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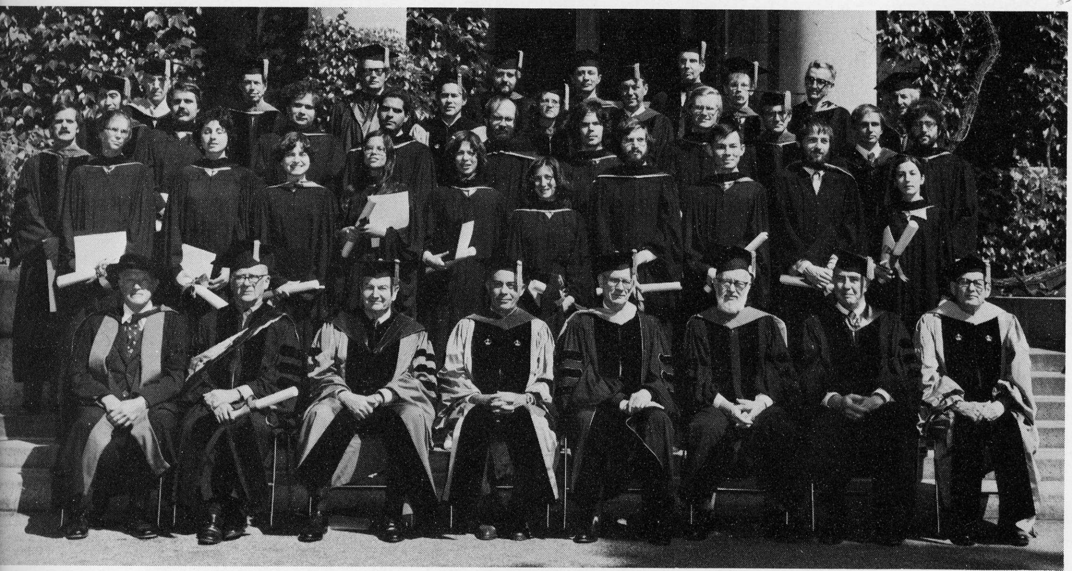
THE ROCKEFELLER UNIVERSITY
news and notes
JULY 1978 VOLUME 9 NUMBER 10

Twenty-two Receive Ph.D.s at Twentieth Convocation; Honorary Degrees for Goebel and Longsworth



Convocation day, June 14, 1978. Front row, seated, left to right: Vice President Carl Pfaffmann, Professor Walther F. Goebel, Trustee David Rockefeller, Dean James G. Hirsch, President Seitz, Board Chairman Patrick E. Haggerty, Professor Vincent P. Dole, and Vice President Maclyn McCarty. Standing behind them on the steps of Founder's Hall are the Ph.D. degree recipients and their presenters.

Twenty-two graduate fellows received the Ph.D. degree on Wednesday, June 14, in Caspary Auditorium at the University's 20th annual convocation. The afternoon was especially nostalgic because it was the last commencement at which Frederick Seitz will officiate as president of the University and because the recipients of this year's honorary doctor of science degrees are two of the University's own: Walther F. Goebel and Lewis Gibson Longsworth, who between them represent more than a century of distinguished service to science and to this institution, where both spent their entire professional careers.

As is the University's custom, the proceedings were limited to talks by presenters who explained the significance of the degree recipients' work.

Professor Goebel was presented by Vice President Maclyn McCarty as one of those who have contributed so vitally to "the golden age of immunology." A member of the University's scientific staff from 1924 until his retirement in 1975, Dr. Goebel has studied the role of

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R. U. Press Publishes Chargaff's Memoirs

To the student of science, Erwin Chargaff is best known as the discoverer of the most important single piece of evidence leading to the identification of the double helix structure of DNA: Chargaff's rule—the concept of "complementarity" or base-pairing of purines and pyrimidines in nucleic acids.

This world-honored biochemist and multilingual classicist is also known as one of the most literate, passionate, and outspoken critics of what he has called "our inhuman century." This month, The Rockefeller University Press publishes Dr. Chargaff's memoirs, *Heraclitean Fire: Sketches from a Life before Nature*.

To the Greek philosopher Heraclitus,

continued on page 8

Haggertys Establish Seitz Fellowship

A gift of $300,000 has been made by Patrick E. Haggerty, chairman of the University's board of trustees, and Mrs. Haggerty for the establishment of a new Frederick Seitz Graduate Fellowship. The announcement was made, appropriately, on June 14, the day of the University's 20th convocation for bestowing degrees.

Over the past months, the University community has been showing its appreciation to Dr. and Mrs. Seitz for their 10 years of stewardship. On May 15, the board of trustees held a dinner at which Dr. and Mrs. Seitz were presented with an album of photographs highlighting major events of "The Seitz Years" and an Oriental rug. At their meeting on the following day, the trustees unanimously adopted a resolution expressing their "pride in the performance of Frederick Seitz as chief executive officer, our appreciation of the opportunity to have worked closely with him in an inspiring venture, and our gratitude for the warm and personal associations that we will all long remember."

Other festivities have included a reception given by the senior faculty on June 8 and a special presentation made to the Seitzes at the 20th anniversary dance of the Faculty and Students Club on May 12. (See photos, page 7.)

TWENTIETH CONVOCATION

continued from page 1

bacterial carbohydrates in infection and resistance and has worked to relate their chemical structure to their ability to evoke immunity to disease. Among his early achievements was the synthesis of an artificial antigen so close to that formed by living pneumococci that when injected into rabbits it protected them against infection by highly virulent microorganisms. This was the climactic proof of the concept, developed by Rockefeller investigators, that the antigenic specificity of the pneumococcus resides in the chemical configuration of the polysaccharides that constitute the bacterial capsule. He also has studied the chemical nature of endotoxins, particularly those elaborated by dysentery bacilli, and devoted some years to characterizing the receptors on the cell surface of enteric microorganisms that are sensitive to certain strains of bacteriophage (viruses that infect bacteria). More recent research was devoted to the chemical nature of colicins, potent antibacterial agents produced by many strains of enteric microorganisms.

Born in Palo Alto, California, on December 24, 1899, Dr. Goebel earned the B.A., M.A., and Ph.D. degrees from the University of Illinois. He joined The Rockefeller as an assistant in chemical immunology. He was named an associate in 1927, associate member in 1934, and member in 1944, a title that changed to professor when the Institute became a graduate university in 1954. He became emeritus in 1970. He was the first recipient, in 1973, of the Avery-Landsteiner Prize of the European Society of Immunologists. The award was named for Karl Landsteiner and Oswald T. Avery, both Rockefeller scientists, who played major roles in laying the foundations of modern chemical immunology.

An accomplished amateur painter, Dr. Goebel organized the art classes offered on campus since 1966. Since his retirement, he has worked as a volunteer at the Walker Laboratory of the Sloan-Kettering Institute for Cancer Research in Rye, New York.

Professor Longsworth, who was unable to attend because of illness, was presented *in absentia* by Professor Vincent P. Dole. In addition to describing the professional contributions of this important pioneer of modern biochemistry, Dr. Dole extolled the man who, "behind the reserved manner and formidable rigor, is a very gentle person, a sympathetic listener, a teacher by example."

