Members of the School of Medicine’s class of 1986 participated in the commencement exercises in May. This year, there were 117 who received the M.D. or M.D./Ph.D. degrees.
Forensic Dentistry: Where Tooth Meets Truth

Forensic dentistry is called into focus to identify human remains. Sometimes there are mass disasters to be investigated, such as air crashes; or the identity of remains may be disputed, as in the Josef Mengele case. Either way, teeth or dental restorations can provide valuable clues to identity.

Into Africa

Anthropologist Jane Phillips-Conroy's annual excursions to Africa yield valuable information about evolution of species. Studying groups of baboons, Phillips-Conroy gains insights that may ultimately prove helpful in the study of human evolution. And it gives her a unique perspective from which to instruct first-year students in human anatomy.

Clinical Pharmacology: Balancing Bench and Bedside

Aubrey Morrison has received an award from Burroughs Wellcome that will help him create a new division—clinical pharmacology—in the Department of Pharmacology. A busy physician on the renal service, Morrison is known worldwide for his research into the causes of, and treatments for, certain kidney diseases.

Studentstage: Match Day 1986

In this annual rite of passage, graduating fourth-year students learn where they'll be spending the next three-plus years as residents in medical or surgical training programs all over the U.S.
Daughaday and Majerus Honored

Two researchers from Washington University School of Medicine have been elected to the National Academy of Sciences.

William H. Daughaday, M.D., Iren and Michael Karl Professor of Endocrinology and Metabolism, and Philip W. Majerus, M.D. '61, professor of medicine and biological chemistry, are among 59 new members honored for their distinguished and continuing achievements.

Election to the academy, which now has 1,477 members, is highly prized within the scientific community. Charted by an act of Congress signed by President Lincoln in 1863, the society promotes research beneficial to human welfare and officially advises the federal government on science and technology.

Daughaday, an internationally acclaimed endocrinologist, was elected in recognition of his research on basic hormonal action, specifically that of growth hormone and plasma levels. He discovered that the action of growth hormone in stimulating growth is mediated by a plasma factor called somatomedin, and developed methods for measuring very small amounts of somatomedin in plasma as an index of growth hormone activity. These methods proved useful in diagnosing disorders of human growth, such as dwarfism and acromegaly, and thus created a new branch of endocrinology.

Also known for his research on pituitary and adrenal function and diabetes mellitus, Daughaday has been on the Washington University faculty since 1947 and directed the metabolism division from 1951-1986. In addition to being Karl Professor, he is director of the Diabetes Research and Training Center at the medical school and is on staff at Barnes and Jewish hospitals. He graduated from Harvard Medical School in 1943 and served his internship at Boston City Hospital in Massachusetts.

Majerus was elected to the National Academy of Sciences in recognition of his research on the role of platelets in forming blood clots and for the discovery of mechanisms by which cells respond to hormones and other external agents. These responses follow the formation of several different messenger molecules that carry signals from the cell's surface to its interior and to other cells. Interference with the formation of one such messenger provides the basis for the use of aspirin to prevent blood clots.

Majerus has been on Washington University's faculty since 1966. He is director of the Division of Hematology, principal investigator and director of the Specialized Center for Research in Thrombosis, and serves on staff at Barnes Hospital. He graduated magna cum laude from Washington University School of Medicine in 1961, and completed an internship and residency at Massachusetts General Hospital in Boston.

Controlling Diabetes: More Than Blood Sugar

Physicians working to control blood glucose levels in diabetic patients should pay close attention to the patient's mood and general psychiatric status, according to Patrick Lustman, Ph.D., assistant professor of clinical medical psychology in psychiatry.

Lustman and a team of researchers at Washington University have been studying the link between emotional status and glucose control in diabetes. They found that depressed patients have poorer glucose control than emotionally healthy diabetics. Diagnosing and treating an existing psychiatric problem may be, they say, an important adjunct to insulin therapy.

"Many factors, both biological and behavioral, may affect glucose regulation in diabetes," says Lustman. "Psychiatric illness is just one of those that we think has some effect, perhaps dramatic effects, in particular patients."

The exact nature of these relationships is still being studied. "In some cases depression, for example, may lead to poor diabetic control," he explains. "In other instances, chronically unstable diabetics may make it more likely that a patient will become depressed."

Lustman points out that the diabetologist's job is already a complicated one — monitoring diet, exercise, caloric intake and insulin administration. Nevertheless, he suggests that more attention be given to psychiatric status. "It is very difficult to know for sure whether symptoms like fatigue or weight loss are related to a patient's mood or their diabetes," says Lustman. "The optimal care of diabetes may require appreciation of the interplay between the patient's emotional and biological features." — Betsy McDonald
A new technique for separating spaghetti-like molecules of DNA—the genetic material of living organisms, carried on chromosomes—may enable researchers to understand the nature of many diseases plaguing humans.

The technique is a variation of electrophoresis, a classical method by which substances are separated according to size and charge as they slither through a "molecular sieve" (semi-fluid gel) while submitted to an electrical field.

In the April 4 issue of Science, a team led by Maynard V. Olson, Ph.D., associate professor of genetics, reported their ability to separate chromosomal DNA molecules of yeast using this new technique—a feat that used to require a more complex system of electrophoresis.

Yeasts belong to the eukaryotes—organisms, like humans, that have chromosomes. More primitive organisms like bacteria and viruses also carry their genetic material as DNA, but it doesn't condense into true chromosomes. Eukaryotes also have larger amounts of DNA than more primitive organisms. Yet even the small amounts of DNA in organisms like viruses can consist of thousands of subunits (base pairs), and many viral "chromosomes" defy standard separation methods.

"Until 1982," says Georges Carle, a predoctoral student of Olson's and co-author on the Science paper, "researchers had little success using agarose gels to separate DNA molecules longer than 50,000 base pairs. The reason is, molecules over that size—comparable to some viruses' DNA—migrate as a single band on the classical electrophoresis gel, and you can't achieve separation."

The first real success in applying electrophoresis to these large DNA molecules came when researchers at Columbia University discovered that separation could be improved by alternately applying two electric fields that had complex shapes. Carle and Olson's technique makes it possible to resolve Histoplasma chromosomes. You can't do that with conventional methods," says Steele, "is by 'walking on the chromosome'—trying to overlap fragments that are sometimes no bigger than 20,000 base pairs." The new technique enables fragments as large as 500,000 base pairs to be analyzed.

Many researchers inside and outside Washington University have eagerly adopted the new technique. Paul Steele, M.D., fellow in pathology and resident in laboratory medicine at Barnes Hospital, uses it to study Histoplasma capsulatum, a pathogenic fungus: "Their technique makes it possible to resolve Histoplasma chromosomes. You can't do that with conventional methods." Steele says that this will enable the first chromosomal studies of this fungus to be performed.

And the new head of pediatrics, Harvey Colten, M.D., is very enthusiastic: "Devastating genetic diseases, like muscular dystrophy and cystic fibrosis, can be much more easily investigated with this technique. It's applicable to many genetic defects."

The McDonnell Douglas Corporation has donated a computer system to aid hearing research in the Department of Otolaryngology.

The equipment, made by Data General Corporation, is being given to the Cochlear Implant Program. It will be used in a clinical trial that will help answer the most important question in cochlear implant research today: what type of speech processing is most beneficial to a particular patient? The research will not only enhance service to deaf people who are not helped by conventional hearing aids, but will also provide information essential to the design of future implants.

School of Medicine investigators are conducting the clinical trial with researchers from the University of California—San Francisco, Duke University and Research Triangle Institute. At Washington University the study is headed by John M. Fredrickson, M.D., Lindburg Professor and head of the Department of Otolaryngology, and Margaret W. Skinner, Ph.D., director of audiological services and assistant professor of otolaryngology. They are collaborating with researchers at Storz Instrument Company of St. Louis and at Central Institute for the Deaf at Washington.
University Medical Center.
Fredrickson initiated the School of Medicine's Cochlear Implant Program in 1984, and is conducting research as well on a middle ear implantable hearing aid. Skinner has worked since 1974 to help hearing-impaired persons by refining procedures for fitting laboratory and commercial hearing aids.

According to Skinner, the donated computer system will allow investigators their first opportunity to compare, in the same patient, processing of the seven cochlear implants approved by the FDA for clinical investigation. Currently, each of the implants is evaluated for effectiveness, but in separate studies, using a cross-section of patients.

"All of the cochlear implants are designed to process sound and electrically stimulate nerve fibers in the inner ear," Skinner explains. "However, each of them uses a different sound-processing scheme and pattern of electrical stimulation. It is important to compare the processing in the same person, because an individual's response is affected by a variety of factors, including the number and position of surviving nerve fibers in the cochlea, the presence of abnormal bone growth in the cochlea, language skills and motivation to communicate.

"Our goal is to develop processing schemes, some of which are not available today, that will help cue patients with poor nerve survival to recognize speech," Skinner says. "Although the processed speech will not sound like it does to people with normal hearing, it should greatly enhance communication."

Going Batty Over Sound

Biology professor Nobuo Suga, Ph.D., and doctoral student John Olsen might be considered Washington University's answer to Batman and Robin. But unlike the comic book-turned-television characters who tangled with adversaries like the Riddler and the Joker, Suga and Olsen use real bats to solve knotty scientific problems. For example, how do mammals make sense out of the cacophony of sounds that surround them, translating noise into biologically useful information? Olsen's work to solve this riddle earned him a share of the 1985 James L. O'Leary Prize for Research in Neuroscience and is the basis for his doctoral thesis.

Bats are the only mammals that fly. But unlike most birds, bats are nocturnal creatures, unable to see where they're flying. So auditory cues are vital to prevent collisions and enable them to pounce on the insects they eat.

"Bats are very auditory animals," explains Olsen. "Their auditory system processes sound very elegantly. Bats echolocate — they bounce sounds off objects and listen for the returning echo. From frequency changes in the returning echo, the time it takes for an echo to return, and other auditory cues, the bat gains information about its prey and the position of stationary objects."

To create the echo, bats emit a high-frequency sound, which Olsen describes in musical terms: "It's like a chord and a brief slide," says Olsen. "The whole sound lasts maybe 30 milliseconds. It's very unusual to find an animal whose vocal tract produces only a harmonic sound. Most voices are much more complicated. But the bat's voice makes only a nice chord, with octaves."

An electronic machine in Suga's lab can make sounds similar to the bats'. By measuring how certain parts of the bat brain respond to these synthetic sounds, Olsen has worked out important details of how bats are able to gain information from auditory cues.

Bats are useful experimental animals because they, like humans, have a mammalian brain. Olsen discovered that a tiny portion — the medial geniculate body (MGB), located in a part of the brain called the thalamus — acts like a synthesizer: The MGB can combine certain characteristics of sounds to yield a single piece of information. Then, the MGB sends this information to neurons in the auditory cortex. For example, target range information is coded by neurons that respond to a combination
of the bat's sound and its echo, separated by a particular time delay.

The auditory cortex is composed of several areas, each devoted to processing a different type of information. "One hypothesis," says Olsen, "is that the auditory cortex is a switchboard of some sort, where the information is splayed out systematically. The cortex either directs or modulates the motor system output, perhaps enabling the bat's cerebellum — which indirectly controls its flight muscles — to make plans on how to go chase an insect."

After receiving his Ph.D. in May, Olsen went to Stanford to work in the laboratory of Eric Knudsen. Knudsen's research is on the auditory system of owls, one of few birds that are nocturnal. "It's a natural transition to go from bats to owls," muses Olsen. "I'll probably study how these special properties arise as the animal develops."

Olsen, an accomplished cellist, is acutely aware of the importance of sound to all animals. The human brain, like the bat's, also has in the thalamus the specialized area called the MGB. It is believed to participate in the processing of sound, sending information to the cortex. But exactly how this happens is unknown. From his work on sound processing in bats, Olsen expects that insights into human ability to process sound in the brain will be gained: "Sound is sound," he says, "and among mammals, there are many more similarities than differences in how sound is processed by the auditory system."

