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The Rockefeller University

News and Notes

The Rockefeller University

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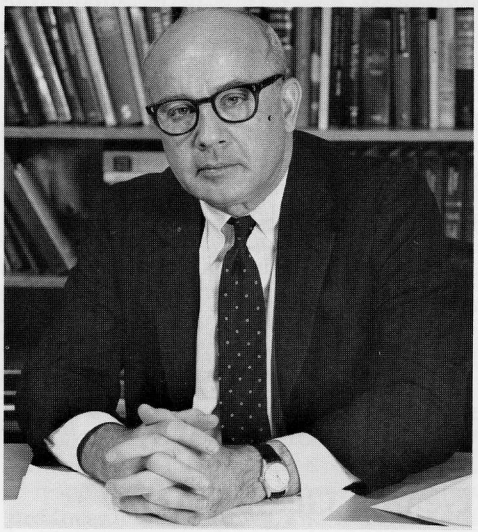
New Jaundice Treatment Provides Hope for Infants

The university's Laboratory of Metabolism-Pharmacology, headed by Professor and Physician-in-Chief Attallah Kappas, has begun a five-year international effort aimed at moderating or preventing severe jaundice in premature newborns and, thus, the neurological damage resulting from this condition. The laboratory recently received $2.17 million from the NIH to support basic studies and clinical trials.

Neonatal jaundice is caused by abnormal accumulations of bilirubin, a yellow bile pigment formed by the natural breakdown of the iron-containing, oxygen-carrying blood component heme. Heme is composed of a four-ring structure, called a porphyrin, with an iron atom at its center. The iron atom binds oxygen and transports it for use by the body's tissues, after which it binds oxygen again to initiate heme's breakdown to bilirubin.

By replacing the iron atom with other metals, of which tin has been found to be the most effective, oxygen can no longer bind to the porphyrin. Thus, the bilirubin-producing process is blocked. (See illustration on page 4.)

The use of tin porphyrins to inhibit bilirubin production is a new therapeutic approach developed by Dr. Kappas and his colleague Associate Professor George Drummond for the clinical management of severe jaundice in newborns. The Laboratory of Metabolism-Pharmacology is the only group in the country permitted by the Food and Drug Administration to conduct clinical trials using tin porphyrins. In fact, these trials are the first ever to use such compounds to treat human disease.



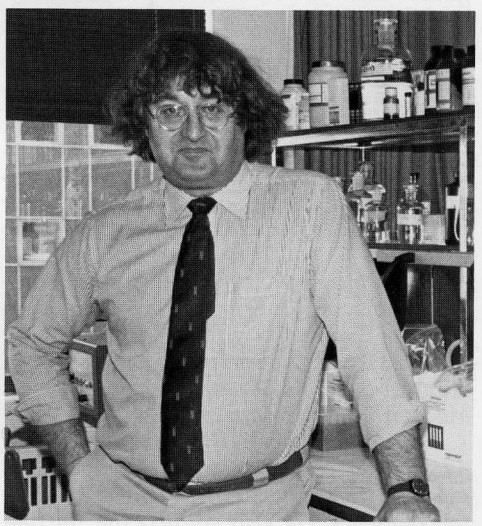
Professor Attallah Kappas

In newborn infants, the liver normally joins a sugar molecule to bilirubin so it can be excreted. However, due to the immaturity of this system in newborns and, sometimes, an accelerated bilirubin production due to other causes, many newborns are unable to process bilirubin efficiently. Consequently, it "spills out" of their livers into the blood, where it circulates, accumulating throughout the body and causing the skin to turn yellow. If left unchecked, this accumulation can eventually cause irreversible brain damage.

Since the early 1960s, jaundiced infants have been treated with phototherapy—a technique involving special lamps that transform bilirubin into substances that are easier for the body to excrete. However, debate surrounds phototherapy, particularly regarding the optimal duration of the treatment, which can last several days and requires the infant's eyes to be masked when exposed to the lamps for as long as eighteen hours a day. Because the infant must be separated from the mother, the treatment's effects on breast-feeding and the mother-child "bonding" relationship are also of concern.

Dr. Drummond notes that phototherapy also poses other practical problems. "For one

(See Jaundice, page 4)



Associate Professor George Drummond

McCarty Wins International Prize

Maclyn McCarty, professor emeritus of The Rockefeller University, has been awarded the 1990 Wolf Prize for Medicine, sponsored by the Israel-based Wolf Foundation. Dr. McCarty is being honored for his contributions to the demonstration that the material responsible for inherited traits is DNA, a discovery which ushered in the modern age of molecular genetics and made possible many of the current advances in biotechnology.

The Wolf Prize was established in 1975 by the late Ricardo Wolf to promote science and art for the benefit of mankind. Wolf, a German-born inventor and philanthropist who emigrated to Cuba, was an ambassador to Israel and died in Jerusalem in 1981. Each year the prestigious Wolf Foundation prize is awarded in the categories of medicine, physics, chemistry, mathematics, agriculture, and the arts.

McCarty and his colleague Colin Macleod were assistants in the laboratory of Professor Oswald Avery at the Rockefeller in the mid-1940s when the three published their seminal discovery describing a phenomenon they called transformation. Their studies centered on the smooth and rough families of the bacteria pneumococcus. The researchers succeeded in transforming the progeny of rough-type bacteria into smooth and demonstrated that the transforming agent was DNA.

Maclyn McCarty is the sole survivor of the three scientists who worked on transformation. The Wolf Foundation prize-awarding ceremony will take place on May 20, 1990. Dr. McCarty's award will be presented to him by the President of Israel, Chaim Herzog, at the Knesset (Parliament) in Jerusalem. □

Deleuse Named Director of Sponsored Programs

Pictured above (l to r) is the staff of the Office of Sponsored Programs: Tish Koyen, Betsey Deleuse, Brian Hardy, and Kassie Evashevski.