Dr. Longsworth's outstanding research has been primarily in the area of electrophoresis, a technique for studying the chemical structure of proteins by observing their movement in an electric field. Its effectiveness depends on precise measurements of purified proteins and natural mixtures such as plasma. The technique was brought to a high degree of perfection by Dr. Longsworth, whose schlieren scanning and moving boundary methods for following the activity of dissolved substances in free electrophoresis are in general use today. He is also known for his work on the study of proteins by means of diffusion, a method that has revealed much about the shape and characteristics of these materials.

Dr. Longsworth was born in Somerset, Kentucky, on November 16, 1904. He was educated at Southwestern College, from which he obtained the B.A. degree, and at the University of Kansas, which awarded him its M.A. and Ph.D. degrees. He came to Rockefeller in 1928 as a National Research Council fellow in chemistry. He was appointed an assistant in 1930, associate in 1939, and a member in 1949 (changed to professor in 1954). He became professor emeritus in 1970.

Following are condensations of the remarks made by the presenters at the convocation. The degree recipients' names appear first.

MICHAEL L. BRINES

Donald R. Griffin

Michael Brines' thorough training in physics and enthusiasm for the sensory physiology of animal navigation led him to analyze the information available to bees and other animals from polarization patterns in the blue sky. These experiments constitute a preliminary approach to testing one of his truly ingenious ideas. Skylight polarization patterns are linked to the sun's position, and move across the sky in regular fashion as the earth rotates. Lines of equal E vector orientation rotate around the North Point (where the earth's axis intersects the celestial sphere). An animal capable of responding to 15° per hour changes of E vector orientation could determine absolute compass direction relative to the North Point as well as direction relative to the sun.

EMILY BRINK

Donald Pfaff

In her research, Emily Brink studied the final common pathway for lordosis behavior, the primary reproductive behavior of the female rat. That is, she studied the means by which this behavior is executed by specific muscles, in turn controlled by particular motor nerves that are projections from motoneurons in the spinal cord. To do this, she used behavioral techniques to discover which muscles govern this behavior, anatomical techniques to analyze the muscles themselves, and a combination of neuroanatomical and neurophysiological techniques to localize the relevant motoneurons and begin the study of their physiological properties. She found specific groups of motoneurons that control the deep back muscles for this behavior, localized in the medial cell column of the central horn of the lumbar spinal cord. Then she began to characterize the responses of these neurons to stimulation of sensory input and of pathways descending from the brain. Her work provides the link that allows translation of a problem of reproductive behavior into a neurophysiological problem.

HOWARD R. BURDICK

(*Degree granted* in absentia)

The topic of Howard R. Burdick's thesis was A Logical Form for the Propositional Attitudes. His research advisor was Donald Davidson.

ADAM DREWNOWSKI

William K. Estes

The traditions and special circumstances at Rockefeller University should, it would seem, make truly "bidisciplinary" training in the study of brain and behavior possible here if anywhere. Adam Drewnowski's career as a graduate fellow is an encouraging case in point. Adam received his B.A. at Oxford University, England, in 1971, majoring in biochemistry, and his M.A. from the same institution in 1974. He began his graduate work at this university, concentrating on studies of the biochemical basis of behavioral mechanisms, and progressed far enough in that specialty to have already to his credit a list of publications and research reports at regional, national, and international meetings that would do credit to a postdoctoral investigator. But during the same period Adam's central interests shifted in the direction of the problems of human memory. Moving into this area, he was able to master the background literature and research methods of cognitive psychology to the point of completing a truly substantial doctoral study that eventuates in a radical reinterpretation of the century-old concept of memory span and a mathematical model relating it at a theoretical level to other research on memory.

ALAN JAY FISCHMAN

David Cowburn

Impressive advances have been achieved in determining the molecular conformations of biologically important molecules, principally by X-ray diffraction techniques. Many significant questions still remain: What do these molecules look like in solu-

tion, as opposed to in a crystal? How can we describe dynamic conformations—those structures changing with time? What are the conformations at the actual sites of biological action of such molecules as hormones and neurotransmitters? Alan Fischman has contributed valuable techniques to this area of research and provided some detailed answers to these questions through his studies of the peptide hormone oxytocin by nuclear magnetic resonance methods. To avoid the occasionally equivocal results from these techniques, Alan has chemically synthesized a series of isotopic isomers of the peptide. His pilot studies of free amino acids established the various synthetic and spectroscopic strategies to be used and developed a new self-consistent method for obtaining torsion angles and their dependencies on time. He has synthesized some 30 or more isotopic isomers of the constituent amino acids and these have been incorporated in various combinations into isotopic isomers of oxytocin. Several novel features of the molecular conformation have been obtained and the detailed motion of many of the side chains described. Alan's work is a major contribution to techniques for investigating the relationship of molecular conformation to biological function in peptide hormones.

DANA J. GIULIAN

(*Degree granted* in absentia)

The topic of Dana J. Giulian's thesis was A Study of Biochemical Events during Regeneration within the Visual System of *Carassius auratus*. His research advisor was David Cowburn.

CAROL C. HALPERN

Hidesaburo Hanafusa

The first filterable agent shown to induce cancer in experimental animals was isolated by the late Professor Peyton Rous at this institution. This agent, known as Rous sarcoma virus, has been extensively investigated for its structure and functions involved in its tumor-forming capacity. Carol C. Halpern's investigations touched upon the question of the genesis of such sarcoma-inducing viruses. After injecting newborn chicks with mutants of Rous sarcoma virus that had a deletion of a portion of the genome essential for cell transformation, Carol observed the formation of solid tumors, from which she was able to recover transforming virus. Her careful characterization revealed that the newly obtained virus had regained the deleted portion of the genome, probably through recombination with genetic materials within host cells. Thus, Carol's study opened a new avenue to investigation of the nature of the so-called endogenous viral genetic information present in normal cell chromosomes, which may be the progenitor of the gene responsible for sarcomagenesis in this class of viruses.

ANGELA M. HYMAN

Marion E. Frank

The goal of sensory neurophysiology is to relate two realms—sensory experience and neuronal events. For the sense of taste, investigators have applied single-component stimuli to the tongue and recorded responses of neural elements at various levels of the nervous systems of animals. Sensations evoked by such stimuli, and by mixtures of these stimuli, have been studied in people. Mixing stimuli can yield enhanced or suppressed sensations, changes attributed to more central neural processing of messages originating at the receptors. However, no one had tried recording from the nerve innervating the taste receptors while stimulating the tongue with mixtures. Angela Hyman did this crucial study. She studied the hamster chorda tympani, the neurons of which have been classified by their relative responses to single stimuli. As a result of her beautifully designed and executed experiments, she was able to describe a set of interesting effects, consistent with the human mixture studies, which, unexpectedly, were most easily attributed to receptor-chemical interactions. Thus, Angela was able to establish a clear connection between two realms: the sensations evoked by mixtures and the effects of mixtures on receptors. This adds significantly to the accumulating evidence that much of the "processing" in the sense of taste can be attributed to the taste receptors.