New Professorship in Dermatology

A

n alumnus of the School of Medicine and his wife have established an endowed professorship in dermatology at the School of Medicine.

Winfred A. Showman, M.D., and his wife Emma have established the Winfred A. and Emma R. Showman Professorship in dermatology. Arthur Z. Eisen, M.D., professor of medicine (dermatology), is the first incumbent for this chair.

Eisen joined Washington University in 1967 as associate professor of medicine and chief of the division of dermatology. He is dermatologist-in-chief at Barnes Hospital and is on the staff at Jewish Hospital.

Eisen received his medical degree from the University of Pennsylvania in 1957, and completed an internship and residency in medicine at the University of Rochester School of Medicine and Dentistry's Strong Memorial Hospital.

Before joining Washington University, Eisen was on the faculty of Harvard Medical School. Co-author of over 100 publications on skin disease research, he has written five dermatology textbooks and presented nearly 30 abstracts. He was named professor of medicine in 1971.

This new chair was formally inaugurated when the Showmans visited Washington University in April. In presiding at the inauguration ceremony, Chancellor William H. Danforth remarked: "The Winfred A. and Emma R. Showman Professorship in Dermatology will have a lasting impact on the School of Medicine. Dr. Eisen is an excellent choice for the important position of first Showman Professor. We are especially proud that the chair will forever carry the names of a respected physician and alumnus and his wife, a loyal friend of the School of Medicine."

Showman received his medical degree from Washington University in 1921. He then spent three years at City Hospital interning in general medicine, surgery, and obstetrics and gynecology. From 1924 to 1927, Showman was affiliated with the Barnes Hospital Outpatient Department and also did clinical work at the Barnard Free Skin and Cancer Hospital.

Subsequently, Showman left St. Louis to establish a solo dermatologic practice in Tulsa, Oklahoma, that he sustained for 50 years. His professional affiliations include the American Medical Association (which he served as delegate to the section on dermatology), the American Academy of Dermatology, the Oklahoma Medical Association, the Southern Medical Association, and the Tulsa County Medical Society, which he served as president in 1951.

A native of New Mexico and former cattle ranch owner, Emma Showman spent many years as a teacher. She notes that her husband's admiration for Washington University has been lifelong, and that the Showman Professorship is of great personal satisfaction to them both.

"Mrs. Showman and I feel great pleasure in our good fortune to be able to contribute to the School of Medicine," said Showman. "This is our way of repaying, at least in part, the cost of my education and to share my gratitude with future generations of medical students."

Winfred and Emma Showman
Pharmacology Department Receives Endowment

The Department of Pharmacology has received a $50,000 endowment from Sterling Drug Inc. to finance a Visiting Professorship in Pharmacology.

The grant is made in honor of Ernst Zander, M.D., former U.S.A. medical director of Sterling Drug and vice president of medical affairs for Sterling's Lehn & Fink Products Co. Zander is a 1939 graduate of the Washington University School of Medicine. He joined Sterling that same year as associate medical director of Winthrop Chemical Co., a predecessor of Winthrop Laboratories. He retired from Sterling in 1985 after 46 years of service.

The Sterling Drug Visiting Professor Program was established in 1979 to promote the interchange of knowledge between colleges and universities in the field of pharmacology. The endowment enables the school to invite a guest professor to the campus for a week each year to present lectures, conduct workshops and seminars and participate in other educational sessions.

The endowment to establish the Sterling Drug Visiting Professorship in honor of Zander was presented to Philip Needelman, Ph.D., Alumni Endowed Professor and head of the Department of Pharmacology at Washington University School of Medicine.

"This award provides us the funds to enrich the environment through critical evaluation and teaching by an outside scholar for the scientific growth of our trainees and departmental scientists," said Needelman.

Under Needelman's direction, the pharmacology department at Washington University is an interdisciplinary program that collectively focuses its research on understanding the molecular bases of disease processes and on their therapeutic modification.

FURTHERMORE

A student at the School of Medicine, Megumi Tanuchi, has received the ninth annual James L. O'Leary Prize for Research in Neuroscience.

Tanuchi, an M.D./Ph.D. candidate in the neural science program of the Division of Biology and Biomedical Sciences, received the prize at the school's 31st George H. Bishop Lecture. The O'Leary Prize recognizes the most original and important accomplishments in neuroscience research by a pre- or postdoctoral student at Washington University.

Tanuchi's research examines the properties of the receptor for nerve growth factor — NGF — a molecule discovered at Washington University in the 1950s by Rita Levi-Montalcini, M.D., and her colleagues. Using a new antibody to the NGF receptor, Tanuchi studied the receptor's biochemical properties and function in the brain. He localized the NGF receptor in the brain and showed that it is expressed in peripheral nerves after surgical transection. These findings clarify possible roles of the NGF receptor in nervous system damage and repair.

The O'Leary Prize was established in memory of eminent neuroscientist James L. O'Leary, M.D., Ph.D., former professor and head of the Department of Neurology at Washington University School of Medicine. O'Leary devoted himself to training young researchers. His career at the medical school extended from 1928 until his death in 1975.

Thomas A. Woolsey, M.D., director of the James L. O'Leary Division of Experimental Neurology and Neurosurgery, has received a $10,000 grant to help support his studies of brain function. The award comes from the Illinois-Eastern Iowa District of Kiwanis International Spastic Paralysis Research Foundation.

Woolsey's work focuses on the organization, development and functional recovery of the brain, with emphasis on the long-term effects of stimulation and sensory deprivation upon the central nervous system. He will use the grant to further explore basic mechanisms and phenomena that might contribute to the treatment of spastic paralysis (cerebral palsy) and related disorders.

Woolsey, who is the George H. and Ethel R. Bishop Scholar in Neuroscience in Neurology and Neurosurgical Surgery, was named director of the O'Leary division in 1984. He is senior McDonnell neuroscientist, and a professor in three departments: neurology and neurosurgery, anatomy and neurobiology, and cell biology and physiology. He received his medical degree in 1969 from Johns Hopkins University and joined the faculty at Washington University in 1971.

James O. Hepner, Ph.D., director of the graduate Health Administration Program at the School of Medicine, has been elected to serve on the board of governors of the American College of Healthcare Executives (ACHE). ACHE is an international professional society of more than 20,000 healthcare executives. With comprehensive programs in education, membership, research, executive assessment and communications, the college works toward its goal of bringing excellence to healthcare management. Hepner's election came at the recommendation of ACHE's nominating committee, whose slate was accepted by the council of regents. The college's legislative body, at its 51st annual meeting in Chicago. He is the first full-time university professor to be elected to the board in the college's history. As a governor, Hepner will be responsible for District Five, which includes Alberta, Colorado, Iowa, Kansas, Manitoba, Minnesota, Missouri, Montana, Nebraska, North Dakota, Saskatchewan, South Dakota and Wyoming.

Julio E. Perez, M.D., associate professor of medicine and medical director of Cardiac Diagnostic Ultrasound at Barnes Hospital, has been elected to Fellowship in the American College of Physicians. Perez is one of 17,000 physicians honored with Fellowship in the college — about 600 have been elected this year.
The Richard A. and Betty H. Sutter Visiting Professorship has recently brought two noted surgeons to the School of Medicine.

Lars M. Odkvist, M.D., Ph.D., associate professor of otolaryngology at Linkoping University in Linkoping, Sweden, was the first Richard A. and Betty H. Sutter Visiting Professor in Occupational and Industrial Medicine. His lecture was titled, "Vestibular and Oculomotor Disorders Caused by Industrial Solvents."

Odkvist is a founding member of the Swedish Vestibular Society and has delivered scientific talks about otolaryngology throughout the world. He has authored several publications that concern the central vestibular system, Ménière's disease, the influence of solvents on the vestibulocuomotor system, respiratory problems in industry workers and facial palsy.

In addition to his faculty appointment at Linkoping University, Odkvist is a member of the otolaryngology department at University Hospital in Linkoping.

Harold E. Kleinert, M.D., clinical professor of surgery at the University of Louisville and Indiana University, recently served as the second Sutter Visiting Professor. His lectures described industrial injuries to the hand, and nerve compression of the upper extremity.

Kleinert has a keen and intense interest in hand surgery and is a specialist in the areas of flexor tendon injuries and microvascular surgery. He has established one of the outstanding hand surgery training programs in the world and dedicates many hours to the education of orthopedic, plastic and general surgeons.

St. Louis physician Richard A. Sutter, M.D. ’35, and his wife Betty established the visiting professorship last year to expand the understanding and practice of occupational medicine, which involves such aspects as environment of the workplace and its effect on employee health, preventive medicine, safety factors, and emergency and definitive surgical care and rehabilitation of the industrially ill and injured.

Sutter is founder of the Sutter Clinic, Inc., which, since 1946, has provided occupational medical service to more than 1500 companies in the St. Louis area. He was director of the clinic until 1984, when it was bought by Barnes Hospital.

Sutter continues to serve as a consultant at the clinic. He also is a lecturer in industrial medicine and rehabilitation in the Department of Preventive Medicine at Washington University, and is on the clinical staffs of Barnes, Deaconess and Lutheran hospitals.

His wife Betty is an associate in the Sutter Clinic and former director of the executive committee of the St. Louis chapter of the American Cancer Society. She is a former St. Louis Globe-Democrat Woman of the Year.

M. Therese Southgate, M.D., deputy and cover editor of the Journal of the American Medical Association (JAMA), delivered the sixth Estelle Brodman lecture. Southgate's talk described the affinities between medicine and the visual arts.

The Brodman lecture honors Estelle Brodman, Ph.D., who was director of the library and professor of medical history at the School of Medicine from 1961–81.

"Medicine and art have a mutual attraction for each other and share a common goal," says Southgate. "The artist gives us a realization of nature's unfinished end, and the physician seeks to complete what nature has not finished. Just as an artist seeks a complex harmony of parts, a physician wants unity and coherence for a patient suffering from a disease. Both medicine and art have as their proper subject the relationship between the physical and spiritual, and both have healing powers. However, for physicians, the immediate need is for the physical well-being of their patients."

Physicians and artists share some common characteristics, she says. Both are keenly observant and have a one-on-one relationship with their work — the physician with the patient, the artist with nature. Medicine, like painting and sculpture, must be underpinned by science. "In the Middle Ages," remarks Southgate, "both physicians and artists belonged to the same guild — St. Luke's. And a work of art, like a patient, does not yield its secrets immediately."

For some 20 years, Southgate has been responsible for selecting art for JAMA. Her professional training includes the study of political science and journalism. It was while she was editor of Chemical and Engineering News that she decided to go to medical school; subsequently, she received her M.D. from Medical College of Wisconsin. In addition to her editorial responsibilities at JAMA, she also directs the journal's Fishbein Fellowship in Medical Journalism. She is the author or editor of many medical publications and has served on the editorial boards of several scientific publications.

The Department of Preventive Medicine has prepared educational software to instruct users on mammogram scheduling. The MAMSCHD (mammographic scheduling program) is available on floppy disk for $99.95. Designed to run on an IBM PC, the software integrates family history of breast cancer, reproductive status, and other individual data to recommend the procedure for asymptomatic women.

Designed by John K. Gohagan, Ph.D., MAMSCHD encourages users to explore the screening implications of variations in risk profiles, radiation dosage, mammographic accuracy and costs. It is intended for educational purposes and is not for clinical applications. For further information, see "Profiles and Predictions," Fall 1985 Outlook. The licensing agreement for MAMSCHD can be obtained by contacting Patricia O. Davis, Business Manager, Department of Preventive Medicine, (314) 362-3500.
A distinctive and durable dentition is the trademark of the Cheshire Cat. When it comes to humans, our teeth are also unique and will be around long after we’re gone. Thus, teeth are often the means of identifying unrecognizable human remains, a task of the forensic odontologist. Forensic dentistry applies the science of dentistry to the needs of the law. Dentists are also called upon to analyze bite marks (in both food and flesh) and testify in cases of child abuse and neglect.