"Our primary goal is to serve the needs of our investigators in the preparation of their grant applications," says Betsey Wilder Deleuse, the new director of the Office of Sponsored Programs. After seven years as executive assistant to Vice President Rodney W. Nichols, Ms. Deleuse succeeds Mary Pat Nowack, who left the university for a job in Washington, DC, in February.

"Our job," notes Ms. Deleuse, "is to help investigators develop the budgets and administrative sections of their applications and to insure that each proposal is complete and meets the requirements of the various funding agencies."

Approximately fifty percent of the university's annual operating budget comes from proposals channeled through the four-person staff of the Office of Sponsored Programs. Last year the office processed approximately 450 investigator-initiated proposals.

With so many proposals being submitted, the office is under almost constant deadline pressure. The Public Health Service, for example, has deadlines for proposal submissions during all but three months of the year. Other sources of revenue, such as foundations, corporations, and other private agencies, all have their deadlines as well. "This is a very busy place," comments Ms. Deleuse.

Although the Rockefeller has an excellent history of having its proposals funded, most NIH grants awarded today provide about ten percent less than the amounts requested. As the money awarded per application decreases, the number of applications submitted through Sponsored Programs by Rockefeller investigators increases. In February alone, the office processed almost eighty applications—an increase of more than thirty percent over February of last year.

Another of the office's responsibilities is the constant search for additional sources of funding, such as previously untapped agencies or government monies set aside for special programs. They process postdoctoral fellowships and organize submissions of candidates for some university-nominated awards.

Although the pace of the office is hectic, Ms. Deleuse enjoys her new position and her "excellent and supportive" staff. In addition to her new duties in Sponsored Programs, she serves as an elected member and secretary of the Children's School Board and oversees the maintenance and scheduling of six of the university's pianos. □

Guest Investigator Segal Dies

John Robert Segal, a guest investigator at this university for the last decade, died at home on January 31 after a long illness. He was 56 years old.

As a biophysicist specializing in membrane transport, Dr. Segal worked in the Laboratory of Biophysics with the late Alexander Mauro. He was also employed as a research biophysicist at the Veterans Administration Medical Center in Manhattan since 1969.

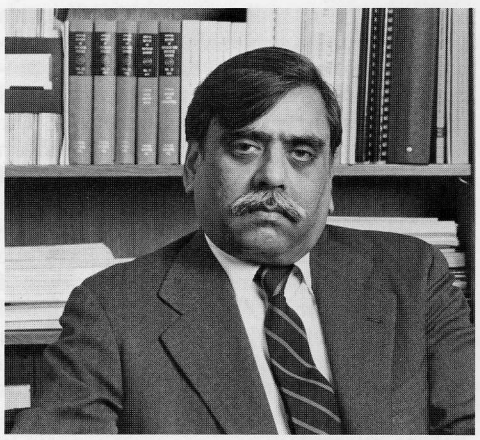
Dr. Segal invented ways to apply high hydrostatic pressures to membranes and measure the results (termed "pressure jump relaxations"). He also studied the fluctuations of ion transport in membranes and voltage clamping in giant axons. He chronicled the results of this basic research in over twenty papers that appeared in scholarly publications.

He is survived by his wife, Dorothy Hubbard Segal, and his daughter, Laura. □

Gearon Gears Up

Daniel Gearon, above, was named Superintendent of Operations and Maintenance on January 29. He will be working closely with Director of Physical Facilities James Z. Metalios. Mr. Gearon comes to the Rockefeller after serving at Columbia University in the Facilities Management Department and as Manager of Support and Service of Telecommunications. In his new position he will be supervising the Boiler House, Custodial Services, Maintenance, the Carpenter's Shop, and the Paint Shop. "What attracted me initially was the high-quality reputation of the university," says Mr. Gearon. "The people I've met and work with here reflect that quality, and I appreciate that they have gone out of their way to make me feel comfortable." □

Mirza A. B. Bég Dies at 55



Professor Mirza Abdul Baqi Bég, whose theoretical work helped establish the quark model, died in his home of a heart attack on January 30.

Dr. Bég came to the university as an assistant professor in 1964 and was appointed a professor in 1968. During his tenure he built an active research group investigating such topics as string theory, structure of the superconducting state, and the gauge sector of unified theories. His work helped clarify the modern quark model of hadron structure, which describes hadrons—nuclear particles such as protons and neutrons—as being composites made up of smaller entities called quarks. His special interest was the symmetry structure of elementary particle interactions. Prior to his work in particle physics, Dr. Bég made significant contributions to nuclear physics.

Born September 20, 1934 in Etawah, India, Dr. Bég received a B.Sc. with honors in physics from Sind University, Pakistan, in 1951, an M.Sc. in applied mathematics from Karachi University in 1954, and a Ph.D. in theoretical physics from the University of Pittsburgh in 1958. Prior to joining the Rockefeller, he was a research fellow at the University of Birmingham, England (1958-60), a research associate at the Brookhaven National Laboratory on Long Island (1960-62), and a member of the Institute for Advanced Study at Princeton (1962-64).

Dr. Bég is survived by his wife, the former Nancie Stager Kress. A memorial symposium was held in Dr. Bég's honor on April 12 in Caspary Auditorium. □

News and Notes is published five times a year from October through July. Suggestions for articles are welcome and may be sent to *News and Notes*, Box 68, or call extension 8967. Photographs: Media Resources Service Center, except page 1, top, Joyce Ravid; page 2, top, Robert Brown; page 2, right, Ingbet Gruttner; page 7, Gilla Kaplan; and page 8, Rockefeller Archive Center. Page 4 illustration by Natasha Brown. Printed in the United States of America.

Good Stress, Bad Stress

Adapted from a presentation delivered to The Rockefeller University Council by Professor Bruce S. McEwen on February 16, 1990.

Stress is a popular topic. And, although stress has some benefits, in many ways it can be debilitating—just ask any scientist waiting for news about a research grant application! My colleagues and I are currently investigating the intriguing possibility that there's a connection between stress and Alzheimer's disease, and between stress and susceptibility to illness. These are what scientists refer to as "diseases of regulation," that is, diseases affected by our environment.