VICTORIA IWANIJ

Philip Siekevitz

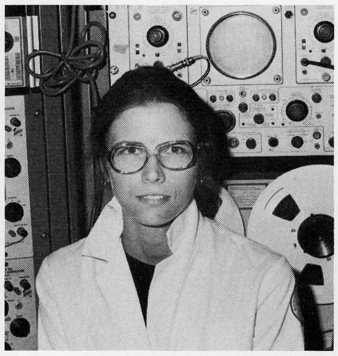
In diabetes we know that three hormones—insulin, somatostatin, and glucagon—are involved in the regulation of glucose metabolism. It is with the last one that Victoria Iwanij has worked, for although a good deal of work has been done with insulin, not that much is known about glucagon. In terms of glucose regulation, it is the ratio of insulin to glucagon levels which is important, insulin tending to decrease blood sugar concentration, while glucagon tends to increase it. Victoria Iwanij used as her animal model a genetically diabetic mouse strain upon which much work has been done, but not with regard to glucagon metabolism. In essence she has found that in addition to the known derangement of insulin function in these mice, there is also a derangement of glucagon function. The pancreas of this animal seems to secrete more glucagon than normal, and this glucagon is more active in these mice than in normal mice in binding to a liver plasma membrane preparation and in activating a liver membrane enzyme, adenylate cyclase, which is the first step in a complicated process leading eventually to a larger-than-normal glucose secretion by the liver into the blood. In addition she has succeeded in showing for the first time how the receptor for glucagon in the liver membrane can be isolated and purified—an important step in elucidating the action of the hormone and of a possible defect in one of the diabetic syndromes.

BARBARA JASNY

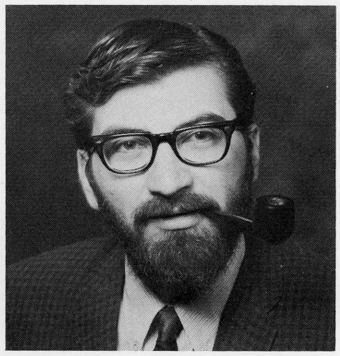
Igor Tamm

The fundamental problem that Barbara Jasny has investigated is that of the organization of activated initiation sites for DNA replication in mammalian cells.

BRINES



BRINK



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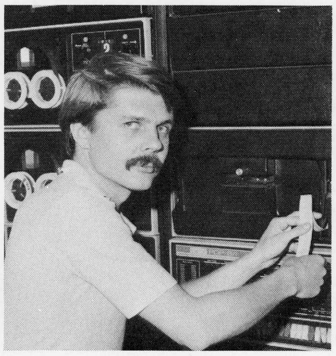
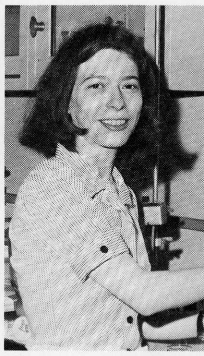
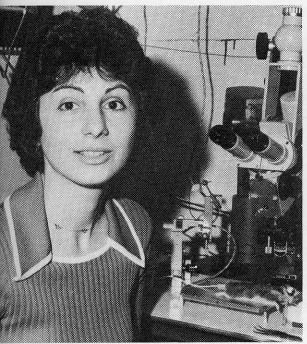


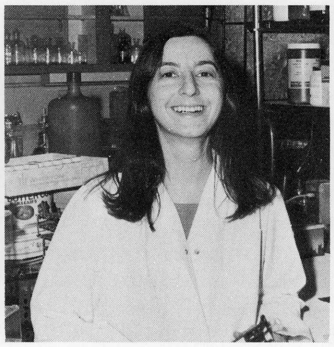
DREWNOWSKI



HALPERN



HYMAN



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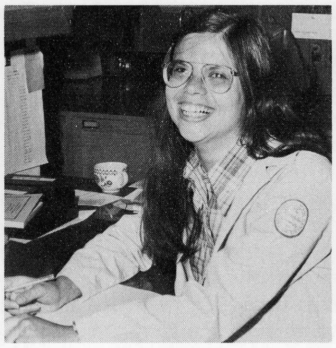
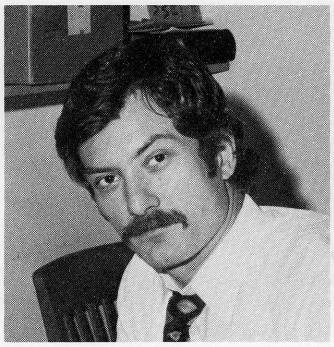
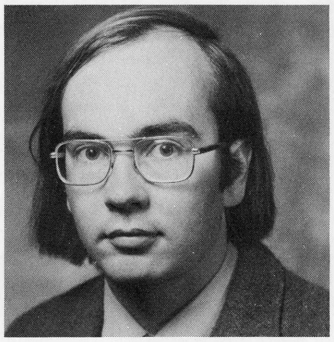


JASNY

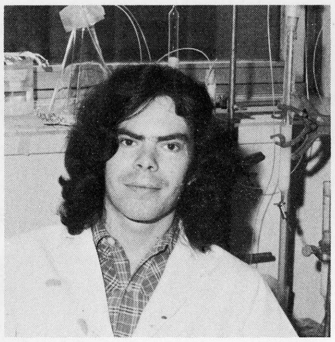


MACKEL

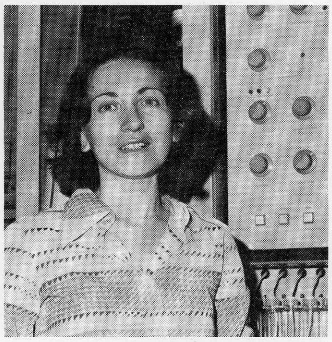
MAHONEY



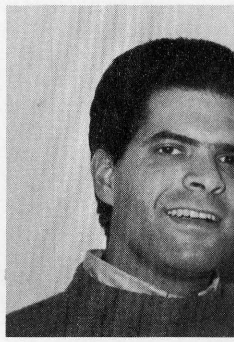
McCLAIN



MILNER



MOJSOV



RAPOPORT

There are some 75,000 origins activated in the course of a round of DNA replication (the S phase in the cell cycle). Synthesis of daughter chains proceeds bidirectionally from the origins. Barbara obtained suggestive evidence that the distribution of initiation sites on stretches of DNA was not random. To test this, she linked forces with Professor Joel E. Cohen, who developed a statistical model and suggested a series of tests. Thus Barbara's natural talent for mathematics found expression in a highly sophisticated analysis of the precise and extensive biological data that she had obtained by isotopic labeling and autoradiography of DNA strands. Barbara's work has established for the first time that there exists a nonrandom pattern of initiation events within segments of DNA. Furthermore, this pattern can be disturbed and changed towards randomness, without changing the mean distance between the initiations. She has proposed a scheme of how the sites are clustered. These results have important consequences for our understanding of mammalian DNA replication.

JONATHAN D. LEAR

(*Degree granted* in absentia)

The topic of Jonathan D. Lear's thesis was Aristotle's Theory of Proof. His research advisor was Saul A. Kripke.

ROBERT G. MACKEL

(*Degree granted* in absentia)

The topic of Robert G. Mackel's thesis was The Central Nervous System Control of the Urethral and Anal Sphincters. His research advisor was Barry W. Peterson.