You are what you eat, they say, but when it comes to making a positive identification, you are what you eat with. “No two sets of teeth are exactly alike,” says St. Louis City and County Forensic Dentist James McGivney, DMD ’75, assistant professor of pathology, School of Dental Medicine. “Even identical twins don’t have identical teeth. Dentition is characterized by the size and shape of the teeth, their arrangement, and any fillings that are present. And these properties are routinely recorded by dentists.”

Fingerprints, also unique, are the classic form of identification. Unfortunately, fewer than a quarter of the population have been fingerprinted, hardly any women and children. On the other hand, over half the U.S. population seeks dental care and thus has dental records.

Dentition is even more useful than fingerprints in establishing identity because tooth structure is tough. Teeth outlast all other body tissues. In fact, jaws are the most common fossil of early humans. Specimens as old as three million years still show evidence of tooth decay and periodontal disease.

Dental enamel is the most durable of human tissues, as hard as leaded crystal. In addition, points out McGivney, “dental restorations are extremely resistant to physical and chemical deterioration. Silver and gold restorations can withstand heat of 1000 degrees centigrade. Long after a body has been burned beyond recognition, dental restorations can establish identity.”

TEETH TELL THE TALE
Certifying death is important. Not only does certainty of death allow grieving relatives to get on with their lives, it also is a

Dental X-rays and records — as well as microdisks that can be attached to teeth (see page 10) — enable forensic dentists to make a positive identification, sometimes when a few fragments of charred teeth or dental restorations are the only remains. (Illustration by Nadine Sokol)
To make a positive identification using dental records, a medical examiner or coroner must suspect a person's identity and be able to locate that person's dentist. Through a recently developed nationwide microfilm disk registry program, this information can be obtained in minutes if the person is wearing a DataDisk.

Placement of the disk, which costs between $15–30, is quick and painless. A tiny microfilm circle is bonded to the cheek surface of an upper molar using a transparent, epoxy-like resin. The procedure does not require anesthesia or drilling and can be completed in about 15 minutes.

Each disk contains a unique 10-digit patient identification number and a toll-free telephone number. The disk, read with simple magnification, need not be removed. By calling the Hotline and giving the identification number, one can obtain a person's name, address, telephone number, social security number, and gender.

In addition to its use in identifying human remains, the disk can also help identify lost children, the elderly and handicapped. The Dental Clinic of Jewish Hospital, which is the only provider of emergency dental services at the medical center, affixes DataDisks.

Call (314) 454-7870 for more information. For persons without natural teeth, identification information can usually be incorporated into removable prostheses. In fact, at least 10 states require that all newly fabricated dentures contain identification information identifying both the patient and the dentist.

But despite the difficulties, dental records have been invaluable in establishing identity. Some of the better-known cases include:

- In 1868, the brother of John Wilkes Booth identified his burned body by the presence of a gold-filled tooth on the upper right side.
- Seventeen years after his murder in Dallas, the remains of President Kennedy's assassin, Lee Harvey Oswald, were positively identified. A British journalist had published evidence that a Soviet agent was substituted for Oswald on a trip to Russia. In 1981, the remains were exhumed and the dentition compared to Oswald's military dental records. The teeth matched, laying to rest the journalist's theory.
- Last July in Sao Paulo, Brazil, the body of Nazi war criminal Josef Mengele was identified by ten teeth and partial dentures. (His remains also showed evidence of a recurrent dental abscess, something Mengele was believed to have had.) Although many still dispute that the remains are Mengele's, the evidence is conclusive.
- Dental records can also discount criminal confessions, as in the case of Henry Lucas. While in prison, Lucas confessed to over a hundred murders. But records of Lucas' tooth extractions placed him in the dental chair, not at the time and place of some murders he allegedly committed. Thus, those confessions were disallowed.

**BEYOND THE ORDINARY**

Forensic dentistry is particularly valuable following mass disasters that result in a large number of dismembered, decomposed, or otherwise unidentifiable bodies. Fingerprints are usually destroyed, and the teeth are often the only means of making an identification. In an airline accident, teams of specially trained dentists collect evidence and record information from the remains, comparing it to passengers' dental records. Colonel William Morlang is an Air Force forensic dentist who participated in the investigation of several mass disasters: the Big Thompson Canyon flood, the Jones-town-Guyana mass suicide, the Pan-Am/KLM 747 mishap, and the December 1985 crash in Canada of the plane carrying U.S.
troops. Most recently, he conducted the investigation of the seven astronauts' remains when they were recovered after the explosion of the space shuttle Challenger. "Since 1976," reflects Morlang, "computers have been used to compare dental records in mass disasters. In cases involving a large number of fragments or bodies, such as the Jonestown mass suicide that left 913 dead, computers are able to quickly match ante- and post-mortem data to suggest likely identification. Final positive dental identification, however, is still made by the forensic dentist."

These identification techniques are very efficient when an identity is suspected by circumstances or personal effects and the forensic scientist can summon records. But what happens when the remains belong to someone completely unknown? The medical examiner or coroner submits the evidence, including dental findings, to the FBI National Crime Information Center in Washington, D.C. Established in 1981, the facility maintains two computer files — one for missing persons (approximately 40,000 per year) and one for unidentified bodies (5-10,000 per year). Identification is positive when missing persons' dental records match data from the deceased.

In unsolved cases, dental evidence can point to possible identity because it yields clues to age, sex, blood types, socioeconomic status, and occupation.

**TELL ME A RIDDLE**

Until about age 25, tooth eruption sequence accurately indicates age. There is also a specific relationship, although less accurate, between tooth structure density and age. Some oral disease patterns, such as periodontal disease and attrition of tooth structure, are also generally associated with advanced age.

Gender can be inferred from tooth size because men's teeth are generally larger than women's, and the male chromosome can be detected in cells of dental pulp up to five months after extraction or death. Blood types have also been determined from cells of the tooth pulp more than a century after death.

"Teeth give clues about habits and occupation. Pipe smokers' teeth often have slight indentations where they grip the pipe. Carpenters and roofers use their teeth as nail holders, as beauticians do for bobby pins, causing a characteristic notch. Miners, exposed to abrasive dusts, have excessively worn chewing surfaces.

But teeth are for biting, and the marks they leave are as unique as the teeth that make them. In 1906, two men were arrested as suspects in a burglary in northern England. One hungry burglar had taken a bite of some cheese, leaving his tooth imprints at the scene. Dental casts of one suspect matched the chewed cheese, leading to a conviction.

Teeth are also used as weapons. Bite marks in human flesh are common, especially in sexual crimes. Scars and wounds that could have been made by teeth are carefully photographed. Impressions are made of the wounds using highly accurate silicone impression materials. The wounds' exact dimensions, once replicated, are thus preserved after the wound has healed or the body decomposed. The scanning electron microscope reveals characteristics of teeth that are otherwise undetectable.

Criminals know that their teeth can implicate them in crimes where they've left toothmarks. At least one has even gone so far as to have his teeth extracted so that he could not be convicted.

According to McGivney, bite marks may contain residual traces of the biter's saliva: "Eighty percent of the population secretes blood group antigens in the saliva, detectable by simple analysis. A minute sample of saliva will demonstrate if the biter was a 'secretor,' and possibly even reveal the biter's blood type."

"Forensic dental information, especially bite marks, must be very carefully recorded to be presented as court evidence," adds McGivney, a diplomate of the American Board of Forensic Odontologists. "But any discrepancy — even accidentally reversing a slide during trial — will cast doubt upon expert testimony."

Although not widely accepted as evidence in the U.S., lip prints are as unique as fingerprints and dental records. Lip prints from drinking glasses, facial tissues, and pornographic magazines have been admitted as evidence.

**Evidence for Child Abuse**

Most forensic dental examinations are performed by dentists trained in forensic sciences, but general dentists can often provide essential evidence for cases of child abuse, says medical examiner Gantner: "Technically, dental records are legal documents. Private dentists are often asked to provide them and can be summoned to testify as experts." Dentists in general practice can also play an important role in detecting and reporting child abuse. Abusive parents may batter a child's head and face, resulting in characteristic bruises, lip lacerations, fractured teeth and bite marks on the cheeks.

According to the National Center on Child Abuse and Neglect, a million U.S. children will be physically abused this year; 2,000 to 5,000 will die. Like all health care professionals, dentists are required by law to report suspected abuse to the appropriate authorities.

Gross neglect for a child's well-being is also reflected in tooth decay patterns, something that dentists should report in cases of suspected neglect.

Making identifications and examining bitemarks don't chew up much of the forensic odontologist's time. Most operate full-time dental offices, spending the bulk of their time performing routine procedures, until their forensic skills are needed.

To most persons, the dentist is the last person in the world they want to see. For some, a dentist is the last person in the world they will see.

William Hartel, DMD '85, is a general practice resident at the Jewish Hospital Department of Dentistry. A member of the American Academy of Forensic Sciences, Hartel has been writing for six years. His wife, Alison Whelan, is a 1986 graduate of the School of Medicine.
Picking her way through the acacia scrub, the anthropologist reached a clearing. She was glad to leave the cat-claw thorns of the “wait-a-bit” trees, which threatened to grab her skin and hair. With a soft clicking noise, she threw corn on the ground, and simian shapes shuffled into the clearing. As the large males stuffed their cheeks with food, the anthropologist felt elated. She had made contact with the baboons.

Around the anthropologist and baboon stretched a triptych of forest, water and thorn scrub. The area lies at 1,000 meters along one of the country’s most important rivers, the Awash. Upstream, a lush strip of forest borders the water, which plunges over steep cliffs to form the spectacular Awash Falls. Downstream, the river flows through a canyon; its sparser forest is hemmed by steep walls, where baboons that tire of eating corn strewn by an eager scientist will settle down to sleep.

The Awash National Park was the setting for this close encounter. Filmed by the crew of *Wild Kingdom* in 1982, Jane Phillips-Conroy, Ph.D., now associate professor of anatomy and anthropology at Washington University, was back in Ethiopia.

Phillips-Conroy has visited East Africa eight times since 1973. Her research site is between central Ethiopia and the much drier Afar Desert to the northeast. In Ethiopia, eleven troops of baboons — about 750 animals that sleep along or near the Awash River — have been the target of her research.

The Awash baboons may represent a species that began to divide into two new species and then merged again, like a river that forks around an island and then flows back together. “These baboons present the scientist with an unusual glimpse into the process of speciation,” says Phillips-Conroy, “and they provide an example of the wide range of diversity that can characterize a single species.” She says that studies of the baboons may shed light on adaptations of early man, since baboons today occupy the same type of habitat as did our hominid ancestors.

**THE HYBRID ZONE**

Two varieties of baboons live in the park. The desert baboon, with its pink face and pink bottom, is the more flamboyant. Its males have silvery whiskers and a showy, elbow-length white mane. The drabber olive variety has a dark face and bottom; its males have brown whiskers and more modest manes.

The adult males also differ in behavior. Although both forsake their natal units after puberty, the desert baboon establishes a permanent harem with up to nine females that he vigorously “herds” by biting errant mates on the neck; the olive male is promiscuous, competing with other males for females in heat.

The two varieties are believed to have di-

From one year to the next on Jane Phillips-Conroy’s African visits, individual animals may drastically change their appearance as a result of age or a change in dominance rank. Conventional methods of animal identification are unreliable, so she identifies baboons from the animals’ palm prints. To obtain a palm print, the animals must be anesthetized.
verged tens of thousands of years ago, when olive-like baboons migrated from central Ethiopia into arid areas of northern and eastern Ethiopia, Saudi Arabia and Yemen. The ancestral animals evolved into desert baboons as they adapted to drier conditions. They would probably have become separate species if continued geographic separation had prevented interbreeding. However, olive and desert baboons subsequently came into contact in several parts of Africa, probably because of climatic changes.

