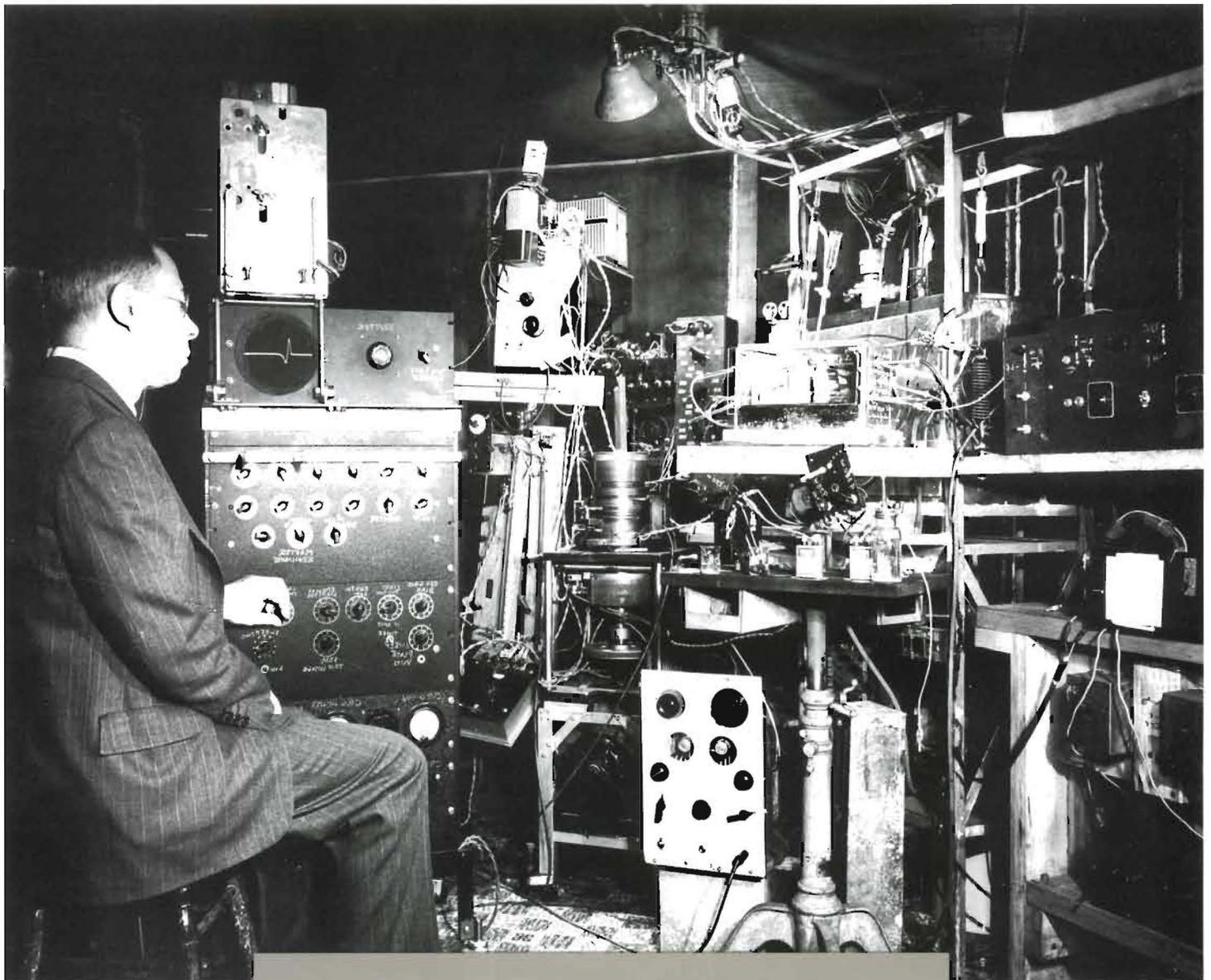
Cornelia M. Van Prooyen, M.D. '51, died April 15, 1987.

Glenda Wacker Brodkey, M.D. '61, died February 23, 1987.

John S. Wier, M.D. '27, died March 9, 1987.

George S. Wilson, M.D. '27, died April 24, 1987.

Keith S. Wilson, M.D. '34, died March 30, 1987.



NIH Centennial Celebration October 23, 1987

**Theme: “Biomedical
Research: Key to the
Nation’s Health”**

Morning session
(8:45 a.m.):
Nobel Laureate
symposium & poster
session

Afternoon session
(2:30 p.m.):
“The NIH in the Fed-
eral Political Process:
Continuing issues”

Carl V. Moore
Auditorium





Julian C. Mosley, M.D. '72 (second from left), and Robert Lee, Ph.D., assistant dean for minority student affairs (third from left), chat with Steven Meeks (left) and Richard Shelton during the annual freshman welcoming party at St. Charles Wine Garden. Meeks and Shelton are the first two recipients of the School of Medicine's new Minority Student Scholarships, established this year to aid minority students who have demonstrated academic excellence in high school and college.

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Brendon Poh

People rarely notice their sense of balance until they lose it. In actuality, the vestibular system is constantly at work, whether one is windsurfing or just walking down the street. To learn more about this important sense of balance, researchers from the School of Medicine are studying the vestibular system of the toadfish at Woods Hole, Massachusetts. See story on page 14.