EILEEN M. MAHONEY

William A. Scott

When Eileen M. Mahoney began her studies, very little was known about the effect of membrane composition on its function. She set out to examine this question by modifying one component of the lipid bilayer, the fatty acid moiety. For this purpose, she chose the macrophage, one of the white blood cells important in host defense. Eileen devised procedures to enrich the membranes of macrophages in culture with saturated and *trans*-unsaturated fatty acids without otherwise modifying the structure or content of other membrane lipids. She examined the rates of phagocytosis or cell-eating and pinocytosis or cell-drinking in macrophage populations with altered membranes. Both processes involve the ability of the cell to interiorize membrane, fuse it to form vacuoles, and modify it during turnover. She found that in modified cells the phagocytic uptake of particles via specific membrane receptors is reduced. Also, the minimal temperature for the process increased, and greater energy is required. Examination of pinocytosis revealed a reduced rate at all temperatures in fatty acid-fed cells but no increased energy expenditure. Normally the rates of phagocytosis and pinocytosis in the macrophage are tightly regulated. Eileen was able to correlate the reduced rates of cell-eating and -drinking with an increased rigidity of macrophage membranes resulting from the altered fatty acid composition. The latter was determined by electron spin resonance measurements in collaborative experiments with Dr. Frank Landsberger. Eileen's experiments indicate that membrane lipids influence both pinocytosis and phagocytosis in the macrophage, mechanisms whereby the body is protected from foreign invaders and tumor cells.

DONALD A. McCLAIN

Gerald M. Edelman

The cell division cycle is a complicated set of events that guarantees the orderly doubling of DNA and the parceling of goods and structures of a parent cell to what will eventually be two daughter cells. Donald McClain became interested in understanding this fundamental set of events of mitosis early in his graduate studies. He was able to show that the mitogenic stimulation of lymphocytes by plant mitogens consists of two sets of controlling events: surface stimulation of the cells by a positive signal and a dominant negative signal that affects submembranous structures as well. He then went on to show that certain submembranous structures, such as microtubules, played a role in the commitment of a cell to divide. These are fundamental studies executed by a superbly intelligent, modest, and idealistic man, with whom it has been a privilege to work.

ROBERT MILNER

Bruce A. Cunningham

Robert Milner has applied immunological techniques in conjunction with radioisotopes to study the structure of an important class of cell surface proteins. These transplantation or histocompatibility antigens are recognized by the immune system in the rejection of transplanted tissues and in the destruction of tumor and virally infected cells. Rob organized a highly sophis-

ticated program to prepare antibodies that recognize individual histocompatibility antigens in mice. He then used these antibodies to define the overall structure of these molecules. With his colleagues, he also developed microchemical techniques to determine the partial amino acid sequences of histocompatibility antigens from mice of different genetic types. These studies have provided valuable insights into the nature of these molecules and have set the stage for analysis of the complete structure of histocompatibility antigens. This fall Rob will begin postdoctoral studies with Dr. Floyd Bloom at the Salk Institute, where he will apply his unusual combination of skills in genetics, immunology, and cell surface chemistry to the nervous system.

SVETLANA MOJSOV

Bruce Merrifield

Svetlana Mojsov came to Rockefeller from the University of Belgrade, where she had majored in physical chemistry. Her interests soon changed to the general areas of biochemistry and peptide chemistry and specifically to the peptide hormone, glucagon. After a series of careful investigations on the technique of solid-phase peptide synthesis, she was able to devise a detailed strategy for the synthesis of this important regulator of carbohydrate metabolism. The synthesis of the 29-residue peptide was successful and led to a highly purified, crystalline product possessing full biological activity. With this significant achievement completed, she has begun to examine the predicted effects of changes in the structure of the peptide on its conformation and membrane affinity. She also plans to apply her new techniques to the design and synthesis of inhibitors of glucagon that will aid in the treatment and control of diabetes mellitus. It has been very satisfying to observe Svetlana's scientific development during the course of her graduate studies here at our University. She has become knowledgeable in her field and has developed a wide range of laboratory expertise.

SAMUEL RAPOPORT

Victor J. Wilson

Samuel Rapoport began his graduate studies at Rockefeller University while still in his last year as a medical student at Cornell. In a way then, he has been doing an individual M.D.-Ph.D. program. For his thesis project, he studied the reflex interconnections of muscles in the cat neck. Control of head movement is a subject that has only recently received the attention it deserves and the kind of experiments done by Sam are badly needed. For many years our knowledge of spinal organization was mainly based on the reflexes of the left hind leg. Later, work advanced to the forelimb by way of the tail. Even today, much less is known about the neural substrate of reflexes of axial structures. Sam showed that two basic circuits of limb reflex pathways, reciprocal innervation and recurrent inhibition, are lacking in the neck. This is presumably related to two things. First, there are many degrees of freedom in head movement, and muscles may be antagonists in one movement but not another. Secondly, head movement is not characterized by the oscillatory movements of limbs during locomotion. The difficult experiments that Sam Rapoport did have produced important information that we must have as we try to understand the neural control of posture and movement.

JEFFREY RAVETCH

Norton D. Zinder

Jeff Ravetch came to us from Yale with considerable training in nucleic acid chemistry. In quick order he produced sufficient data to write papers on ribosome binding sites and protein biosynthesis. A mutant had been isolated in a bacterial virus we were studying. It was supposed to be a change in the DNA sequence of this virus such that a particular sequence-specific enzyme would no longer recognize this DNA and cut it. The viral mutant had this property, but to everyone's surprise it also had another rare type of mutation in a gene coding for a particular viral protein. The simple explanation was that these two functions were controlled by overlapping nucleic acid sequences. If this were so, then when one of the mutations reverts, the other mutation should revert also. It didn't. Jeff sequenced this region in the normal, the mutant, and a number of similar recognition sites. DNA is a long polymer containing four chemicals called bases A, G, C, and T, which encode in their sequence the information that resides in the DNA. Part of the particular enzyme recognition sequence we were studying was composed of the three bases T-G-A. It had mutated to T-T-A. The next base in the DNA chain after the A was a G, thus giving T-T-A-G in the mutant. For a protein-controlling gene, T-A-G means "stop": hence the other mutational change. Now all would have been revealed and forgiven had the reverse mutation gone back to T-G-A-G. Instead it went still further forward to T-T-A-T, thereby reversing one mutant property but not the other. Moreover, another interesting fact began to emerge. Jeffrey was studying the sequence of many independent mutants of this virus. It seemed that whenever possible, the mutants were G-to-T changes, one of the rarest and most difficult kinds of base substitution mutation found. A curious thing is that this virus' DNA contains a large excess of T residues. The problem Jeffrey has left us with is how does this virus know that it's to have an excess of T and to mutate in this direction, when the host that it grows in has no such excess T and has difficulty even producing this type of change. I've touched only lightly on the many problems that Jeff has left the geneticists to solve.

STEPHEN M. REDER

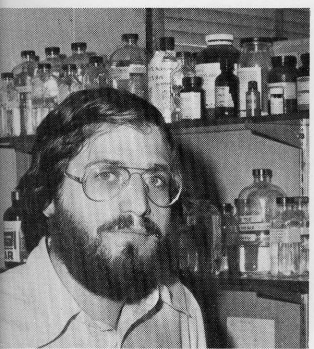
(*Degree granted* in absentia)

The topic of Stephen M. Reder's thesis was Functional Relations between Speaking and Writing: the Case of Vai. His research advisor was Michael Cole.