Where they meet today, as in the Awash, they interbreed, producing hybrids with many combinations of characters. For example, some hybrids differ from pure olive baboons in length and color of the hair that forms their cheek tufts. Others differ from pure desert baboons in the color of their faces.

In 1968, Swiss zoologists who visited the Awash found that pure olive baboons were mainly above the Falls. Pure desert baboons, on the other hand, resided 20 kilometers further downstream, sleeping on the steep cliff faces that form the canyon walls. Hybrid baboons inhabited the canyon and a narrow zone of thorn scrub and grassland in between. The Swiss researchers suggested that the hybrid zone had formed after desert males had raided olive troops for females.

Thus the zone received genes from olive baboon mothers and desert baboon fathers. But, the zoologists concluded, it did not contribute genes back to the parental populations because hybrid offspring had behavioral traits that made them less successful at breeding than purebred baboons. The net result was a narrow hybrid zone; on either side, desert and olive baboons remained separate and distinct species even though they could and did interbreed.

Phillips-Conroy and Clifford Jolly, Ph.D., her colleague from New York University, first visited the Awash in 1973. They observed the same groups as the Swiss researchers, and they trapped and photographed male baboons, taking tooth casts, palm prints and blood samples. With these data, they later derived a hybrid index that measured the resemblance of each animal to a pure olive or desert baboon.

When Phillips-Conroy and Jolly looked at the results, they discovered that the structure of the Awash population had changed drastically since 1968. In 1973, none of the troops consisted entirely of purebred animals. Instead, the hybrid zone had expanded downriver. The olive troops above the Falls also contained a number of hybrid males, indicating that capture of olive females by desert males was not the only mechanism of gene flow. Genes now seemed to be moving between the pure parental populations as well as into the hybrid zone: Although the forks of the "river" had been separate, they were now flowing back together.

THE MODEL

In an upcoming paper in the American Journal of Physical Anthropology, Phillips-Conroy and Jolly set out a model that reconciles the conflicting hypotheses and explains how the variety of male mating patterns could shape the hybrid zone.

The model is based on the premise that anatomical and behavioral differences between the baboons are adaptations to different habitats — the well-watered woodland/savanna habitat of the olive baboons and the drier habitats of the desert baboons.

If this premise is true, climatic changes would influence the size and structure of the hybrid zone in the following manner: Drought would adversely affect the olive baboons more than the desert baboons, since the latter are already adapted to dry conditions. During periods of low rainfall, the reproductive success of olive baboons drops because they are trying to survive in a less-than-optimal habitat. At the same time, desert baboons would probably migrate upstream, where the previously more lush habitat would be drier. At such times, desert males would effectively become dominant to olive baboons, and they would move into olive groups and establish residence. (Such behavior has recently been observed.) Thus, the boundary of the hybrid zone would move upstream during drought.

When rainfall was relatively high, on the other hand, olive troops would be able to resist the encroachment of desert males and
might even move downstream to mate with desert females. In this case, the boundary of the hybrid zone would shift downstream. Alternation of wet and dry years would expand the hybrid zone in both directions.

Testing the model will not be easy because baboons live into their twenties and therefore must be studied over a long period of time. But climatic data already provide some support. Rainfall in the Awash was high in the late sixties and, according to the model, this should have allowed olive and hybrid males to migrate downstream and father hybrids in desert troops. Such hybrids were found in the 1973 survey. On the other hand, the low rainfall of the early seventies should have created suitable conditions for desert males and hybrid males to migrate upstream and father hybrids in pure olive troops; such males were seen in 1973, and hybrid offspring appeared in the 1982 sample.

**PALM PRINTS**

As the researchers test their model, they would like to know about the movements of individual animals as well as the changing composition of troops.

To solve the problem, Phillips-Conroy and Jolly have adapted a method of palm printing. They coat a tranquilized baboon's hand with graphite, press its palm into the contours of the palm, and then stick the tape to an index card. The palm prints provide unequivocal identification because baboons, like humans, have patterns that are unique to individuals. (Fingerprints cannot be used because baboons walk on their fingertips, which covers them with callouses.)

An adult baboon's hand is cool, rough and calloused, but an infant baboon's hands are soft and pink. Says Phillips-Conroy, "When we trap females with newborns to palm print them, the babies are not frightened. They stay on the mother and are awake all the time the mother is tranquilized. Often when you take their palm print, they just lie there looking at you with the mother's nipple in the mouth."

Palm-printing has proven to be the ideal tool for recognizing animals. "There would be only one other way to get the necessary data," says Phillips-Conroy. "We would have to stay there for 10 years."

Already the technique has tracked two individuals. In 1982, the researchers identified two males from the 1973 study sample that had migrated into a troop just above the Falls, one from a troop 5 kilometers upstream and one from a troop 8 kilometers downstream in the depth of the hybrid zone. "The latter was a definite hybrid with quite a shaggy coat," says Phillips-Conroy. "And he was a very high-ranking male — we called him Honcho. So presumably, even though we never actually saw it, this hybrid born in a hybrid troop migrated into an olive troop, where he would have left his genes for perpetuation."

Phillips-Conroy and Jolly have also used the data from the 1973 survey to study the differences between male and female baboons. The existence of such differences is called sexual dimorphism.

Interest in sexual dimorphism has increased in recent years, as biologists have tried to account for its evolution. However, their arguments have often been based on observations of animals in captivity or on small samples. Says Phillips-Conroy, "People looking at rare animals may come up with an index of dimorphism derived from just two individuals in a species that itself may have much variation."

The study should also interest paleontologists, who must necessarily draw conclusions from small numbers of specimens. Because baboons live in the African savanna, the habitat of early man, they are often used as models for hominids. "We therefore feel that it is important to look at the range of variation in a known population," says Phillips-Conroy. "Sexual dimorphism is a characteristic of a population and not just individuals."

**BACK TO THE FIELD**

In April, Phillips-Conroy returned to Africa to visit the Mikumi National Park in Tanzania with Jeff Rogers, a graduate student in anthropology at Yale. There she works with researchers from the University of California at Riverside. The California anthropologists have observed three groups of yellow baboons continuously for the past 11 years. "This gives us a tremendous opportunity to look at the factors responsible for genetic change over time," says Phillips-Conroy. "If you just look at gene frequencies in a population, you get a very static notion. But the demographic data from the California group could show how the genetic structure of the population came to be that way, because you know its history — for example, when a male migrated in, whom he potentially fathered, how many of a mother's offspring survived, and who they are, what their reproductive success has been, and so on."

In August, Jane Phillips-Conroy will return to St. Louis from four months in Tanzania and Ethiopia. Then, she will teach first-year medical students gross anatomy, assisted by her husband, Glenn Conroy, Ph.D., professor of anatomy and anthropology.

In hiring the Conroys, Washington University joins a growing list of prominent medical schools (Johns Hopkins, Duke, Chicago) that have met their gross anatomy teaching needs by hiring primate biologists. However, the Conroys are not the first biological anthropologists to have an appointment in the Department of Anatomy at Washington University. Professor emeritus and physical anthropologist Mildred Trotter, Ph.D., was at Washington University from 1920 until she suffered a stroke last year. And Raymond Dart, the famous anthropologist who discovered the first human fossil in South Africa, was a Rockefeller Fellow here in 1920-1 under Robert Terry, then head of anatomy. So although the nuts and bolts of anatomy take precedence in any medical curriculum, students at the School of Medicine have learned about modern man with a perspective from the previous two to three million years.

**EDITOR'S NOTE**

Jane Phillips-Conroy is a research associate of Addis Ababa University in Ethiopia. Her fieldwork there is done with permission of the Wildlife Conservation Organization. She takes students and faculty into the field and has developed an active inter-university collaboration. One of her Addis Ababa students is currently a Ph.D. candidate at New York University.

Since 1982 her research has been supported by the National Science Foundation, the Guggenheim Foundation, and the Centre for Field Research.
Foreign medical school graduates usually face an uphill battle when it comes to getting a residency at the top American academic medical centers. But Aubrey Morrison has overcome the stereotyping that plagues this much-maligned group. He has been able to achieve a singular form of academic success atypical of one whose origin is British Guyana. A physician deeply emmeshed in the treatment of renal patients at Barnes Hospital, and a vigorous and productive researcher in the Department of Pharmacology, Morrison has the singular ability to keep a foot firmly planted in both basic science and clinical arenas — a balancing act that many academic physicians aim for, but usually fall short of.

These achievements have not gone unnoticed. Thanks to a $250,000 stipend from Burroughs Wellcome, he will be able to establish a division of clinical pharmacology at Washington University. And just as Morrison himself has risen above stereotyping, so will this new division mark a departure from that found in other academic medical centers.

"Clinical pharmacology will shorten the time between fundamental scientific discoveries and new patient therapies," says Philip Needleman, Ph.D., Alumni Endowed Professor and head of pharmacology. "But one can set out to design a therapeutic agent, test it in animals or in an isolated system, and eventually do clinical testing in humans. It's that total spectrum that I like to think we can accomplish."

"I'm trying to understand how a potential drug interacts at the enzyme level, or cell level, or higher organizational levels including the whole body. So the ability to utilize the clinical testing ground — the Clinical Research Center at Washington University, the final phase in the testing of a drug that has the potential of being a therapeutic agent — is really the kind of scope I'm going to try and cover."

Like so many endeavors at the medical center, clinical pharmacology is the offspring of a marriage between basic and clinical science — the Department of Medicine's division of renal medicine, and the Department of Pharmacology. Saulo Klahr, M.D., chief of renal medicine, is enthusiastic over the collaborative prospects: "Dr. Needleman and his group have worked extensively with atrial natriuretic factor (ANF) — a substance produced in the heart that has profound effects on the kidney. We think that this substance may be abnormal in certain uremic patients. We're interested in collaborating with Dr. Morrison so we can measure the levels of this substance in uremic patients and try to determine if the levels are elevated. We also want to know how it may contribute to the uremic state. In addition, I can see potential in investigating hypertension — we want to know the contributions of both ANF and prostaglandins to this condition. So I can see a series of areas where we will interact."

Yet Klahr and Needleman both acknowledge that someone like Morrison, who has feet planted firmly in both basic science and clinical service, is rare. Says Klahr: "People like Aubrey, who can bridge the gap between basic science and clinical work, come about quite infrequently."

"It's really unique that a clinician like Aubrey would have his labs in a basic science department like pharmacology," says Needleman. "Even the most dedicated and hard-working physician/scientists often find it necessary to compromise one area or the other. And renal medicine is tough — it's a very busy service, full of chronically ill patients."

Morrison says that he's able to handle both "because I jealously guard my time. I like to see patients, and I don't think I could ever give that up. But at the same time, you could spend all your time providing primary or secondary care, and your laboratory investigations will suffer. So I try to keep a high profile in the laboratory."
Aubrey Morrison will head the Department of Pharmacology's new division of clinical pharmacology, which marries the basic research conducted in pharmacology to the clinical services provided by the Department of Medicine.

Clinician-Scientist

When he's attending on the renal service, Morrison usually sandwiches afternoon rounds between early morning and late evening sessions in the laboratory. Over his years at Washington University, which began when he was a fellow in Klahr's laboratory, Morrison has led several lines of research. "In some respects, I'm a frustrated chemist," he muses. "I just love working with test tubes and chromatographic systems."

His expertise in high-pressure liquid chromatography and in mass spectrometry enabled him to chart then-unknown pathways of prostaglandin metabolism in the kidney.

Prostaglandins are hormone-like compounds derived from a fatty acid known as arachidonic acid. They are implicated in many types of inflammatory reactions, and they have dramatic effects on renal blood flow and ion transport in the kidney. "I wanted to characterize various segments of the kidney responsible for producing these fatty acids," says Morrison. His goal was to see if there was a stereotyped response to injury: "There are lots of gaps in our knowledge when it comes to understanding the cellular basis for renal failure," he explains.