We can define a stress as any experience—good or bad—that perturbs the body, or threatens to perturb it, from its state of homeostasis, or balance. The body redresses imbalance through a variety of means, including the use of hormones. Hormones are chemical signals released in one part of the body to set things in motion in other parts of the body.

More than thirty hormones are activated when your body responds to stress. Among the most important are two produced by the adrenal glands. One, the "fight or flight" hormone adrenaline, is released quickly when we're stressed and helps us deal with immediate danger.

The other adrenal hormone, called cortisol, is a steroid hormone that, like the sex hormones, is derived from cholesterol. Cortisol is secreted more slowly than adrenaline and helps with adaptation and coping.

Cortisol also provides a second level of defense. The body has primary defense mechanisms, like inflammation and immune responses. Cortisol is a secondary line of defense which, in fact, tempers the effects of the primary responses. For example, inflammation is suppressed by cortisol. However, too much cortisol can suppress the very basic immune mechanisms involved in fighting diseases.

A dramatic example of stress is the migrating salmon, which may jump large waterfalls on the journey to the place where they spawn. After mating, most salmon die because they have produced too much of a stress hormone—cortisol, in fact—which causes self-destructive processes to take place.

In a similar way, human stress-related illnesses can also be produced through the effects of cortisol. Cortisol and other hormones can affect the activity of genes—the DNA in the cell nucleus. Consequently, what humans experience in the environment can affect the output of hormones and, therefore, the very makeup of our bodies and brains.

Our lab work is an example of what is called "basic research." Basic research is important because the serendipity, or happenstance, of unanticipated discoveries can actually have very practical payoffs.

In 1968 we injected rats with a radioactive form of cortisol to see where the hormone was picked up in the brain. To our surprise, we found that the hormone accumulates in the hippocampus, a part of the brain where emotions and cognition appear to come together. Repeated doses caused a progressive loss of nerve cells in the hippocampus. This resembled an aspect of normal aging, in that

Professor Bruce S. McEwen

the aging hippocampus also loses nerve cells through the action of cortisol. The more cortisol you have, the more neuronal loss there is.

We started this basic research interested in how the environment affects genetic activity, and not specifically in neuronal loss or Alzheimer's disease. But as other scientists read about our research findings, it quickly became evident that our basic research could lead to important practical results.

One practical result of our research suggests the possibility that cortisol may play a role in Alzheimer's disease. For example, in response to stress, a young rat temporarily produces a lot of cortisol, and then levels of the hormone return to normal. An aging rat, though, is less able to regulate its stress response. We observed that as more nerve cells in the hippocampus are lost with age, rats tend to hypersecrete cortisol; levels of the hormone remain elevated, possibly causing more damage. In studies of people in the early stages of Alzheimer's disease, researchers have found that those patients with the greatest hippocampal damage also had the highest cortisol levels.

I am not saying that cortisol or stress are causes of Alzheimer's—it is an inherited genetic disease. However, once the disease starts, cortisol may accelerate the destructive process.

One consequence of this basic research is that we've become increasingly aware of how emotions affect susceptibility to disease. This phenomenon has been documented in studies of elderly individuals who have lost a spouse or loved one. It seems there is an increased probability of serious illness within two years after the loss of the loved one. We think this may again be related to what I've described about how the stress response affects immune function.

All of this relates to the enormous importance of basic research. We made some basic discoveries about cortisol and the hippocampus, and, in other people's hands, these discoveries have led to practical applications.

Thus, we remain interested not only in the brain's response to cortisol, but also in the link between stress hormones, the brain, and the immune system, and how stress affects the body's response to cancer and other challenges. We didn't know that all this was in store for us when we began our basic research, and we certainly don't know exactly where it's going to take us. One thing my colleagues and I are sure of, though, is that it's very exciting. □

Honors And Awards

The November 1989 issue of the *Journal of Statistical Physics* was dedicated to Rockefeller Professor of Theoretical Physics **E.G.D. Cohen** on the occasion of his sixty-fifth birthday and in recognition of his "seminal contributions to the statistical mechanisms of nonequilibrium processes of fluids, to the theory of quantum fluid mixtures, and to the theory of equilibrium systems." The special issue followed a Symposium on Current Topics in Statistical Physics held in Dr. Cohen's honor at the University of Maryland during September 1988.

Professor of Biochemistry **Bruce Merrifield** was presented the Ralph F. Hirschmann Award in Peptide Chemistry in Boston on April 24. He is the first person to receive this award, which was presented by the American Chemical Society and sponsored by Merck-Sharp-Dohme. Dr. Merrifield was honored for his work in the development of solid-phase peptide synthesis.

Professor Emeritus **Carl Pfaffmann** was elected a William James Fellow of the American Psychological Society in November. The following month, during a celebration of thirty years of cooperation between the National Academy of Sciences and the Academy of Sciences of the USSR, he was presented a medallion in recognition of his important contributions to the interacademy program.

Assistant Professor **Alan R. Saltiel** of the Laboratory of Molecular Oncology received the John Jacob Abel Award from the American Society of Pharmacology and Experimental Therapeutics on April 4. This award is presented annually to an investigator in biochemical pharmacology under the age of forty.