ABRAHAM SNYDER

Robert Shapley

Sometimes I have felt that watching Avi Snyder do scientific experiments was like watching Harpo Marx play the harp: he dit it very well but it was only a small part of his act. Avi is an accomplished pianist, he has done some promising experiments in computer-generated art, and he has an intense interest in developing a theory of the functions of the brain. His thesis work on the visual cortex in normal and visually deprived cats grew out of this determination to reach an understanding of the func-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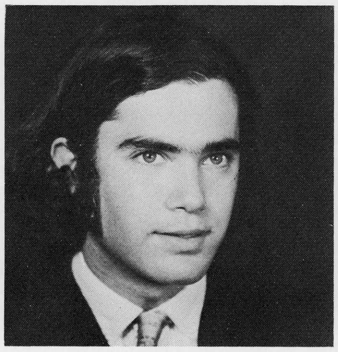
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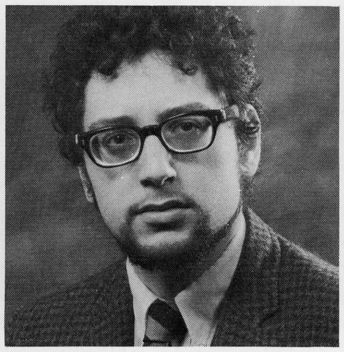
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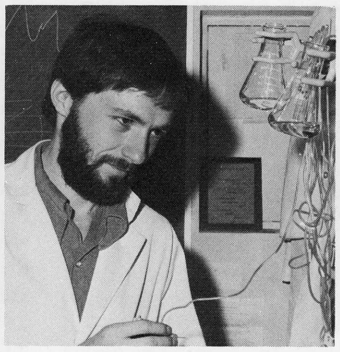
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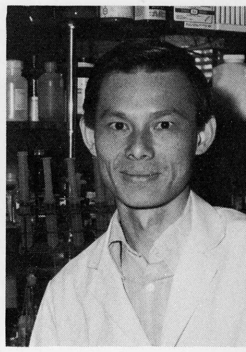

TZENG

tion of the brain. One of the most interesting features of the visual system is that it is quite plastic in young animals. If a kitten is reared with one or both eyes closed, the central visual pathways are irreversibly disrupted. Avi studied this phenomenon by measuring the cortical evoked potentials in response to visual stimulation with spatial patterns. He found specific deficits in the responses of monocularly deprived cats and different specific deficits in binocularly deprived animals. He also showed that kittens that were monocularly deprived while anesthetized responded in just the same way as binocularly deprived cats. This is pioneering work of great practical and theoretical importance.

STEVE S. SOMMER

Warren Jelinek

Steve Sommer was accepted into the M.D.-Ph.D. Rockefeller University-Cornell joint program in 1972. He arrived at Rockefeller already quite advanced in his knowledge of math and physics. Over the course of the first year Steve learned that it was impossible to arrive at believable scientific answers through wit and intuition alone and that all the variables and unpredictables in a biological experiment couldn't be divined at the outset. Nonetheless, he was able to do what in our experience not every physicist turned would-be biologist is able to do—adapt to the semi-quantitative, repetitive mode of biologic research. As he got better at laboratory experiments and fewer test tubes hit the deck, his fertile mind regained the freedom he needed and he began always to be the first to see a hint in an experiment that a better designed probe at a question would yield the answers we sought. He chose as the subject of his thesis work the meaning of addition of methyl groups to messenger RNA in animal cells. As is almost always the case, facts about the subject had to be gathered before meaning could be imputed. But gather the facts he did, and his conclusions—that these chemical hallmarks of mRNA are added in the cell nucleus and all are likely transported to the cytoplasm during the journey of the mRNA and finally some are rapidly lost in the cytoplasm—represent important contributions to an important area of biology.

MU-CHIN TZENG

Philip Siekevitz

Why do biochemists and neurobiologists study the molecular properties of the toxins of amphibians, snakes, insects, and arthropods? The answer is fairly simple: these are all neurotoxins, and are turning out to be wonderful probes of the biochemical functioning of the nervous system. One of the most toxic of these poisons is the venom of the black widow spider, *Latrodectus*. The venom of the Italian spider, which we use, is many times more active than that of the American one. Doctors Alexander Mauro and William P. Hurlbut here had been studying the electrophysiological effects of this venom, and a few years ago, their laboratory and mine joined forces, with the aid of Dr. Nora Frontali from Italy, to isolate and purify some of the protein toxins in this venom. Strangely, the venom has different proteins, corresponding to a range of possible adversaries and food for the spider. Mu-Chin Tzeng completed this earlier work and greatly extended it. Using biochemical, morphological, and electrophysiological techniques, he has found, in essence, that the major protein that he has purified from this venom is the one acting on the vertebrate central nervous system, at all the different cell-to-cell junctions, or synapses, in the brain, and with the same effects in all cases. He has made a significant start in finding which cellular and membrane proteins interact with this toxin. Indeed, as a result of this work, I think it can be said that this protein is now the most excellent probe for the elucidation of the mechanism of the chemical transmission of the nerve impulse from cell to cell.

HONORARY DEGREES

WALTHER GOEBEL

Maclyn McCarty

Walther Goebel arrived at this institution in 1924 during a period that he has recently characterized as "the golden age of immunology at The Rockefeller Institute." In a short time, he assumed an important role in the drama of these immunological events and contributed much to the golden quality of the era. Trained as an organic chemist and fresh from a postdoctoral year with Professor Richard Wilstätter in Munich, Goebel joined Heidelberger and Avery in their pioneering studies of bacterial polysaccharides. He was uniquely suited also to follow the precepts of another Rockefeller immunologist, Karl Landsteiner, who was preeminent in establishing the chemical basis for serological specificity. He extended Landsteiner's approaches to an understanding of the specificity of the sugar building blocks of the polysaccharides. He established the individual serological specificity of the common simple sugars in a set of experiments that can be epitomized by his finding that the two anomeric forms of glucose, which differ from one another only in the configuration around the first carbon atom, show distinct differences in serological reactivity. A milestone in the biological implications of polysaccharide structure came from his studies of the Type III pneumococcal polysaccharide, which he and Heidelberger had shown to be a linear polymer made up of disaccharide repeating units. A synthetic antigen, prepared by skillful chemical manipulation of this disaccharide unit, elicited antibodies that reacted with Type III polysaccharide and protected mice from infection with Type III pneumococci—a final, elegant proof of the importance of the polysaccharide capsule in the virulence of pneumococci. He responded to the special needs of World War II by turning to a new area and tackling the complex antigens of the dysentery bacilli. In the succeeding years, he brought the precise disciplines of immunochemistry into this world of Gram-negative bacteria, exploring their antigens, their interaction with bacteriophage, and the nature of the bacteriocins. In focusing on the many contributions of Walther Goebel in the more traditional scientific pursuits of our University, one should not overlook his efforts on behalf of its cultural life. We owe to his enthusiastic sponsorship, for example, the continuing evening art course.

