In This Issue

Behavioral biology—the study of the biological basis of behavior—is a relatively new scientific discipline, and one of growing interest and significance. At Caltech this month its importance is reflected in the dedication of the new Mabel and Arnold Beckman Laboratories of Behavioral Biology. And that event is underscored by this special issue of *E&S*, which presents articles by seven members of the faculty about their research in this field.

The Beckman Laboratories—in which about 80 faculty members, postdoctoral fellows, research associates, graduate students, and technicians will do research and teaching in behavioral biology—are located on the west side of the Beckman Auditorium mall. Externally, the building is a twin of the Donald E. Baxter, M.D., Hall of the Humanities and Social Sciences on the east side of the mall. Inside, of course, Beckman and Baxter are not at all alike. Beckman has offices, laboratories, and data preparation and storage rooms for each of nine research units. In addition, there are laboratories, an instrument room, a central stock room, and a sterilization room which will be shared. When the laboratories are in full operation, the faculty and students working there will be making studies of perception, developmental psychology, comparative psychology and ethology, neuroanatomy, neurophysiology, neurochemistry, psychopharmacology, physiological psychology, and experimental psychology.

The objective of such study, says Robert Sinsheimer, chairman of the division of biology, is "to apply the disciplines of the natural sciences to achieve understanding of the biological foundations for animal and, ultimately, human behavior. . . . The origins of human motivation and aggression, of mental illness, of some forms of criminal and other antisocial behavior, and the processes of education and learning are among the areas that might be illuminated."

The achievement of such goals is in the future, but the work has begun. The seven authors of the articles in this issue—Seymour Benzer, James Olds, Anthonie Van Harreveld, C.A.G. Wiersma, Richard Russell, Roger Sperry, and John Pettigrew—are all distinguished scientists in the field. Among them there are six PhD's, two MD's, and two DSc's, and their work at the Institute alone totals more than 112 years. While they are by no means the only people at Caltech whose work can be called behavioral biology, they represent a cross-section of approaches to this expanding field, and a broad spectrum of experience that can only be suggested in these brief biographical notes:

Seymour Benzer

Seymour Benzer, professor of biology, began his scientific career as a physicist, and got his PhD at Purdue University in 1947. Almost immediately he became interested in the application of physical concepts to biological problems—using viruses as model systems for gene replication. In 1971 he received a Lasker award for work in this field—research that is generally credited with establishing the foundations of the field of fine-structure genetics. In the mid-1960's Benzer's interest in the possibility of applying molecular biology to the problems of brain function and his curiosity about the genetic control of behavior led him to shift his scientific sights to behavioral biology. He came to Caltech to work with Roger Sperry in 1965, and since 1967 has been making studies of development and behavior in the fruit fly *Drosophila*.

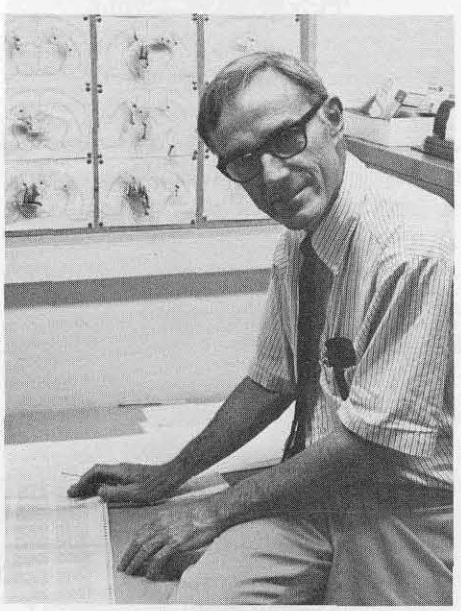
STAFF: *Editor and Business Manager*—Edward Hutchings Jr.
Managing Editor—Jacquelyn Bonner
Associate Editor—Bernard Cole
Art Director—Kathleen Marcum
Photographer—Floyd Clark

PICTURE CREDITS: 20—Anthonie Van Harreveld/All others—Floyd Clark.

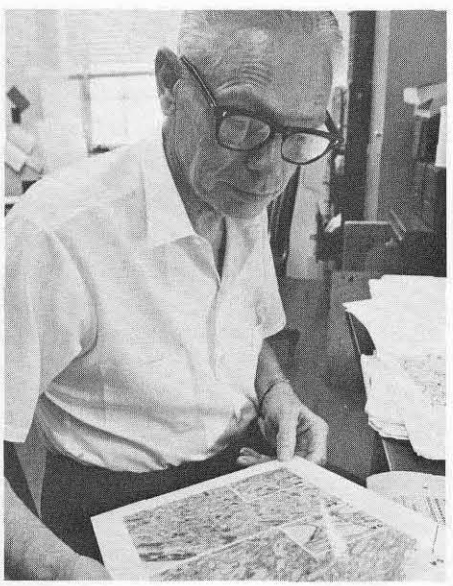
Published seven times each year, in October, November-December, January, February, March-April, May, and June, at the California Institute of Technology, 1201 East California Boulevard, Pasadena, California 91109. Annual subscription $4.50 domestic, $5.50 foreign, single copies 65 cents. Second class postage paid at Pasadena, California, under the Act of August 24, 1912.