Professor **Torsten N. Wiesel** was one of five medical scientists awarded honorary doctor of humane letters degrees from Johns Hopkins University in February as part of Hopkins's celebration of its one-hundred-year history of medical studies. □

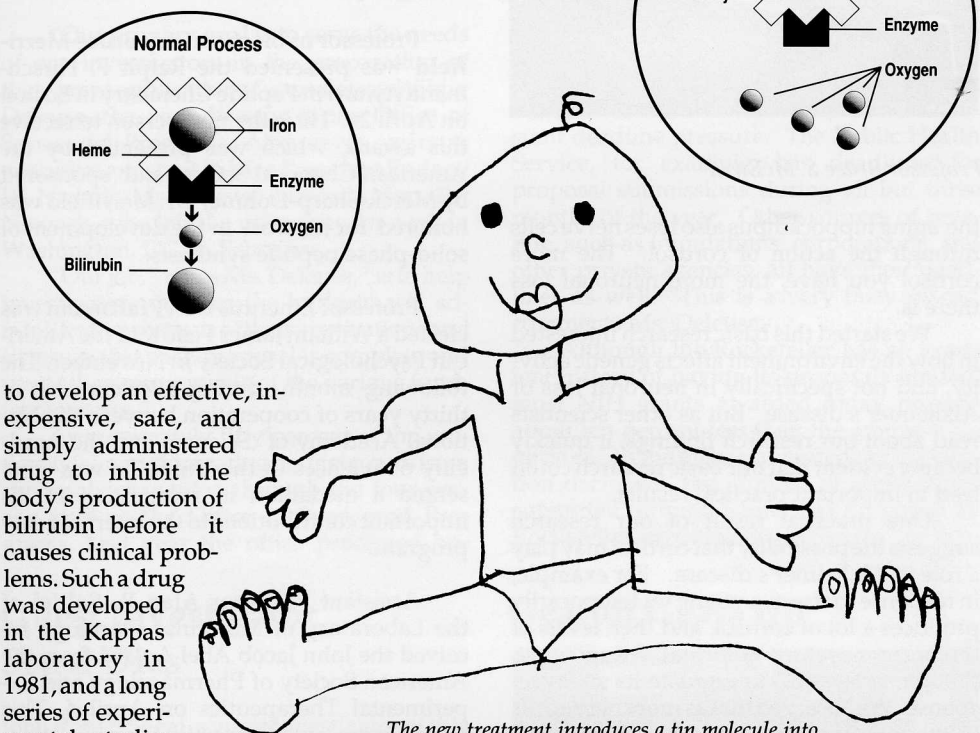
Promotion

James W. Young, Cellular Physiology and Immunology, to Assistant Professor. □

(*Jaundice*, from page 1)

thing," he comments, "phototherapy is largely unavailable in developing nations--exactly the settings where prematurity is common and illnesses after birth are prevalent. These are situations which can predispose infants to the development of sustained jaundice. Furthermore, phototherapy, for all its success and its wide availability in nations with advanced health care facilities, is directed towards disposing of bilirubin after it has been formed—it does not prevent neonatal jaundice."

Drs. Kappas and Drummond felt a more practical approach to this problem would be to develop an effective, inexpensive, safe, and simply administered drug to inhibit the body's production of bilirubin before it causes clinical problems. Such a drug was developed in the Kappas laboratory in 1981, and a long series of experimental studies on animals and adult humans followed.



The new treatment introduces a tin molecule into heme, replacing its iron molecule. Like iron-containing heme, the new tin heme joins with the enzyme that initiates heme's breakdown to bilirubin. However, because tin does not bind oxygen, a critical stage in heme degradation, bilirubin is not produced.

"Our approach to this problem over the last decade," says the project's principal investigator, Dr. Kappas, "has been similar to that employed in the development of inhibitors of cholesterol production. It seems more logical to lower blood cholesterol levels by using an inhibitor to block its production than to try to dispose of cholesterol once it has entered the bloodstream. The same logic applies to bilirubin."

The NIH funds, provided by its National Institute of Child Health and Development, will be administered by the Laboratory of Metabolism-Pharmacology. Clinical trials will be supervised by Tufts University Professor of Pediatrics Timos Valaes on infants at Metera Maternity Center in Athens, Greece, which delivers nearly 18,000 babies each year—a far greater number than any American hospital. Later clinical trials will be carried out at St. Margaret's Hospital Neonatal Intensive Care Unit in Boston. Laboratory and other basic studies will be conducted at The Rockefeller University.

The main goal of the five-year program is to determine an effective dosage and treatment regime for premature infants. Dr. Drummond comments: "We've already shown that another form of porphyrin, called a mesoporphyrin, is substantially more effective than the tin compound we initially studied. We will be using this new tin compound in our planned studies of premature infants."

In the future, inhibitors may be targeted to specific tissues where bilirubin is being formed by encapsulating them in fatty particles called liposomes. Upon injection, liposomes are quickly taken up by the spleen, where about two-thirds of the body's bilirubin is formed. This method of delivery has the advantage of directing the inhibitors to the site where they can be most effective. The efficiency of such a delivery system was recently demonstrated in a joint study conducted at Rockefeller with Visiting Professor Stephen Landaw.

For the next five years, various doses and delivery systems for inhibitors of bilirubin production will be studied in an effort to define an effective and inexpensive treatment. Such a treatment could help millions of newborns who presently have no alternative form of therapy for severe or sustained jaundice that may develop after birth. □

Answers Raise New Questions, New Applications

The promise of this new treatment for neonatal jaundice caught the interest of another scientist in the Kappas laboratory, Assistant Professor Richard A. Galbraith. He wondered: If a tin porphyrin is effective against jaundice in newborns, could it also help others afflicted with bilirubin disorders?

Among the diseases he began researching to answer this question was a rare genetic disorder known as Crigler-Najjar Type 1 syndrome. In Crigler-Najjar patients, jaundice is caused by a genetically determined, complete deficiency of the enzyme that couples a sugar molecule to bilirubin, allowing it to pass from the body. Crigler-Najjar infants suffer a marked yellowing of the skin, and ultimately develop a constellation of neurological impairments, including progressive brain damage. Most patients with this disorder die before reaching puberty.

Two young Crigler-Najjar patients have been cared for in The Rockefeller University Hospital for the past year. Both have suffered significant loss of neurological abilities and brain function—one regressing from an "A" student just four years ago to what has been termed an "ineducable" state today.

Except for the long-term nature of the treatment plan, the strategy of Drs. Galbraith and Kappas for treating these patients is similar to the one underlying the laboratory's neonatal jaundice studies. The plan involves a sustained attempt to diminish bilirubin production and thus lower its levels in the blood and tissues of the two youngsters.