LEWIS G. LONGSWORTH

Vincent P. Dole

Lewis Gibson Longsworth ranks with the pioneers of modern biochemistry. His fundamental work in quantitative electrophoresis provided an early model of the separation methods used today in all laboratories. Consider the state of the analytical art 50 years ago, when Longsworth came to Rockefeller Institute as a research fellow in the department of Duncan MacInnes. Biochemists of the time were still using essentially the same methods as their predecessors of the 1800s: color reactions, precipitation, distillation, and combustion. The new principle that made modern biochemistry possible was the separation of molecules by differential migration in a field of force. Today, with modern techniques of electrophoresis, differential centrifugation, and chromatography, chemists can easily measure trace quantities of substances unimagined 50 years ago. The key to this development is the sorting out of molecules by differences in their mobility, and this was the central theme of Longsworth's investigations. Of course none of the subsequent development could have been foreseen when he began his work on moving boundaries five decades ago. The problem that occupied him then, and for much of his scientific career—the transference numbers of ions in aqueous solutions—had no obvious connection to the concerns of organic chemists, but this is not surprising. The relevance of fundamental work to application in the so-called real world often can be seen only in hindsight. Two other apparently disparate applications of his work stem from the concept of ionic mobility. Bioelectric potentials, associated with cellular activity, gradients of material, and transport processes in general, are consequences of the differential mobilities of charged particles. Theory as yet is inadequate to explain these phenomena in detail, but when all becomes clear, the language of the explanation will be that of the electrochemists. In all of his scientific communications, Longsworth has been utterly convincing. So thoroughly is his work thought out, so precisely done, and so accurately described that editors can only congratulate him. He may be the only person on our staff to be told by the editor and reviewers of a major journal that they had been unable to discover a flaw in the manuscript.

On Their Way

What are the immediate destinations of the University's 22 new graduates?

Michael L. Brines, Emily Brink, Eileen M. Mahoney, and **Svetlana Mojsov** are remaining at Rockefeller as postdoctoral fellows. Three members of the joint Rockefeller-Cornell Medical Center M.D.-Ph.D. program, **Donald A. McClain, Jeffrey Ravetch,** and **Steve S. Sommer,** will complete their medical studies at Cornell. **Howard Burdick** has a research fellowship at the Australian National University. **Adam Drewnowski** holds a postdoctoral fellowship in the department of psychology at the University of Toronto. **Alan Jay Fischman** will become a medical student at Yale University. **Dana Giulian,** who has already completed medical studies at Cornell Medical Center, will go to Dartmouth as an intern. **Carol C. Halpern** will do postdoctoral viral research at MIT. **Angela Hyman** will attend Harvard Medical School. **Victoria Iwanij** has a postdoctoral appointment in the department of cell biology at Yale. **Barbara Jasny** will do postdoctoral research in DNA replication at the State University of New York at Stony Brook. **Jonathan Lear** has been appointed assistant professor of philosophy at Yale. **Robert G. Mackel** is joining the department of physiology at the University of Göteborg, Sweden. **Robert Milner** has a postdoctoral appointment in neurobiology at the Salk Institute in California. **Samuel Rapoport,** who holds an M.D. from Cornell, will complete his internship and go on to a neurology residency at Cornell. **Stephen Reder** has a research appointment at the Northwest Regional Education Laboratory in Portland, Oregon. **Abraham Snyder** is going to medical school at the State University of New York at Buffalo. **Mu-Chin Tzeng** has been appointed an associate scientist at the Institute of Biological Chemistry, Academia Sinica, in his native Taiwan.

Farewell from President Seitz

In the *Report of the President 1977–1978*, published in June, Frederick Seitz bids farewell to his campus colleagues, extends his heartfelt thanks for the cooperation of so many through difficult years of inflation and cutbacks, and welcomes his successor, Joshua Lederberg, to an institution which, by dint of difficult and often painful decisions, is in good shape financially and scientifically.

He states: "Our University was determined from the start to impose the highest possible standards for selecting those who seek scientific careers, with the auxiliary stipulation of our founders that we serve mankind through basic contributions to medicine. It is imperative that we remain uncompromising with respect to these standards. . . . The sternly inspiring benchmark of excellence in research and education implies concern for authentic talent, for persistent originality, and for informed evaluation of the significant results. The record of our institution shows that, in applying such standards to appointments and to the use of resources, the outcome has been consistently important to society.

"I leave office with the fervent wish that society will help us to extend our valuable work here *pro bono humani generis*. This wish bespeaks my faith that The Rockefeller University will continue to sustain a deep involvement in its historic mission of promoting the well-being of humanity through contributions to the understanding of nature and through innovations in medicine."

President and Mrs. Seitz, above, at trustees' dinner with souvenir album of "The Seitz Years." Below, Mrs. Seitz and Mrs. Attallah Kappas admire gifts at faculty party. Below, left, best wishes to Dr. Seitz from E. G. D. Cohen, representing the Faculty and Students Club at the club's 20th anniversary party.

HONORS & AWARDS

Trustee and Adjunct Professor **Lewis Thomas,** president and chief executive officer of Memorial Sloan-Kettering Cancer Center, received an honorary doctor of science degree from Columbia University on May 17.

Professor and Physician-in-Chief **Attallah Kappas** received an honorary doctor of science degree from New York Medical College on June 6.

Professor **Purnell W. Choppin,** Virology, received the Howard Taylor Ricketts Award of the University of Chicago Medical Center and delivered the Howard Taylor Ricketts Award Lecture on May 8. He spoke on Structure and Function of Paramyxovirus and Myxovirus Membranes. The award was established in honor of the University of Chicago scientist who demonstrated that Rocky Mountain spotted fever is transferred to man by ticks and for whom the genus *Rickettsia* was named. Previous winners who have been associated with Rockefeller were Thomas Francis, Jr., Joseph E. Smadel, René J. Dubos, Albert B. Sabin, Richard E. Shope, and Sir Christopher H. Andrewes.

Carol Moberg, secretary to Professor René J. Dubos, was awarded the Ph.D. degree from Columbia University on May 17. Her thesis was in the field of English and comparative literature, on the use of the words "Heart" and "Love" in Middle High German and Provençal love lyrics.

Neighborly gesture. Reba Sarkar, wife of Dr. Nurul Sarkar of Sloan-Kettering, and Rockefeller Children's School group prepare for annual show.

Scribner to HEW

Senior Research Associate Sylvia Scribner, Comparative Human Cognition, has been appointed associate director of the National Institute of Education of the Department of Health, Education, and Welfare, effective August 15. She will head the Teaching and Learning Section, which under a new reorganization plan consolidates development and funding of behavioral research on teaching and learning processes.

Dr. Scribner, who joined the Rockefeller faculty in 1970 to pursue interests in cultural influences on cognition, will continue her research in this field, directing a study of the psychological skills involved in literacy among an adult industrial working population.

Neal Miller President of New Academy

Professor Neal E. Miller, Physiological Psychology, has been elected the first president of the Academy of Behavioral Medicine Research. He will serve for a one-year term.

Formed in April, the purpose of the organization is to promote the interdisciplinary efforts of researchers in the behavioral and biomedical sciences in relation to the understanding and treatment of disease.

CONCERT SERIES

The 1978–79 Rockefeller University Concerts will begin on October 4. There will be 12 Wednesday night concerts at 8 P.M. in Caspary Hall. The full series may be purchased for $45, or either of two half-series, designated A and B, for $27.

The A series program is: the King's Singers (October 4); the Romeros, guitarists (October 25); the Guarneri Quartet (December 13); the Beaux Arts Trio (February 21); the Netherlands Wind Ensemble (March 21); and Stephen Bishop, pianist (April 4).

The B series program is: the Belgrade Chamber Orchestra with Lynn Harrell, cellist (October 18); Jorge Bolet, pianist (November 15); Vladimir Spivakov, violinist (January 31); the Juilliard String Quartet (March 14); Maria Ewing, mezzo-soprano (April 18); and The Cleveland Quartet with Richard Stoltzman, clarinetist (May 16).