Although only around one percent of arthritis patients will develop kidney problems
It's really unique that a clinician would have his labs in a basic science department like pharmacology: Even the most dedicated and hard-working physician/scientists often find it necessary to compromise one area or the other.

as a result of their medication, Morrison says that this translates into "a fair number of persons who may develop interstitial nephritis, a condition in which the kidney tubules are injured. It's precipitated by the anti-inflammatory agents like ibuprofen or indomethacin that arthritis sufferers take. But what's actually happening at a cellular level to the kidney cells? It's still up in the air."

In his studies on the kidney, Morrison found that when the kidney begins to deteriorate, there is an effect on a specific phospholipid in the area of the brush border membranes of cells facing the lumen (urine-collecting side). "Does the kidney actually respond in stereotypical fashion to injury, as these results suggest?" asks Morrison. "We think there may be a final common pathway by which the cell disintegrates. But there's still a lot of information needed to pin that hypothesis down."

Right now, Morrison also heads investigations into one of the "hottest" areas of cell biology — the so-called "second messengers" of hormonal action.

Second messengers are small molecules that actually "do the dirty work" for certain hormones or hormone-like substances that don't affect cells directly. When one of these hormones interacts with its receptors at the surface of a cell membrane, it stimulates the production of some substance — a second messenger — which eventually brings about the hormone's ultimate effect. These hormones and their second-messenger effectors are involved in a complicated inter-relationship that is akin to a sort of cellular Rube Goldberg-type apparatus (see diagram).

The adenyl cyclase system was the first of the second messengers to be discovered. The late Earl Sutherland, who won the Nobel Prize for his work, found cyclic AMP's importance during his tenure at Washington University.

More recently, another second-messenger system has stimulated a flurry of research, both at Washington University and elsewhere. This "new" system revolves around substances called phosphoinositides, which have been implicated as effectors in the action of hormones like bradykinin.

Manufactured in many organs including the kidney, bradykinin is one of the peptides implicated in the swelling and pain associated with injury. It seems to trigger these and other effects by activating prostaglandin production. But bradykinin doesn't directly stimulate prostaglandin synthesis. Instead, it somehow stimulates the production of second-messenger phosphoinositides.

Some of the known second messengers — cyclic AMP and the phosphoinositides — depend on calcium for their activity. Morrison thinks that in addition to bradykinin, other hormones that also affect the kidney, such as angiotensin II, may be tied into the phosphoinositide pathway and calcium. It's also possible that the second messengers could affect one another: "Are the phosphoinositides and cyclic AMP totally separate, or are they interacting in some push-pull sort of mechanism?" queries Morrison.

Research fellow James A. Shayman, M.D. '80, FHS, has worked with Morrison for the past three years, attempting to characterize this new family of second messengers and their actions in the kidney, triggered by bradykinin. Shayman, who this summer will accept an appointment in renal medicine at the University of Michigan, calls Morrison "my mentor." He says that Morrison "is able to incorporate ideas not classically related to renal physiology or biochemistry and glean information or concepts that are useful to people studying the kidney. He has not been constrained by the traditional approaches."

Another of Morrison's former students agrees. Donald Kennerly, M.D./Ph.D. '80 and FHS, is currently assistant professor of internal medicine at the University of Texas Health Science Center in Dallas. A 1985 recipient of the Pfizer Scholar Award, Kennerly is an allergist who did the principal part of his research training here under Charles W. Parker, M.D. '53, professor of medicine and microbiology/immunology, but spent part of his time as a senior resident in medicine in Morrison's lab. "Aubrey taught me everything I know about high-pressure liquid chromatography," says Kennerly, "which has turned out to be an enormously important technique for my current research. Aubrey has mastered many techniques that enable him to ask the right questions — he's launched many interesting ideas that he and others have pursued. He permits independence in his junior people and is enormously supportive of their developing interests. Aubrey exhibits a nice blend of inquisitiveness and intuition in his science."

Intuitive Approach

Morrison's long-time technician Nina Pascoe, who recently moved to California, echoes these sentiments: "We often used to do pilot experiments, maybe only three or four, and then go on to other, unrelated work. Some years later, we'd be working on something else, and he'd ask me: 'Do you remember when we did such-and-such? Well, it's related to what we're doing here because...'. And of course, I wouldn't remember and would have to check my records to see what he was talking about. I would be so much in awe of his ability to remember that work from long ago and apply it to what we were then doing."

"[Dr. Morrison] is very intuitive about his work and has a phenomenal memory. He's able to integrate all these various data because he's always thinking about the implications of even long-ago or seemingly unrelated work. Naturally, when you're in the thick of doing experiments, as I was, you'd get hung up on the details; he'd be making the overall connections."

Yet Morrison is more than a busy clinician and top-notch researcher. He's a good-natured man who always had to be reminded by Pascoe to let her do the mundane tasks like photocopying or coming in...
Some hormones don’t produce effects directly but instead stimulate the production of “second messengers” — small molecules that ferry the hormone’s “message” into the cell. Here, bradykinin interacts with its receptor at the cell surface. This interaction triggers the activation of a regulatory protein (GNRP), which in turn activates an enzyme (PLC₂). PLC₂ catalyzes the breakdown of a small molecule (PIP₂), generating two other substances — DAG and IP₃. IP₃ mobilizes calcium; DAG activates an enzyme called protein kinase C and generates prostaglandins, the hormone-like “second messengers” responsible for bradykinin’s ability to cause the swelling and pain associated with injury.

(Illustration by Tony Lasordo)

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on weekends to feed animals. And Pascoe remembers the years when Morrison’s wife, Beverly, now in private practice, was a medical student and later a member of the house staff at St. Luke’s Hospital: “No matter how busy he was in the lab, whenever any of their children got sick or needed a parent at a school conference, he was the one who took care of it. Certainly, without a spouse like him, his wife couldn’t have taken on medical school while having young children to care for. I often wonder how they were able to manage during those years.”

For his part, Morrison can’t point to anything in his background that suggested he would be here, doing what he’s doing today: “I was born and raised in British Guyana,” he reminisces. “My father’s grandfather had emigrated there from Portugal. My father, who was a teacher and administrator, told all five of his children: ‘Anything you do, you should do your best at.’ And he was certainly the driving force behind my professional education.”

After completing medical school in Dublin, where he became interested in renal medicine, he came to the United States as a foreign medical school graduate knowing how difficult it was to get into a good residency and prepared to repeat work he had already done, if necessary, to prove himself.

“I had a friend whose father was on the faculty at Hopkins. Although I at first wanted to go to a hospital in Newark for my training, my friend’s father advised me not to. He told me to apply to Washington University, saying it was an excellent school every bit as good as Hopkins. And he advised me not to apply for a straight internship in medicine because I probably wouldn’t get it. Instead, he said, ‘go for a rotating internship; once you’re in, if you’re any good, it will be recognized.’ So that’s exactly what I did. I was in a rotating internship the last year the program was in existence.

“It had not been the tradition of the Department of Medicine to pick a student from a rotating internship to go into straight medicine. But I sent in an application anyway, and forgot about it. One day Carl Moore called me in and told me I’d gotten my medicine residency, and that I didn’t have to start all over as an intern. I was elated.

“I was finishing my residency just as Dave Kipnis was taking over the department. I’d only met him once. One day he called me into his office to talk over my long-term goals, and I was afraid I’d done something wrong. It was at that point he offered me chief residency, and it came as a complete surprise.”

It was Kipnis’ encouragement that sent Morrison to Needleman for basic science training after he had completed a fellowship in renal medicine with Klahr. The rest, as they say, is history.

The future looks bright for Morrison and his leadership of clinical pharmacology, not only because of the support he’s received from the university, but also because of companies like Burroughs-Wellcome and Monsanto, which are interested in biomedical pharmaceuticals: “Industry will definitely play an important role in the future,” he says. “We hope to develop medically useful pharmaceuticals for these companies to market. I think the fact that Burroughs-Wellcome was willing to fund this kind of endeavor attests to the fact that the pharmaceutical industry is very interested in supporting the unique kind of basic and clinical work that we do here.”
In spring, a young man's fancy turns, according to the Muse. But spring at the School of Medicine brings to young men and women more than relief from winter and the promise of warm weather... there's also the promise of at least three years' additional work during their residency.

Match Day 1986 brought few surprises. Of the 115 fourth-year students, 112 sought residencies; two opted for research. Only one did not match to a residency.

“This is the first time we’ve had only one unmatched student in the past decade,” remarks Elmer B. Brown, M.D., associate dean for continuing medical education. Typically, anywhere from five to 12 students in a class of around 130 will not match. This year, says Brown, he took a slightly different tactic, and it seems to have paid off: “I went through every student’s file and contacted those who had applied to only three or fewer places—usually, I don’t do that for the whole class. And I explained to each of those that unless they were certain of their plans, they needed more than three applications to increase their chances of a match.

“But if external circumstances have changed traditional match patterns, it’s been very subtle,” he continues. “In both the places they’ve selected and in their specialty choice, our graduates continue to fit established patterns.”

This year’s smaller-than-normal class may be more parochial than in years past. Nearly half will be staying at Washington University for their residency or research. Associate Dean John Herweg, M.D., suggests that there are several factors at work: “This is our smallest class in at least a decade,” he says. “We have fewer than the usual number of M.S.T.P. [M.D./Ph.D.] students finishing this year, and several students are spending an extra year in order to finish the research required for the M.A./M.D. program. In addition, the medical schools in North and South Dakota, from whom we used to get several transfers in the junior year, are admitting fewer freshmen and thus not transferring as many to other medical schools.”

Herweg thinks that the record number of graduates electing to stay at the medical center may be due in part to the growing number of two-career families represented in the medical school classes: “If the spouse of a medical student has a good job, which they often do, it’s harder to pick up and leave, and it’s expensive to move, even if you do it yourself. And certainly, we have superb training programs here, which the students know. So all in all, it will be interesting to see if this develops into a trend.”

One trend that seems to be growing among medical students across the country — indebtedness — is mirrored at Washington University. Among graduating students at the School of Medicine, an all-time record was achieved this year. “For the first time ever,” says John Walters, assistant dean, “one of our graduating stu-
Students have a debt that exceeds $70,000. That’s an all-time high.” Walter’s says that there has been a dramatic shift overall — fewer students fall into the lower ranges of indebtedness, while more owe significant sums. “This year, 14 graduates fall into the debt range of $50,000 to $59,000,” says Walters. “Last year, there were only two in that category.”

But if student indebtedness is on the upswing, it hasn’t influenced graduates’ specialty choices. This year’s pattern is fairly typical of past years. Only four students have opted for a transitional residency; 10 chose either preliminary medicine or preliminary surgery. This, says Brown, is due at least in part to the decline in the number of quality programs for transitional residencies: “Often, a person taking a year of service in a variety of specialties is not given the same attention as someone who’s taking a full year of medicine, for example. Many top-notch places have recognized this and stopped offering transitional residencies. The trend is to turn to family practice residencies instead.”

Surgical residencies were the choice of 18 of the graduating seniors. Internal medicine attracted 43. Fifteen picked pediatrics. Psychiatry attracted six students; obstetrics/gynecology, five. Three students chose family practice, and two picked anatomic pathology. Urology, ophthalmology, pathology, clinical pathology, diagnostic radiology and anesthesiology each attracted one student.