Dr. Galbraith notes, "Even if we were able today to completely halt bilirubin production in these two boys, it would take an extremely long time to purge them of the enormous amounts of bilirubin they have accumulated during their lifetimes. By sustained treatment, we hope to avoid the need for liver transplants in these patients. This would be a considerable advance in the therapy of this genetic disorder."

The Electronics Lab: More Than Gadgets And Gear

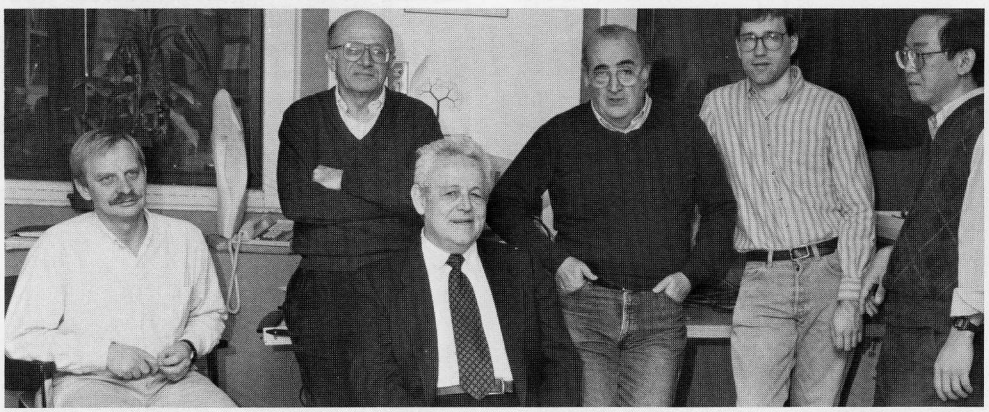
Most biological phenomena are too numerous, rapid, and minute for scientists to study with the unaided human eye. Nerve impulses, for example, last for about one-thousandth of a second and move along the nerve at speeds up to 270 miles per hour. Associate Professor Robert L. Schoenfeld and his colleagues in the university's Laboratory of Electronics assist researchers by providing special equipment to detect, amplify, record, and analyze such elusive phenomena. Furthermore, they coordinate all these activities through microcomputers. As Dr. Schoenfeld says, such instrumentation extends the "limits of sensitivity" of the biologist.

Since he arrived in 1957, Dr. Schoenfeld and his group have participated in hundreds of projects helping scientists at the university and at laboratories around the world probe nature's hidden domain.

When Professor D. Martin Carter's Laboratory for Investigative Dermatology needed a way to obtain skin cell samples, for example, Dr. Schoenfeld's group built a suction blister device that painlessly removes a quarter-sized sample of healthy skin cells from a patient. These cells are grown into sections that are placed into a wound and function as a mooring on which new skin cells can grow.

supervision of Chief Engineer Mike Chen. For example, a computer-controlled device that emits electronic tones and bright lights is being constructed by Electronics Engineer Konrad Kondratowicz for Professor Bruce S. McEwen's laboratory and its study of stress. Herb Cohen, another electronics engineer in the lab, creates specialized electronics components for the spectrometers in Professor Brian Chait's lab. "With the help of the Electronics Lab we were able to build and maintain equipment that was not commercially available," comments Dr. Chait. "Without it, we couldn't do the experiments which are important to our field."

One of the commercial projects the Schoenfeld group is now developing is a micro-miniaturized biofeedback device to assist individuals with curvature of the spine. Worn comfortably under clothes, the device senses the angle of the spine and provides an auditory signal alerting the patient to straighten up. Another project-in-progress with possible commercial applications is Computer Engineer Brian Stromquist's effort to develop a program enabling a personal computer coupled to an inexpensive image scanner to identify the chemical composition of a DNA fragment from a specially processed photograph--a process presently available only with a $20,000 piece of equipment.



The staff of the Electronics Lab (l to r): Konrad Kondratowicz, Paul Rosen, Robert Schoenfeld, Herb Cohen, Brian Stromquist, and Mike Chen.

But Dr. Schoenfeld and his team concoct more than electronic wizardry in their Smith Hall basement workshops. In recent years they have helped place the power of computers as laboratory instruments at the disposal of university scientists. Senior Research Associate Paul Rosen helps faculty adopt their personal computers to sophisticated research protocols. For years, Dr. Rosen has played a key role in the development of important instruments that today are standard issue in laboratories and hospitals the world over.

Recently, the Schoenfeld lab developed the microprocessing apparatus and program used in the neurophysiology laboratory of Professor Hiroshi Asanuma for studies correlating brain activity to behavior involving limb movement. And for Professor Vincent P. Dole's laboratory, the group developed a computer system to electronically measure the imbibing behavior of 192 mice in studies of the biology of alcohol addiction.

Currently, the laboratory is busy with fifteen electronic design projects under the

Dr. Schoenfeld, who retires in July after thirty-three years at the university, says that hindsight has given a renewed appreciation for the role instrumentation plays in scientific discovery. "A researcher may not think of asking a question of nature until there is the means of getting at the answer," he says.

"Often, researchers can't describe what they require in technical terms," continues Dr. Schoenfeld. "But we have schooled ourselves in the research areas conducted at this university. So, by being trained biomedical engineers and biomedical computerniks, we can translate the needs of the biomedical research scientist into technical terms and specifications. The most important thing we do in this laboratory is to be able to communicate with the biologist." □

Ralin Retires

Thomas J. Ralin, Architectural Designer in Plant Operations, holds up one of the sweetest gifts he received at his retirement party on January 25: a lollipop. Mr. Ralin began working at the university in 1958 as a "temporary" draftsman, but was soon hired as a permanent employee. During the presentation ceremony it was said that "scientists have unanimously praised Tom's gift for laying out laboratories so that research efforts could be conducted as efficiently as possible." Mr. Ralin received a cash gift from the university community, a briefcase, a book on paintings, and scores of appreciation letters. He will serve as a consultant to the university in years to come. □

Conroy Bids Farewell

Mrs. Marie Conroy, above, reflects back on her years at Rockefeller during her retirement party on January 18. She leaves her position of Senior Purchasing Assistant in the Purchasing Department after thirty-three years of service. Her thanks were extended to the campus community for making these years so special. The university honored Marie with a check and tickets to the Broadway show, *Gypsy*. □

A View from the Dean's Office

1989 Entering M.D.-Ph.D. Students

In this issue, the five entering M.D.- Ph.D. students will be introduced.