CHARGAFF'S MEMOIRS

continued from page 1

fire was the underlying substance of the universe. Dr. Chargaff begins his book by reflecting on the fires of Hiroshima and Nagasaki and the role of scientists in that holocaust and in the holocaust in Europe, from which he escaped, but in which his mother was among the millions who perished.

He was born in 1905 in the "last glow" of the "blissful decrepitude" of the Austrian empire. After earning a Ph.D. in chemistry from the University of Vienna, he spent the early years of his career at Yale, the University of Berlin, and the Pasteur Institute in Paris—all trenchantly and often hilariously recreated in the book—before returning to the United States, to Columbia University's College of Physicians and Surgeons. For him, as for so many others, there was to be no return to a beloved homeland, and he remembers hearing, in those early days at Columbia from the open doors of the department of biochemistry, "the rich mixture of Brooklynese, Bostonese, but mostly Hamburg-American."

Dr. Chargaff describes the progress of his multifaceted research at Columbia, where he remained until his retirement in 1974; and he paints lively verbal portraits of his colleagues. (Readers familiar with the much-publicized drama of the race toward the double helix will relish his irreverent impressions of the major players.) He explains how the pivotal findings of Oswald T. Avery and his co-workers at The Rockefeller, who identified DNA as the genetic substance, spurred his own important discoveries.

Throughout the book, two major themes resonate—profound reverence for the mystery and wonder of the natural world and horror at the human abuse of it: in recent years, most specifically, his dread of "big science," which he sees as more and more "utility-drunk," "complacent," fragmented, and dangerous.

His strong, often iconoclastic views have not endeared him to many of his peers. In an epigram in the book which typifies the superbly crafted style of the man who once dreamed of becoming a writer, Erwin Chargaff declares: "If at one time or another I have brushed a few colleagues the wrong way, I must apologize: I had not realized that they were covered with fur."

Heraclitean Fire was edited by Helene J. Jordan and designed by Reynard Biemiller. It is available to members of the Rockefeller community for 20 percent below the $13 list price.

BRIEFS

Professor **Abraham Pais,** Theoretical Physics, is serving on the eight-member planning committee for the Einstein Centennial Symposium to be held in March 1979 at The Institute for Advanced Study in Princeton, New Jersey.

Professor **Neal E. Miller,** Physiological Psychology, was among 30 American scientists who participated in the first Soviet-American meeting on psychology, held in April at the University of California at Irvine and sponsored by the academies of sciences of the two countries. The conference was titled Neurophysiological Mechanisms of Goal-Directed Behavior and Learning.

Professor **Nicola N. Khuri,** Theoretical Physics, was an invited speaker at a symposium on the Division of Particles and Fields at the American Physical Society meeting, held April 24–26 in Washington, D.C. His topic was Borel Summability in Quantum Field Theory. Professor **Heinz R. Pagels** served as chairman of the symposium.

Professor **A. I. Sanda,** Theoretical Physics, gave a paper at the International Conference on Neutrino Physics and Neutrino Astrophysics, held April 28 at Purdue University. He spoke on Parity-Violating Electron Interactions Induced by One-Loop Corrections.

Professor **René J. Dubos,** Environmental Biomedicine, served as the first Caldwell B. Esselstyn Fellow of the Department of Epidemiology and Public Health, Yale Medical School, April 19–21. He delivered the Caldwell B. Esselstyn Lecture, on Health and the Quality of Life. Dr. Dubos also delivered the Phi Beta Kappa Oration at the Harvard University commencement ceremonies in June.

PERSONALS

Born, April 26, to Professor **Charles P. Martucci,** Metabolism-Pharmacology, and his wife, Regina, a son, Jason Angelo, their first child.

Born June 14 to **Lynne Schwartz,** chief production editor, Journals, and her husband, Richard, a daughter, Allison Dawn, their first child.

Trager and Group Teach in Thailand, Africa

Professor William Trager, Parasitology, recently returned from Bangkok, Thailand, where he presented five weeks of courses on malaria biology and cultivation at the Mahidol University, under the sponsorship of the Tropical Diseases Research and Training Program of the World Health Organization.

The participants, all M.D.s or Ph.D.s from Thailand, India, Burma, Malaysia, South Korea, Japan, Australia, and France, were there to learn new methods for the cultivation of the human malaria parasite first developed by Dr. Trager and his lab at Rockefeller two years ago. Assisting him in Bangkok was Dr. Chariya Brockelman of Mahidol University, a former postdoctoral fellow in his lab.

Dr. and Mrs. Trager also visited a malaria control center to observe work on chloroquine-resistant malaria, now prevalent in Thailand; as well as research laboratories in Bombay and Delhi, where Dr. Trager addressed the Indian National Institute for Communicable Diseases and met with Dr. C. Gopalan, director general of the Indian Council for Medical Research.

Two other members of his lab, Professors James B. Jensen and Robert T. Reese, conducted a similar course in Ibadan, Nigeria, in June, also sponsored by WHO.

All in the Family

A recent visitor to the Rockefeller campus was Deborah Gates Senft, granddaughter of Frederick T. Gates, advisor to John D. Rockefeller and the man whose vision of the application of science to medicine led to the founding of this institution.

Although Frederick Gates was not himself a scientist, his interest in science became a family affair. His eldest son, Frederick Lamont Gates, Mrs. Senft's father, was a bacteriologist at The Rockefeller from 1913 to 1929. She herself holds a master's degree in physiology and has worked with her husband, Professor Alfred W. Senft of Brown University, on his schistosomiasis studies. He was here to address the Biochemistry of Parasites Seminar in April. Frederick T. Gates III, great-grandson of Frederick T. Gates and Mrs. Senft's nephew, was at the University as a postdoctoral fellow in immunology in 1976–77. The oldest of the Senfts' three children, Stephen Lamont, is a graduate student in neurophysiology at the University of Oregon.

Of her visit to the University, the first in many years, Mrs. Senft said: "It was fun to walk around Founder's Hall and see portraits of people we knew and others I have heard about all my life."

APPOINTMENTS

Ernst A. H. Friedheim, formerly guest investigator, as visiting professor, Medical Biochemistry, effective May 1.

Robert H. Schor, Neurophysiology, as assistant professor, effective July 1.

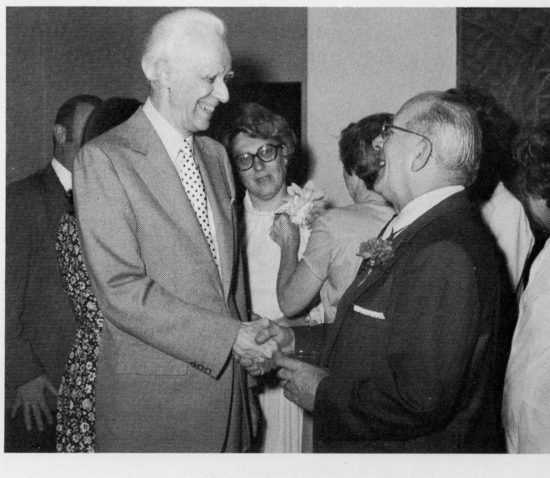
Sigma Xi Elects

Following is the list of new and promoted members of the University's chapter of Sigma Xi, The Scientific Research Society of North America, during this academic year.

Fulton Wong was promoted from associate member to full member. Elected as new full members are: Karl E. Anderson, Günter Blobel, Robert Contreras, Rise K. Cross, Howard Fillit, David C. Merz, Peter H. Model, Stanley E. Read, George N. Reeke, Jr., Samuel M. Silver, and Giorgio Vidali. New associate members are Jaqueline Blanchard and Robert J. Filewich.