Arizona
Tucson
University of Arizona, Affiliated Educational Program
Donald Kirkpatrick, Internal Medicine

California
Los Angeles
Martin Luther King Hospital
Eric Pitts, Internal Medicine
UCLA Medical Center
Charalabos Chrysikopoulos, Internal Medicine Preliminary
Veterans Administration Hospital (Wadsworth)
Michael Gornet, Internal Medicine Preliminary

Oakland
Kaiser Permanente Medical Center
Marissa Bartlett, Pediatrics

San Diego
Mercy Hospital
Margaret McCracken, Internal Medicine
University of California—San Diego Affiliated Hospitals
James McFeely, Internal Medicine

San Francisco
University of California Hospitals
Nancy Bartlett, Internal Medicine

Stanford
Stanford University Hospitals
Ted Usdin, Psychiatry

Colorado
Denver
Mercy Medical Center
Bruce Herman, Family Practice
Presbyterian St. Luke’s Medical Center
David Boggs, Transitional University of Colorado Affiliated Hospitals
W. Daniel Kovarik, Pediatrics
Michael Presti, General Surgery

Florida
Gainesville
University of Florida Medical Center
Maureen Frikke, Pathology

From left: Trevor Axford, John Frattini, Phillip Rauk and Ashi Daftary share congratulations.

Miami
Jackson Memorial Hospital
Mark Belew, Orthopedic Surgery

Illinois
Chicago
Cook County Hospital
Tom Reinsel, Orthopedic Surgery
McGaw Medical Center of Northwestern University (Evanston)
Brian Smith, Transitional Michael Reese Hospital
Allan Anderson, General Surgery
Hitesh Chokshi, Internal Medicine
Sharon Karp, Internal Medicine
Paul Weisman, Internal Medicine
Mount Sinai Medical Center
Anthony McCloud, General Surgery

Indiana
Indianapolis
Indiana University Medical Center
John Powell, General Surgery

Kansas
Kansas City
University of Kansas Medical Center
Donald Carter, Surgery Preliminary

Louisiana
New Orleans
Tulane University Affiliated Hospitals
Waldo Bracy, Internal Medicine

Maryland
Baltimore
Johns Hopkins Hospital
Michael Clark, Psychiatry

Massachusetts
Boston
Brigham & Women’s Hospital
Trevor Axford, General Surgery
Daniel Hechman, General Surgery
Children’s Hospital
David Wilson, Pediatrics

From left: Trevor Axford, John Frattini, Phillip Rauk and Ashi Daftary share congratulations.
Troy Scroggins searches for his match from among 112 on the stage in Cori Auditorium.

Massachusetts General Hospital
  Michael Seiden, Internal Medicine

Michigan
Ann Arbor
  University of Michigan Affiliated Hospitals
  Kenneth Lown, Internal Medicine

Grand Rapids
  Butterworth Hospital
  John Lubben, Surgery
  Preliminary

Minnesota
St. Louis
  (Washington University Medical Center)

Rochester
  Mayo Graduate School of Medicine
  Charles Sims, General Surgery

Missouri

St. Louis
  Barnes Hospital
  Carl Allen, Obstetrics & Gynecology
  Matthew Arquette, Internal Medicine
  Jeffrey Barteau, General Surgery
  Steven Bello, Otolaryngology (Research)
  Carl Berg, Internal Medicine
  Paul Buse, Internal Medicine
  Andrew Chan, Internal Medicine

  Michael Christensen, Obstetrics & Gynecology
  Wilson Compton, Psychiatry
  Ashi Daftary, Obstetrics & Gynecology
  Gregory D не,l, General Surgery
  Daniel Dye, Psychiatry
  Bradley Evanoff, Internal Medicine
  Kirsten Fleischmann, Internal Medicine
  John Frattini, Internal Medicine
  Rachel Haft, Internal Medicine
  Baron Harper, General Surgery
  Renee Kanan, Clinical Pathology
  Michele Koo, General Surgery
  Michael Korenfeld, Ophthalmology (Research)
  Lyn McDivitt-Duncan, Anatomic Pathology
  Timothy McDonnell, Anatomic Pathology

  Michael Molleston, General Surgery
  Rebecca Peck, Internal Medicine
  Phillip Rauk, Obstetrics & Gynecology
  Gordon Robinson, Psychiatry
  Andrew Rouse, General Surgery
  Daniel Slawski, General Surgery
  Clark West, Internal Medicine
  Alison Whelan, Internal Medicine

Children's Hospital
  Lawrence Bergman, Pediatrics
  David Callahan, Pediatrics
  Kathleen Hanlon, Pediatrics
  Robert Hayashi, Pediatrics
  Leslie Lang, Pediatrics
  Juanita Stumpp Loftus, Pediatrics
  Jean Molleston, Pediatrics
Michael Potter, Pediatrics
Jewish Hospital
Christopher Bodine, Internal Medicine
Steven Dawson, Surgery Preliminary
Judith Dibble, Internal Medicine
James Donnelly, Internal Medicine
Allen Evans, General Surgery
Kathy Faber-Langendoen, Internal Medicine
James Goldring, Internal Medicine
Fredric Gross, Internal Medicine
Ajith Kumar, Internal Medicine
Marek Mirski, Internal Medicine
John Nordlund, Internal Medicine
James Schiro, Internal Medicine
Steven Shields, Internal Medicine
Susan Sullivan, Internal Medicine
James Wu, Surgery
Washington University School of Medicine
Jay Yang, Neurobiology (Research Associate)
Deaconess Hospital
Jerry Menikoff, Transitional
St. John's Mercy Medical Center
David Johnson, Transitional
St. Luke's Hospital
Edward Buschmiller, Internal Medicine
St. Mary's Health Center
Steven Anolik, Internal Medicine Preliminary
Jeffrey Judd, Internal Medicine Preliminary
Mark Kory, Internal Medicine Preliminary

North Carolina
Durham
Duke University Medical Center
Ian Christoph, Internal Medicine

Ohio
Cincinnati
Cincinnati General Hospital
Michael Ho, Pediatrics
Jewish Hospital
Curtis Morrison, Internal Medicine Preliminary

Toledo
Medical College of Ohio
Laurel Harkness, Obstetrics & Gynecology

Oregon
Portland
Oregon Health Sciences University
Michelle Butzer, Pediatrics

Tennessee
Memphis
University of Tennessee College of Medicine
Troy Scroggins, Internal Medicine Preliminary

Texas
Dallas
University of Texas SW Medical School
Michael Cher, Urology
Galveston
University of Texas Medical Branch
Douglas Winter, Anesthesiology

Houston
Baylor College of Medicine
Robert Bennett, Internal Medicine

San Antonio
Wilford Hall USAF Hospital
R. Bryan Graveline, Internal Medicine

Utah
Salt Lake City
University of Utah Affiliated Hospitals
Raoul Nelson, Pediatrics

Washington D.C.
Washington Hospital Center
Robert Wolverton, Internal Medicine

Wisconsin
Madison
St. Mary's Hospital, University of Wisconsin
Bradley Roter, Family Practice

New York
New York
Presbyterian Hospital
Eric Stevens, Internal Medicine

Rochester
University of Rochester Associated Hospital Programs
 Mitchell Strominger, Internal Medicine

Syracuse
SUNY, Upstate Medical Center
Peter Bushunow, Internal Medicine

Kirsten Fleischmann, John Lubben and William Monaco scan Match Day listings.
America is undergoing a profound demographic transformation that will be, without question, the issue of the 21st Century. During that century, old may be pitted against young in civil combat over national priorities and the division of governmental services.

Today, one in nine citizens is an older American. By the year 2000, the ratio will be one in six, and by the year 2020, one in four. Most significantly, the very old — those over age 85 — are projected to triple between 1980 and 2020 and increase seven times between 1980 and 2050.

Americans are healthier and living longer, an eloquent testament to the marvels of medical science and improved health care for the elderly over the last two decades. We revel in these successes and eagerly seek new frontiers to conquer. Genetic engineering and recombinant DNA technology may unlock the mysteries of all 3,000 hereditary diseases; someday, these tools may allow detection of genes that predispose certain people to heart disease, cancer, and diabetes. From that explosion of knowledge may come undreamed-of treatments, cures, and even greater longevity. These medical and scientific advances are not unalloyed blessings; they carry enormous cost implications. As more of us live longer, how do we pay for the pensions and Social Security benefits that already have the federal government tied up in knots? How do we pay for the improved medical care that science has given us?

Of the over-85 population, more than 70 percent will be women living alone, with little income other than Social Security. The demand for health care from this age group — some 77 percent more Medicare benefits per capita go to this group than those aged 65 to 69 — will push health spending higher than federal outlays for retirement programs.

In 1985, national defense, health and retirement programs for the elderly, and interest on the national debt, accounted for 77 percent of all federal spending. By the end of the decade, those programs will consume 90 percent of the budget. Keep in mind, these figures reflect projected program costs before any of the baby boomers, who are now entering their forties, reach elderly status. In 2020, if present trends continue, and if the budget remains at the same percentage of GNP here is what the federal budget will look like:

- 2/3 for the elderly — Social Security, pensions and health;
- 1/3 for defense;
- a little something for interest on the debt;
- NOTHING ELSE!

Are we a society willing to live with those spending priorities?

Changing Times

When I entered the U.S. Senate seventeen years ago, the nation was caught up in an era of infinite expectancy. Whatever needed to be done, could be done, would be done. And if the private sector or the states or the local governments wouldn't or couldn't, the federal government would, no matter what the problem.

I entered the Senate convinced that timely government action could redress all grievances, solve all ills, and distribute the benefits necessary to make life and liberty more decent and meaningful for everybody. As I leave the Senate, I no longer believe that any government, no matter how humane and altruistic its impulses, has within its power and its purse the wherewithal to solve all of mankind's dilemmas. We no longer live in an era of infinite expectancy, but in an era of finite resources that have to be cautiously allocated among inexhaustible, competing demands.

Health care services and health research are classic examples of areas in which government will have to restrain itself and cease being the inexhaustible cash register it once was. As our nation ages, as our post-WWII baby boomers become retirees, as the genius of medical science keeps us all living longer — sometimes beyond anything that could be called useful life — we will amass retirement costs for the elderly that even a rich nation is strained to pay.

As we develop new and incredibly expensive medical techniques, we will amass health care costs that even a rich nation cannot afford to pay. A liver transplant costing $120,000 — and a pancreatic transplant costing $25,000 to $40,000 — will be limited not only by organ availability, but by cost.

Keeping Costs Down

I was in the Senate back in 1972 when the Medicare actuaries made an off-the-wall, bizarre estimate: A nationwide program of kidney dialysis and transplantation would cost $90 million to $110 million each year. That seemed a modest sum to maintain life for the thousands of Americans with chronic renal disease. So the Senate...
voted 52–3 for a program to bring kidney disease treatment within the reach of every man, woman, and child in need. Today, the cost is $3 billion.* If we were contemplating the starting of the program today, we wouldn't do it — simple as that; no money.

Perhaps the most discussed topic in medicine today is the artificial heart, work of Drs. DeVries and Jarvik. No facet of medicine (except perhaps AIDS research) has received more media coverage. Assume Drs. DeVries and Jarvik had been ready to transplant a permanent artificial heart in 1972 instead of 1982. There would have been a race in Congress to be the first to propose massive new funds for a "targeted" research program on the artificial heart and extending full federal coverage to heart transplant recipients of any age. Such proposals may well have been enacted and would be in place today, at incalculable cost.

But it is not 1972, and today there isn't a peep from Congress about broadening federal medical programs to cover heart transplants. Why? Simple — no money. In health care, like everything else except defense spending, the guide words are: NO NEW STARTS!

There are a number of reasons for this: 

1. The era of finite resources, we are forced to confront the question: Can we afford all that?
2. How do we ration organs, services, and federal dollars?
3. How do we ration the medical care of a person, usually elderly, who has Alzheimer's disease? Do we pay for it at the expense of an education for a young black kid in north St. Louis who might then escape the cruel confinement of perpetual destitution?
4. How do we save Jamie Fisk but let Joey Jones die?
5. Economist Lester Thurow has written, "Like it or not, Americans are going to have to come to some social consensus concerning the trade-offs between costs of medical services and the life-extending benefits that result. Our basic problem is that somehow we are going to have to learn to say no." It's not an approach to health care that appeals to many Americans.