A 1989 graduate of Harvard-Radcliffe University in the biochemical sciences, **Emily Chan** was the winner of a Harvard College Scholarship and the Elizabeth Agassiz award for academic excellence. Her undergraduate research experience included summer internships at Cold Spring Harbor Laboratory and at Johns Hopkins University. With Dr. Bernard Weiss at Johns Hopkins, she investigated the mechanism of activation of a DNA repair enzyme. Emily, who was born in Hong Kong, lived briefly in New York City before moving to Baltimore, Maryland, where she grew up. Committed to environmental issues, Emily was a member and co-chair of the Harvard Environmental Action Committee. She enjoys pottery-making, ping-pong, and reading.

Athanasios (Thanos) Dousmanis received his B.Sc. degree in 1987 with distinction from the University of Toronto, Canada, with a double major in mathematics and physiology. He then pursued graduate work in electrophysiology and was awarded a master's degree from the same university in November, 1989. His graduate research, done with Dr. Peter S. Pennefather, involved the characterization of a hormone-induced potassium current in AtT-20 clonal pituitary cells. At Rockefeller, he plans to focus on neural plasticity as it pertains to memory. Thanos, who was born in Princeton, New Jersey, lived in Rochester, New York, until the age of fourteen when his family moved to Canada. Of eclectic interests, Thanos spent his junior year of college in Athens, Greece, studying archaeology, history, literature,and sculpture. Classical saxophone, opera, squash and swimming number among his other interests.

A fortune cookie **Kwan-Hong Christopher Min** received in 1988 has proven more prophetic than most as it read: "You could prosper in the field of medical research." For Chris, the omen did not prove to be life-changing. He was already pursuing biomedical studies at Harvard University, from which he graduated magna cum laude in 1989. It did, however, provide an unusual opening for his medical school applications. At Harvard, Chris's research concerned the purification of the middle T antigen of polyomavirus, on which he worked with Dr. Thomas L. Benjamin. He also juggled a hectic extracurricular schedule. A founding member of the Harvard Badminton Club, Chris was also first violinist, producer, and finally president of the Harvard-Radcliffe Orchestra. In 1988, he managed the orchestra's tour of Southeast Asia. In addition to the violin, he plays the clarinet and bagpipes. He also enjoys soccer and tennis. Chris, whose family now lives in Oklahoma City, Oklahoma, was born in Houston, Texas, and raised in West Des Moines, Iowa.

Masaki Oishi graduated with a B.S. degree in biochemistry in 1989 from the University of Tokyo. Though born in New York City, he moved at the age of fifteen with his family to Japan. In 1988, a summer position as a visiting scientist at Columbia University allowed him to work with Dr. Charles Cantor. Masaki's research concerned the determination of prokaryotic chromosome structure through the use of various mutants of E. coli bacterium and T4 bacteriophage. His undergraduate thesis dealt with the isolation, purification, and characterization of a calcium-activated neutral protease (CANP). At Rockefeller, he will focus on neurology and neuroscience, with emphasis on neural plasticity. Fishing, baseball, hiking, and the novels of Raymond Chandler provide Masaki with his main non-scientific diversions.

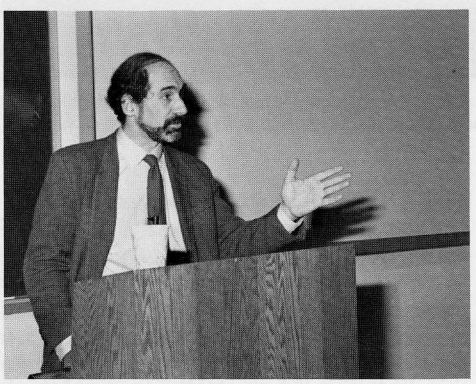
Edward Vates graduated with a B.S. in Zoology from Duke University in 1989. Elected to Phi Beta Kappa, he received his degree summa cum laude. His primary research interests are in neuroscience. As an undergraduate, Ed worked with Dr. J. David Robertson and John Z. Young on a possible structural mechanism for learning and memory in Octopus vulgaris. His research involved structural changes in pre- or post-synaptic neurons concomitant with a tactile learning event. Using electrophoretic separation techniques on Octopus brain proteins, he attempted to identify proteins associated with learning and memory by looking for biochemical tracers. A native of Wilmington, Delaware, Ed plays classical piano, enjoys attending classical music concerts, and is a devoted basketball fan. □

The "World" Series

"Advances in science and technology have rewritten the very terms and conditions of the human contract with no more warning than the morning headlines." —Robert Heilbroner in "The Future as History"

Assessing the changes in the human contract is the challenge of the Global Environment Lecture Series, organized by a committee of junior faculty members and students.

The World Series Committee. Back row, from left, Pierre Gonczy and Andrew Millar; front row, Dr. Helen Chao, Dr. Shelley Halpain, Dr. Gloria Coruzzi, and Marina Picciotto.



Dr. Michael Oppenheimer, speaking at the February 15 Global Environment lecture.

The lecture series represents over a year's worth of planning and the efforts of a nine-member committee. Headed by Dr. Shelley Halpain, a research associate in Dr. Paul Greengard's lab, the committee consists of assistant dean Gloria Coruzzi, Rockefeller alumnus Bill Bleisch, research associate Helen Chao, assistant professor Steve Kay, postdoctoral fellow Daniele Piomelli, and students Pierre Gonczy, Andrew Millar, and Marina Picciotto. Informally known as the "World Series Committee," they have assembled an impressive list of speakers for the eleven lecture series.