New officers are E. G. D. Cohen, president; Günter Blobel, vice president and president-elect; Ronald Larkin, secretary; George Reeke, treasurer; Giorgio Vidali, executive committee member; and Peter Model and Stanley Read, admissions committee members.

A fond farewell from Stanford Moore, left, to Walter Schuerger, center, and Vera Schuerger, second left, at their retirement party on June 23.



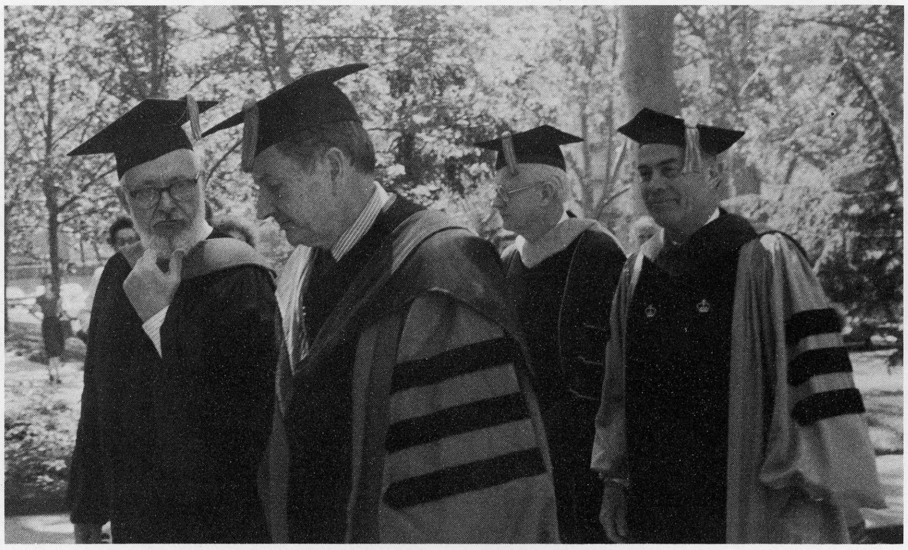
Hospital Reports Drug Effect on Gall Bladder

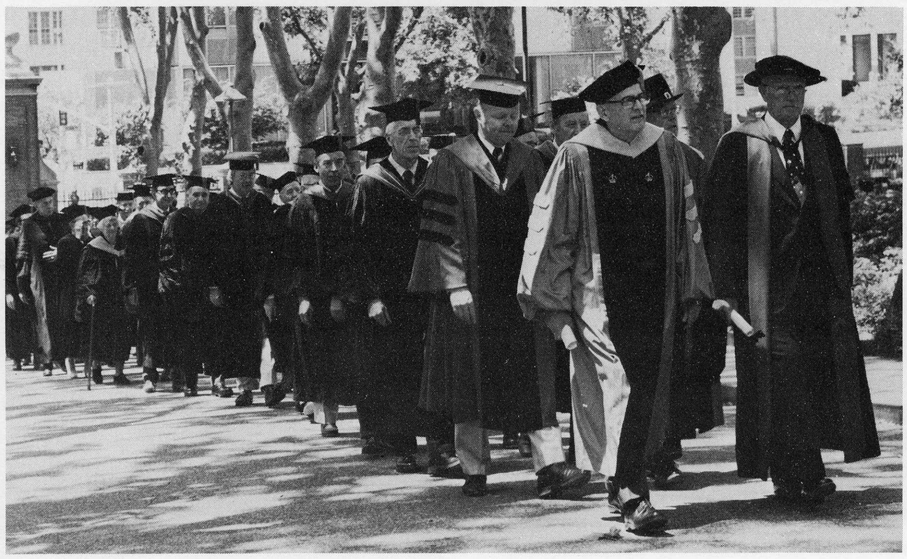
Hyperlipidemia patients taking the drug clofibrate appear to run a risk approximately eight times normal of developing gallstones or nonfunctioning gall bladders, according to studies at The Rockefeller University Hospital. By contrast, patients given the drug cholestyramine did not have increased gall bladder problems.

Clofibrate, marketed under the brand name Atromid S, is a widely prescribed treatment for hyperlipidemia, a condition of elevated levels of fatty substances in the blood, believed to be a significant factor in the development of arteriosclerosis and heart disease.

These findings were reported by Adjunct Professor Robert H. Palmer at the annual meeting of the Association of American Physicians, the American Society for Clinical Investigation, and the American Federation for Clinical Research, held April 29–May 1 in San Francisco. Dr. Palmer was medical director of the Hospital's Center for the Prevention of Premature Arteriosclerosis, which from 1972 to 1977 ran a wide-ranging program of tests, with many hundreds of hyperlipidemic volunteers, to learn more about the effects of diet, drugs, and behavior in relation to the prevention of coronary heart disease.

Commenting on the clofibrate findings, Professor Edward H. Ahrens, Jr., head of the University's laboratory of cholesterol metabolism, who was principal investigator on the CPPA project, states: "Physicians faced with the problems of hyperlipidemia in their patients must weigh the possible advantages of lipid-lowering versus the disadvantage of gallstone formation. Lipid-lowering has not yet been proved to retard or prevent coronary heart disease, although this premise is widely believed to be sound. In fact, it was CPPA's goal to ascertain whether the premise is correct. In fairness to clofibrate it must be stressed that gall bladder disease was caused in only 4.2% of the patients over a one-year period."





PROMOTIONS

Partial listing:

Anthony Cerami, Medical Biochemistry, to professor, effective July 1.

Donald W. Pfaff, Physiological Psychology, to professor, effective July 1.

William H. Beers, Cell Biology, to associate professor, effective July 1.

Claude Ghez, Neurophysiology, to associate professor, effective May 1.

William S. Hayward, Viral Oncology, to associate professor, effective July 1.

Charles M. Peterson, Medical Biochemistry, to associate professor, effective July 1.

David H. Live, Physical Biochemistry, to assistant professor, effective July 1.

Population Council Appoints Bardin

C. Wayne Bardin has been appointed director of the Population Council's Center for Biomedical Research, housed in the Tower Building of the University. He succeeds Sheldon Segal, who has joined The Rockefeller Foundation.

Dr. Bardin has been professor of medicine and chief of the endocrinology division of the Milton S. Hershey Medical Center at Pennsylvania State University College of Medicine since 1970. He is an associate in physiology at the Hershey Center and a consulting physician at the Veterans Administration Hospital in Lebanon, Pennsylvania.

He will head the council's major new program of research on the physiology of the male reproductive system, aimed at the eventual development of contraceptive methods for men, and also supervise the council's other contraceptive research efforts, and direct programs for biomedical and research awards. He is expected on campus September 1.

UNTIL OCTOBER

This is the last issue of *news and notes* for the academic year. The next issue will appear in October.

news and notes is published from October through July. This is Volume 9, Number 10. Suggestions for articles are welcome and may be sent to *news and notes*, Box 194, phone extension 1420 or 1051. Photographs: page 1, 8, and 7, bottom right, Henrik Boudakian; page 3, 4, 5, and 7, bottom left, George Rodriguez; page 7, top, Allen Green; page 9 and 10, George Byron. Published by The Rockefeller University Press, New York 10021. Printed in the United States of America.