Tough Choices

Consider the following cases:

1. Clinicians will continue to face the agonizing choice: Who gets the organ when not everyone can? They may increasingly have to require advance payment or insurance coverage.
2. Jamie Fisk is now a healthy preschooler with a bright future because her father had the determination and know-how to make her need for a liver transplant into a national media story. Her transplant costs were $200,000. But how many other Jamie Fisks are out there who can't come up with the $200,000 for surgery?
3. More than 400 counties in the United States have no doctor at all. Poor and elderly sick residing in those areas who can't afford transportation have virtually no access to health care.
4. The recently implemented Medicare prospective payment system fixes an amount government will pay a hospital for the care of an elderly person with a particular condition. When an elderly patient consumes that pre-set amount, he or she — fully well or not — is often discharged.
5. Illinois' efforts to curb soaring Medicaid costs are reducing payments to a level where a major teaching hospital publicly admits turning away indigent pregnant women with high-risk deliveries.
6. The State of Texas recently passed an emergency-room statute requiring that, at a minimum, emergency care be provided to those in need of such care, regardless of income. This action came after State officials documented five deaths of persons who had been turned away from emergency rooms because of their lack of insurance and ability to pay.
7. A 1984 Urban Institute study estimated that 20 percent of Americans — 48 million — are without any form of health insurance.

These are all cases of rationing, pure and simple. And they demonstrate that we already have various kinds of rationing in this country. But no one likes to admit it. We all stand by and watch quietly while some of the elderly and most of the poor fall through the cracks. How many more people will have to fall through before we, as a nation, start to address this question?

The truth is, we don't have the money to provide everyone with the miracles from modern medicine. And we lack the consensus wisdom to decide, in the absence of adequate resources, who should live and who should die.

In the era of infinite expectancy, the answer was: Let medical science do its thing; when all the cures are found, somehow there will be a way to pay for them. In this era of finite resources, we are forced to confront the question: Can we afford all that medical science invents, and if we can't, how do we ration it?

How do we ration organs, services, and federal dollars? How do we ration the medical care of a person, usually elderly, who has Alzheimer's disease? Do we pay for it at the expense of an education for a young black kid in north St. Louis who might then escape the cruel confinement of perpetual destitution?

Senator Eagleton will be University Professor of Public Affairs at Washington University beginning in January 1987.
Harvey R. Colten, M.D., has been appointed head of the Department of Pediatrics at Washington University School of Medicine. Colten replaces Philip R. Dodge, M.D., who is stepping down after 19 years as department head to pursue his research interests in pediatric neurology.

Colten is the Harriett B. Spohrer Professor of Pediatrics. Formerly, he served as professor of pediatrics at Harvard Medical School, as well as chief of the Division of Cell Biology and director of the Cystic Fibrosis Program at Children's Hospital Medical Center in Boston.

Colten will serve as pediatrician-in-chief at Children's and Barnes hospitals, and he has a clinical appointment at Jewish Hospital.

In June 1985, the School of Medicine celebrated the establishment of the second Alumni Endowed Professorship (AEP) and decided it should be placed in the Department of Pediatrics. That, according to Colten, was a key reason for deciding to leave Harvard and to come to Washington University: "I've been quite happy in Boston," says Colten. "But having the Alumni Endowed Professorship in the department was one of the tangible bits of evidence of the confidence that the Dean and the medical school had in me and the future of pediatrics. It was one among many positive features of the Washington University School of Medicine. The Alumni Endowed Professorship helps in recruiting and retaining a vigorous faculty. It's very gratifying."

Colten had been at Harvard since 1970 and was chief of the allergy division at Children's Hospital Medical Center from 1973–76. His career has included academic appointments at George Washington University Medical School and the National Cancer Institute. His research has focused on the biochemistry and cell biology of inflammation in such disorders as cystic fibrosis, arthritis, asthma, juvenile diabetes, autoimmune diseases, and inflammatory bowel disease.

For his part, Colten is impressed with Washington University's medical alumni: "This kind of endowment [the Alumni Endowed Professorship] is a testament to the wisdom of the alumni. It suggests that alumni recognize academic excellence and want to further it."

In the past year, says Colten, new heads of pediatrics have been appointed at several academic medical centers. "We're a different breed from researchers of previous decades," he muses. "Today, pediatric research cuts across disciplines, affecting diseases of all organ systems, and control of growth and development."

The AEP is a testament to Colten's track record, but it is also a tribute to the tireless work of Marvin E. Levin, M.D. '51, the members of the School of Medicine's Eliot Society committee that he chairs, and the alumni. Medical Eliot Society funds support the professorships. In only two years, Levin and his committee secured the endowment for the second AEP by enlisting 145 new members. What's more, the medical school's alumni and friends have responded to Levin's committee with gifts needed to fund the third AEP just since July 1985. The goal is to eventually endow one AEP in each of the School of Medicine's 18 clinical and preclinical departments.

The first AEP was awarded to Philip Needleman, Ph.D., head of pharmacology, in 1982. Needleman was already a member of the WU faculty. M. Kenton King, M.D., dean of the WU School of Medicine, thinks that future AEPs will be invaluable as a reward for key faculty or as a prime recruiting tool: "An endowed chair is a terrific drawing card in recruiting outstanding faculty. Financial support from our alumni in such a program is a most valuable asset for the future of the school."

Harvey Colten's administrative duties as head of pediatrics don't keep him from enjoying a visit with a patient at Children's Hospital.
Six Alumni Receive Awards at Reunion

The highlight of the medical alumni reunion 1986, held May 1-3, was the presentation of the alumni achievement/faculty awards. This year, the six honorees were feted at a banquet presided over by Nicholas T. Kouchoukos, M.D. '61, president of the alumni association for 1985-86.

Robert M. Filler, M.D. '56 cum laude, is a pediatric surgeon who captured world attention two years ago when he separated conjoined twins at The Hospital for Sick Children in Toronto, where he is surgeon-in-chief. Filler's 43-member team took 17 hours to separate two-and-a-half year old Lin and Win Htu, whose bodies were fused in a Y-shape at the abdomen and pelvis. The Brooklyn native was profiled in Outlook as the "Silhouette" feature, Summer 1985.

Filler is also professor of surgery and pediatrics at the University of Toronto, consultant in pediatric surgery at The Princess Margaret Hospital in Toronto, and consultant for the division of pediatrics at Women's College Hospital in Toronto.

Thomas F. Hornbein, M.D. '56, is upwardly mobile, both professionally and personally. Professor of anesthesiology and physiology/biophysics at the University of Washington School of Medicine in Seattle, he was a member of the first American expedition to climb Mount Everest, which took place in May 1963. His ascent was via the West Ridge of the mountain, considered to be the most difficult route.

Hornbein heads UW's Department of Anesthesiology and is a research affiliate for the school's primate center.

Named to Phi Beta Kappa and Alpha Omega Alpha, he recently received the Distinguished Teaching Award at UW. His professional affiliations include the American Physiological Society, American Society of Anesthesiologists, Association of University Anesthetists and the Institute of Medicine.

Kenneth E. Pletcher, M.D. '36, doesn't expect his classmates to salute him, despite the fact that he's spent his life in the military. Currently Lieutenant General (ret.), Pletcher was Surgeon General of the United States Air Force from 1966–70. Currently, he is vice-president and associate medical director for Mutual of Omaha in Nebraska.

Pletcher began his military career in 1940. He served as deputy surgeon, First Air Division, in the Pacific Theater. After the war, he returned overseas and established the first training school for aviation medicine officers at Hangchow. He has had a long and distinguished career in the diplomatic corps, serving as air attaché at the U.S. Embassy in London — the first medical officer in the Air Force to be assigned that role.

Pletcher holds two world records in skeet shooting and was a member of the all-American skeet team's senior division from 1969–75. He also served as a member of the U.S. Olympic Committee from 1973–76.

Marvin E. Levin, M.D. '51, is a man with two aims in life — to help diabetic patients avoid the ravages of that disease, and to help his beloved alma mater continue its tradition of quality teaching in its medical curriculum. Professor of clinical medicine at the School of Medicine, Levin is also associate director of the Metabolism/Diabetes Clinic and is on the staffs of Barnes, Jewish and Children's hospitals.

His international renown in endocrinology is bolstered by his strong support of dietary management of diabetes, a stance that has been lauded by many dietitians whom he in turn has served as mentor. He is one of few American endocrinologists to have taught at universities in China.

For the past three years, Levin has chaired the School of Medicine's Eliot Society. Under his leadership, the society completed the second Alumni Endowed Professorship, which is in pediatrics.

Philip W. Majerus, M.D. '61, has spent all his professional life at the School of Medicine, from which he was graduated magna cum laude. Professor of medicine and biochemistry and director of the division of hematology, Majerus is principal investigator and director of the Washington University Specialized Center for Research in Thrombosis.
Sidney F. Pakula, M.D. '29, was honored last fall as the first recipient of the Humanitarian Award of the Friends of CASA (Court-Appointed Special Advocate). CASA is sponsored by the Greater Kansas City Section of the National Council of Jewish Women. The program helps abused and neglected children.

Pakula is a Kansas City pediatrician who has been in practice over 56 years. He was medical director of the Jackson County Juvenile Justice Center and is still active there.

During his 40 years in private practice, Pakula headed pediatrics at Children's Mercy Hospital and Menorah, Baptist and Research medical centers and the medical staffs of Menorah and Children's Mercy hospitals. In 1972, he began teaching pediatrics at Children's Mercy and at the University of Missouri-Kansas City School of Medicine, where he served as professor of pediatrics and adolescent medicine and docent for second-year medical students. He continues to serve as clinical associate professor of pediatrics at the University of Kansas Medical Center, Kansas City.

Eugene M. Bricker, M.D. '34, delivered the presidential address at the 105th Annual Meeting of the American Surgical Association. Bricker, professor emeritus of surgery at Washington U., reviewed the work that has been done on cancer since the time of Galen.

His address was published in the *Annals of Surgery*, September 1985.
Vergil N. Slee, M.D. '41, FACP, is editor of Health Care Terms. The book is a glossary for health care administrators. Slee founded the Commission on Professional and Hospital Activities and is now a consultant in hospital quality management. He served for over 20 years on the staff of Estes Park Institute, which presents conferences for hospital administrators. He is a Fellow of the American Public Health Association and an honorary fellow of the American College of Healthcare Executives.

Ceylon S. Lewis, M.D. '45, FACP, is the president of the American College of Physicians. A Tulsa, OK, cardiologist, Lewis has been active in the ACP for 10 years. He is clinical professor of medicine at the University of Oklahoma (Tulsa) Medical College.

Among his many professional activities, Lewis has served as president of the Tulsa County Medical Society, the Oklahoma State Medical Association, vice-president of the American Heart Association and a member of the Institute of Medicine. He is the former medical director of St. John Medical Center.

Gladden Elliott, M.D. '46, was one of 13 citizens of San Diego to be honored as Citizen of the Year by the City Club and Junior Chamber of Commerce. Elliott, nominated by the San Diego County Medical Society, is a former president of that organization and continues to serve on its various committees. His professional affiliations include the California Radiological Association and the California Hospital Association.

After graduating summa cum laude from the university, he served as a captain in the U.S. Air Force. His civic activities include past presidency of the Tuberculosis & Health Association and the La Mesa Chamber of Commerce.

James E. Darnell, M.D. '55, wrote “RNA,” published in the October 1985 issue of Scientific American. Darnell is Vincent Astor Professor at Rockefeller University.

After completing medical school, he joined the staff of the Laboratory of Cell Biology at the NIH. In 1961, he moved to Massachusetts Institute of Technology, and three years later joined Albert Einstein College of Medicine in New York. After a six-year tenure at Columbia University, he took up his present position at Rockefeller.

John Stone, M.D. '62, has received the 1985 literary award from the Mississippi Institute of Arts and Letters for his latest book of poems, Renaming the Streets. Former winners of this prize, awarded annually to the best work of literature by a Mississippian, include notables such as Ellen Gilchrist and Walker Percy.