Featured will be scientists from the Environmental Defense Fund, the NASA Goddard Institute for Space Studies, and the United Nations Environment Programme, as well as a senior analyst from the New York City Comptroller's office and the president of the Worldwatch Institute. Topics to be covered will include the greenhouse effect, acid rain, tropical deforestation, population growth pressures, and toxic waste management.

At the first lecture, Dr. Michael Oppenheimer, Senior Scientist with the Environmental Defense fund, warned the 100-member audience "that saving the earth will depend on people like yourselves." Scientists, he declared, "cannot get out of this responsibility." He charged that as we emerge from the Cold War, we are realizing that we "fought the wrong war . . . we should have been warring against our own shortsightedness." Stating that the future is "highly problematic," Dr. Oppenheimber outlined the problems to be encountered in this "era of human control of the environment."

Upcoming lectures will present the scientific research underpinning environmentalists' concerns. While the topics may sound dire—"Race to Save the Planet" and "Surviving the 21st Century"—the series will end on

(See next page)

Journey to Kathmandu

Few scientists begin their day with a view of the Himalayas at sunrise, but that is what six Rockefeller scientists were able to do when they participated in a cell-mediated response study in Nepal.

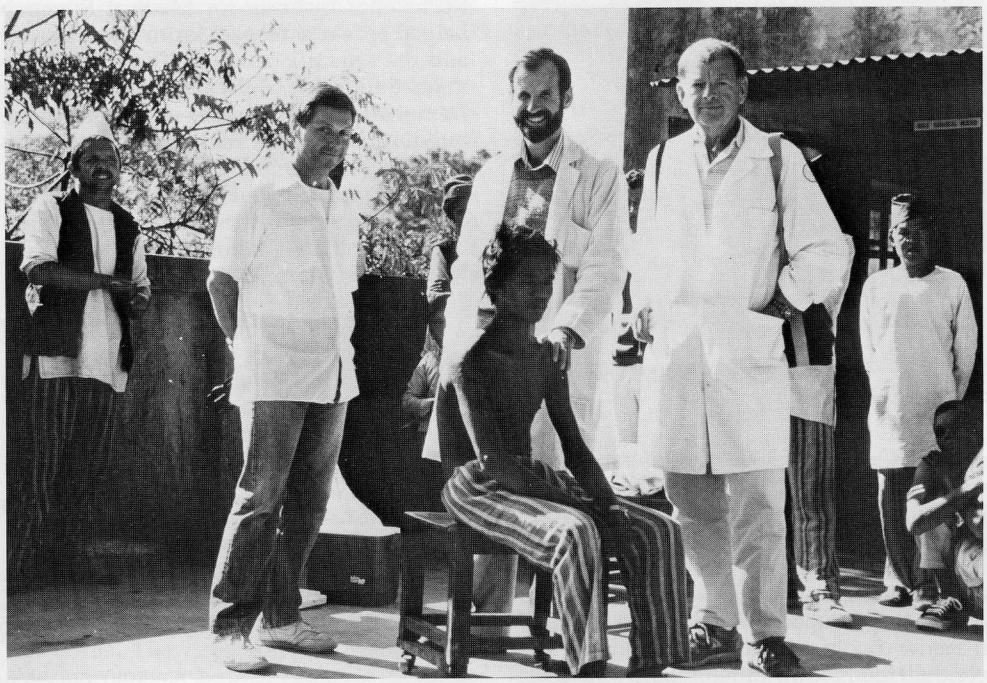
The Rockefeller scientists involved in the study were professor Zanvil Cohn, postdoctoral fellow Gerald Hancock, assistant professor Gilla Kaplan, professor emeritus Maclyn McCarty, third-year Ph.D. student Anthony Molloy, and research assistant Rochel Burkhardt. Together with Dr. Kendall Smith of Dartmouth Medical School, the Rockefeller scientists spent four-and-a-half weeks in a project testing the systemic effects of Interleukin-2 (IL-2) on leprosy patients.

The research focused on the effects of IL-2 on populations of cytotoxic, or killer, cells. The project is part of a multi-year and multi-country study which is investigating the effects of various cytokines, including IL-2 and gamma interferon, on the cell-mediated immune response. Cytokines, which are secreted polypeptides, modulate the unction of other cells, especially cells associated with the immune system. The members of Dr. Cohn's cellular physiology and immunology lab have studied the cell-mediated response to cytokines in the disease processes of leprosy and leishmaniasis. Their reseach has taken them to Brazil, Ethiopia, India, Pakistan, and the Philippines.

The study was conducted at the Anandaban Leprosy Mission. Anandaban, meaning Forest of Joy, is a village situated 16 kilometers north of Kathmandu. Nepal is famous for having the most rugged and hilly terrain on earth, and the mission was reachable only by an hour's walk along the side of a ravine. The 100-bed mission hospital and the houses where the scientists stayed were built, terrace fashion, running up the side of a hill.

The Anandaban project focused on fourteen patients who were injected with IL-2. While IL-2 is not a therapy for leprosy at this time, it has shown potential for overcoming the immunological block imposed by the causative agent of leprosy, *Mycobacterium leprae*. As with the other diseases studied by the team, leprosy is characterized by a profound antigen-specific immunosuppression. Thus, the work of Dr. Cohn's team will shed further light on the process of human immune response.

The Rockefeller team arrived in the beginning of November, at the very end of the wet season, and, by the time they departed on December 7, the dry season had begun. Work filled most of their time, but they did find time for short climbs of nearby mountains, infrequent trips to Kathmandu, and intense games of badminton played on the mission's only piece of level ground. □



Above, from left, Paul Roche (Anandaban investigator), Dr. Gerald Hancock, and Anthony Molloy. At left, from left forefront, Dr. Kendall Smith, Dr. Warwick Britton (Chief Scientist and Principal Investigator, Anandaban Leprosy Mission), and Dr. Zanvil Cohn. Surrounding the investigators are Anandaban patients.

(from previous page)

an optimistic note. The final lecture, to be given by Lester Brown, president of the Worldwatch Institute, is entitled, "The Shape of a Sustainable Society."

The catalyst for the series was Shelley Halpain. She wanted to provide a forum for speakers to present current research and, thus, firmly ground environmental concerns within the framework of scientific practice. Shelley sees the Rockefeller community as a "pool of future educators" on environmental issues, who, when they assume positions at other universities, can impart the belief that individuals, acting as consumers and citizens, can change the outcome of global events.

The series, which began on February 15 and will run until May 3, is held on Thursdays in Tower 301. □

Oh, Those Pounding Feet

When 23,000 pairs of feet pounded across the Verrazano Bridge on November 4, 1989 during the twentieth New York City Marathon, at least twelve pairs belonged to members of the Rockefeller community.

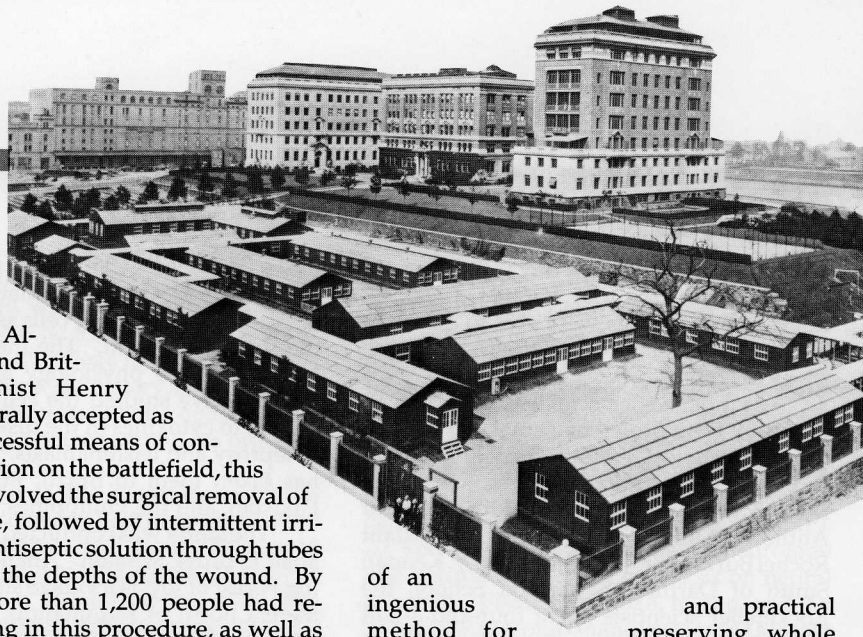
Known competitors in the 26.2 mile run were: professor Konstantin Goulianos, associate professor Angus Nairn, assistant professors William Muller, Roger Rusack, and John Taylor, Rockefeller University Press promotion manager Kathleen Ghiorsi, hazardous waste manager Richard Joao, and students Marian Birkeland, Roy Herbst, John Seykora, Marcia Simpson, and James Rubenstein.

Rockefeller runners do not limit themselves to marathons, however. For the last several years, teams from the university have successfully competed in the Manufacturers Hanover Corporate Challenge. Held in Central Park, the race is three-and-a-half miles long. Teams compete in two of three races held in May and June, and teams with exceptional finishing times are invited to compete in the Metropolitan Challenge finals. Of the five Rockefeller teams in the women's, men's, and coed divisions, two teams--the men's and one coed--were invited to run in the November 20, 1989, Metropolitan race. The men's team was the non-profit division champion, and finished eighth in a field of 76 international teams. The coed team finished midway in a field of 69 teams.

The 1990 teams are being formed now, and sign up sheets will be posted on bulletin boards around campus. Membership is open to all and experience is not required. □

Rockefeller Retrospective

Doctors and Doughboys



American entry into World War I came within a month of President Woodrow Wilson's inauguration to his second term of office. By then, the Rockefeller Institute's governing board had held meetings to determine what the Rockefeller's role in the conflict should be: Dutifully, the laboratories, personnel, and materials of the Institute were placed at the full disposal of the American war effort. The stars and stripes, flying daily from a flagpole newly erected in front of the main building, gave notice that, beginning in August 1918, The Rockefeller Institute for Medical Research was a U.S. Army post.

Practically all staff members who were qualified for commissions in the Medical Corps went into uniform, with Simon Flexner, President of the Institute, taking top rank as Lieutenant Colonel. With special appropriation from The Rockefeller Foundation, the Institute formed the War Demonstration Hospital. Designed to imitate conditions near the front, the hospital, composed of 16 portable wooden buildings, was constructed on the southwest corner of the Institute grounds. The design was so functional that the Army adopted it for American hospitals in France.

This facility was primarily a school for teaching military surgeons the Carrel-Dakin method of treating infected wounds (a procedure pioneered by the Institute's Dr. Alexis Carrel and British biochemist Henry Dakin). Generally accepted as the most successful means of controlling infection on the battlefield, this procedure involved the surgical removal of injured tissue, followed by intermittent irrigation with antiseptic solution through tubes inserted into the depths of the wound. By war's end more than 1,200 people had received training in this procedure, as well as in bacteriology, clinical chemistry, pathology, and modern techniques of diagnosis and treatment of pneumonia, a serious menace to the health of the troops.

The production of serum was a crucial wartime activity at the Institute. Flexner had developed a rapid method of producing antimeningitis serum, and large-scale production was initiated for the Army. A considerable quantity of antidysentery serum was also made, as was sera against several types of pneumococcus.

However, perhaps the most far-reaching achievement of The Rockefeller Institute during World War I, although it went almost unnoticed at the time, was the development of an ingenious and practical method for preserving whole blood for use in transfusions. Drs. Peyton Rous and J.P. Turner achieved a mixture in which human red corpuscles survived intact for as long as twenty-six days: This extended the time blood could be used in life-saving transfusions of severely wounded soldiers on the battlefield.

During the first world war, The Rockefeller Institute for Medical Research helped spread a respect for medical science and the scientific method. The flagpole remained until 1957. The last relic of the War Demonstration Hospital—one small frame building east of the 64th Street gate—was demolished early in 1958. □

News and Notes

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