Stone is associate dean at Emory University medical school. His clinical expertise is in emergency medicine.

Roslyn Kaplan Yomtovian, M.D. '74, FHS, was the subject of a front-page article published in the St. Cloud (MN) Times. Yomtovian is central Minnesota's authority on AIDS and a pathologist at St. Cloud Hospital, where she is director of the blood bank. She instituted an autologous blood transfusion program there and has spent much time recently addressing publicly the subject of AIDS.

Yomtovian was an intern at The Jewish Hospital in St. Louis and completed a pathology residency at University of Minnesota Hospitals. She is a graduate of Case Western Reserve University.

Linda A. Hershey, M.D. '75, and Charles Owen Hershey, M.D. '77, will be leaving Ohio for New York this summer. At State University of New York (Buffalo), Linda will be an associate professor of neurology and pharmacology. Charles will head the division of general internal medicine at Erie County Medical Center in Buffalo.
Michael J. Isserman, M.D. '75, is president of the St. Louis Ophthalmological Society. He is a diplomate and fellow of the American Academy of Ophthalmology and is clinical assistant professor of ophthalmology at Washington U.

Kenneth S. Moss, M.D. '76, has been appointed chairman of the division of anesthesiology at St. Thomas Hospital Medical Center, Akron, OH.

Charles Gluck, M.D. '78, was the subject of an article in the Miami Herald. Gluck is a gastroenterologist who is also a stand-up comic. While a medical student, he performed a balancing act for hospitalized children, billing himself "The Human Seal."

John H. Kissel, FHS, was the subject of a feature article in the St. Louis Post-Dispatch on April 22, 1986. Kissel was named last summer as medical director of the new public hospital, the St. Louis Regional Medical Center, and its five outreach clinics. Regional takes the place of St. Louis City and Homer Phillips hospitals.

Before joining Regional, Kissel was a member of the faculty at Washington University. He is a 1971 cum laude graduate of Harvard Medical School. He served with the U.S. Public Health Service in rural northern New Hampshire. Subsequently, he spent three years at the old St. Louis City Hospital as chief resident and assistant medical director. He also worked in the clinic at St. Luke's-East.

MaryBeth Pereira, FHS, has been appointed director of rehabilitation medicine at Jewish Hospital in St. Louis. Pereira succeeds Franz U. Steinberg, who founded the division and served as its director for 28 years.

Pereira received her medical degree in 1978 from the University of California at San Diego. After completing residency at Jewish Hospital, she was appointed chief medical resident in 1982. From 1982–4, Pereira was a fellow in rheumatology at Washington University, where she currently is assistant clinical professor of medicine. She is board-certified in internal medicine and rheumatology.

Harold H. Sandstead, FHS, a distinguished researcher in human nutrition, has joined the medical branch of the University of Texas as professor and head of the Department of Preventive Medicine and Community Health. Previously, Sandstead was at Tufts University where he served as professor of nutrition and senior scientist and director of the USDA agricultural research service Human Nutrition Research Center in Boston.

Sandstead received his medical degree from Vanderbilt University School of Medicine in 1959. He completed residency in internal medicine at Barnes Hospital and Vanderbilt University Hospital. His worldwide scientific reputation is in trace mineral metabolism, particularly zinc.

H. Phillip Venable, FHS, has been elected a member of the Oxford Ophthalmological Congress, an organization founded in 1909 by Robert Doane. His membership derives from a presentation Venable made to the Congress in 1984, describing his work on pseudotumor cerebri. He will journey to Oxford this summer to be inducted into the Congress.

Venable studied 169 patients with this condition and found that it has a genetic component. Common among middle-aged black women, and to a lesser degree among whites, the disease produces symptoms that mimic brain tumor. But its cause stems from an endocrinological imbalance and a defect in the arachnoid villi.

Venable, who has been in private practice of ophthalmology for 42 years and a staff member at Washington University since 1959, was honored by Barnes Hospital for 25 years of service. Prior to 1959, he was on staff at St. Louis University for 15 years.

Venable wrote the "Good Samaritan" bill, signed into law by former Governor Teasdale on June 5, 1979, that protects from subsequent liability physicians who aid accident victims. Currently, he has a special interest in AIDS and lectures on the subject in an attempt to separate the facts from the myths, especially in relation to blood donations.

A life member of the American Academy of Ophthalmology and the American College of Surgeons since 1978, he served for 23 years as associate examiner for the American Board of Ophthalmology and for seven years on the admissions committee at Washington University School of Medicine.

After receiving the M.D. from Wayne State University in 1940, Venable completed internship and residency at Homer G. Phillips Hospital in St. Louis.

Before entering medical school, Venable was a jazz musician and singer who worked with such notables as Ethel Waters and Duke Ellington. He was the subject of an Outlook cover feature story in Winter 1979.

FORMER HOUSE STAFF NOTES

John H. Holbrook, FHS, was given the Laureate Award by the Utah Chapter of the American College of Physicians. Holbrook, an international authority on the health effects of smoking, is associate professor of medicine in the University of Utah Health Science Center's Department of Medicine.

After graduating from the University of Utah, Holbrook served as medical officer with the U.S. Public Health Service in Maryland, where he prepared congressional reports on the health consequences of smoking. He completed residency at Barnes Hospital. Holbrook has been at the university since 1977 and has continued to contribute to the annual Surgeon General's Report on Smoking.

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Secretary
Yin and Yang

The Dual Career of Allan James Shapiro

By Candace O'Connor

In the paintings of Martin Wong, the colors and contrasts of Brooklyn spring vividly to life: the Hispanic grocer hawking melons in front of flashing beer signs; a ragged old man in the doorway of a lottery ticket outlet; children busy at swordplay next to a shop selling religious icons; the multi-national faces of people — rich, poor, despairing, criminal, laughing, hoping, doting on their children.

"There is that sort of yin and yang between the up and down sides of life: life in decay on the one hand and a sense of life growing on the other," says Allan James Shapiro, M.D. '73. He knows this tension well, seeing it every day in his work with pediatric cardiology patients at Brooklyn's Downstate Medical Center.

And after work, miles away from Brooklyn, he can ponder this polarity in its artistic form. Shapiro, 39, owns a six-year-old art gallery that displays the work of Wong and other contemporary artists. Called "Semaphore," it signals a new voice in the art world. But it is also the sign of a restless late-blooming art enthusiast. The only early hint came while he was a student at Stanford University and travelled to England with the Stanford Overseas Program. A biology major, he found himself prowling through museums and galleries, fascinated by his artistic discoveries.

But when he applied to Washington University School of Medicine, his thoughts were on pediatric medicine. A family friend, Samuel D. Soule, M.D. '28, emeritus clinical professor of obstetrics and gynecology, encouraged him to come. Soule introduced him to Philip R. Dodge, M.D., professor of pediatrics and of neurology/neurosurgery and former head of the Department of Pediatrics. That interview clinched Shapiro's interest in the school, already a favorite since his parents were native Missourians and his father a Washington University alumnus.

As a student, he was stimulated by his pharmacology courses, especially by teachers James A. Ferrendelli, M.D., Seay Professor of Clinical Neuro-pharmacology, and Philip Needleman, Ph.D., Alumni Endowed Professor and head of pharmacology. Intrigued by his work with such pediatric faculty as the late Antonio Hernandez, M.D., and James P. Keating, M.D., professor of pediatrics, he found it easy to choose a sub-specialty.

"One reason I selected pediatric cardiology is that it's an active sub-speciality in terms of the total involvement with the patient," Shapiro says. Most often, it also offers patients a good prognosis. "Children with heart defects, who would have died 30 years ago, now can be rehabilitated by open heart surgery. It is gratifying that so many children with significant problems can be repaired and put back on the road to health."

Staying on in St. Louis to complete his pediatric internship and residency at Children's Hospital, Shapiro moved to New York City in 1975 for fellowships in pediatric cardiology and clinical pharmacology at Babies Hospital, College of Physicians and Surgeons. By the time they were over, New York had charmed him. When a clinical and academic appointment developed at Downstate, he jumped at the chance.

As director of the Pediatric Cardiac Catheterization Laboratory and assistant director of the Pediatric Intensive Care Unit, he sees a range of patients: from children with benign heart murmurs whose families need reassurance, to those with congenital heart disease who require treatment or surgery. Whatever their condition, Shapiro prides himself on his personal concern: "Parents and children need a lot of support...
in dealing with these problems and I'm willing to give it," he says.

But six years ago, something happened to complicate his life. Offered an irresistible deal on a cooperative loft space downtown, he decided to leave his uptown apartment. He found himself half a block from Soho — and just a stone's throw from one of America's most flourishing art markets. For Shapiro, the sudden immersion was "exciting, rather intoxicating."

At the urging of a dealer-friend, he decided to become a private dealer himself and scheduled a showing in his own loft. With the opening three weeks away, though, the cooperative's board gave Shapiro a shock, voting to forbid the commercial use of building space: "I had to make a quick decision," he says. "I would either try to find gallery space in Soho, or give up the idea." He took the gamble.

**The Early Years**

"Struggle" best sums up the first few years, Shapiro admits with a laugh. In his Walter Mitty dream world, he says, he had imagined that a gallery might yield financial independence. "But for a few years, instead of being a boon to my income, it was an exercise in tax strategy."

All the time, though, Shapiro and director Barry Blinderman were learning as they went. Of the eight artists featured during the first year, only one remains on their roster. They have become aggressive in seeking out and marketing new talent. In addition to their shows, they send their artists' work to 40 or 50 other shows each year, as far away as Japan.

"There are plenty of art buyers who choose a painting to suit their décor," Shapiro says. "Others are collectors, who have a more developed eye; art history-oriented people who are seeking new ideas."

We have always taken the path of choosing work that would appeal to the collector."

At the moment, their three best-known artists include Wong, acclaimed for his vivid representations of city people and urban life. Last Christmas, he was asked to illustrate the Time Magazine cover story about poverty in Brooklyn. Vastly different in style is artist Robert Colescott, with his explicit images and "brassy" subject matter. "Anybody who's anybody in the art world knows the work of Bob Colescott," says Shapiro. The third is Duncan Hannah, whose work often finds a niche in corporate and private collections. "Hannah has a painterly way that makes him immediately popular to a broad audience," he says.

The work of recognized artists does not come cheap. Semaphore recently sold a Colescott painting to a Delaware museum for $16,000. A four-by-six Duncan Hannah might range from $6,000 to $8,000. But acquiring the work of less well-known figures is still possible for young collectors, Shapiro insists, beginning in the $300 to $1,000 range. He and Blinderman often act as consultants to novice buyers, steering them toward prudent investments.

His own art collection has also been growing steadily, gradually lining the walls of the loft that he shares with wife, Janna, an actress. Both a hobby and a business, art consumes much of Shapiro's free time, as he maintains contact with artists, attends openings and meets regularly with his partner to solve business problems.

This connection has added rich diversity to his life, Shapiro says, enabling him to make friends outside his profession. It also keeps him young, "since much of the energy in the art world comes from the youth who are involved."

Yet juggling such divergent interests is not for everyone, Shapiro admits: "I'm sure there are a lot of people who think I'm crazy to have done it." For him, though, it has been an adventure: "I just feel that the most exciting thing I can do, aside from practice medicine, is taken an active interest in the art scene."

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Mother and infant baboons of the desert variety are important to anthropologist Jane Phillips-Conroy. Her annual treks to Africa over the past 13 years have enabled her and collaborator Clifford Jolly to study over 500 animals. Using their index of differences between olive, desert and hybrid baboon varieties, they found that male and female desert baboons differ much more from each other than male and female olive baboons in external features, particularly mane development. The difference between males and females, called sexual dimorphism, may have evolved to such a high degree in desert baboons because of their unusual form of social structure (see story, “Into Africa,” page 12).