James Olds

James Olds, Bing Professor of Behavioral Biology, is a 1947 graduate of Amherst and has a PhD in psychology from Harvard. After graduation he held research appointments at Harvard, McGill, and UCLA, and in 1957 became a member of the faculty at the University of Michigan. In 1969 he came to Caltech and in 1970 was appointed to the Bing professorship. Early in his career Olds discovered "pleasure centers" in the brains of rats—a significant step toward understanding the basic physiological events underlying motivation. More recently, he has been interested in neuronal factors and circuitry in the brain. He has developed a technique to pinpoint memory storage areas there by monitoring individual neurons in the act of learning, and has found evidence that memory storage sites exist in a least four different parts of the brain.



Anthonie Van Harreveld



Anthonie Van Harreveld, professor of physiology, is a native of Haarlem, the Netherlands. He attended Amsterdam University and received four degrees there between 1925 and 1931—BA, MA, PhD, and MD. He was also an assistant at the university from 1926 to 1932, and served as chief assistant at Utrecht University from 1932 to 1934. In 1934, Van Harreveld came to Caltech as a research assistant, and he has been a member of the staff here ever since. Mammalian physiology—the ultrastructure of nervous tissue, water and electrolyte distribution in the central nervous system, and acute and chronic effects of oxygen deprivation on nervous functions—has been his chief research interest. In addition to his work at Caltech, in 1943 he also served as a consultant in psychiatry at Los Angeles County General Hospital and in 1944 was a research associate in psychiatry and surgery at the University of California.

C. A. G. Wiersma

C. A. G. Wiersma, professor of biology, is also from the Netherlands. He attended the University of Leiden, receiving an AB in 1926, and then went to the University of Utrecht for an MS in 1929 and a PhD in 1933. He was a chief assistant in medical physiology (a position roughly equivalent to a senior research fellow in the American academic hierarchy) at Utrecht from 1932 to 1934, and then came to Caltech as an associate professor. In the ensuing 39 years, he has learned a lot about the freshwater crayfish; he and the neurophysiology group at the Institute have been investigating its nervous system—and that of other invertebrates—for most of that time. He also spent the seven years from 1943 to 1950 as a member of the attending staff of Los Angeles County General Hospital, and made studies of the myography and treatment of infantile paralysis and the treatment of schizophrenia with electronarcosis.

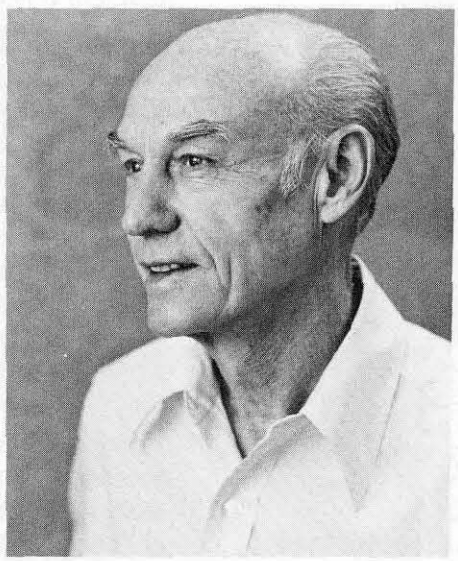
continued on page 36

Richard Russell

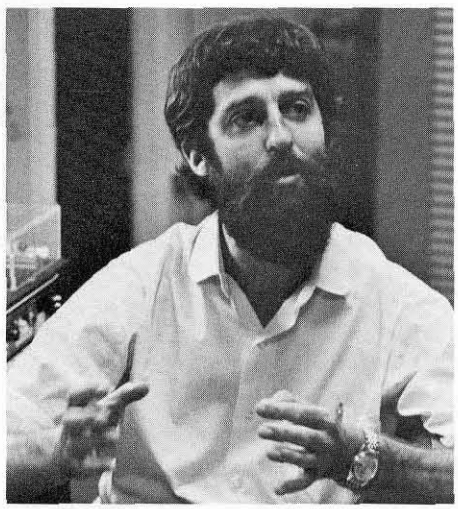
Richard Russell, assistant professor of biology, graduated from Harvard in 1962 and then came to Caltech to do graduate work in phage genetics, with a minor in chemistry. His PhD was granted in 1967, and he spent the next year as assistant professor of biology at Cornell University. For three years after that he was a postdoctoral fellow at the Medical Research Council Laboratory of Molecular Biology at Cambridge University in England. He worked there first on the study of transfer RNA and then began his research into the genetic blueprint of the nervous system in the nematode. Still working on the nematode, he is now trying to learn more about the molecular composition of synapses and how genes control their formation.

Roger Sperry

Roger Sperry, Hixon Professor of Psychobiology, attended Oberlin College, majored in English literature, and received an AB in 1935. Influenced by his undergraduate courses in psychology, he switched to that field for graduate study, earning an MA at Oberlin and, in 1941, a PhD in neurobiology from the University of Chicago. He joined the Caltech faculty in 1954, after a distinguished career at the Yerkes Laboratory of Primate Biology, the University of Chicago, and the National Institutes of Health—plus service during World War II on a government research project on surgical repair of nerve injuries. In 1971, the American Psychological Association gave him its Distinguished Scientific Contribution Award, citing him for "his now classic studies of sensory and motor integration, and his bold and original work with the split-brain preparation, both simian and human. His early work is still definitive with respect to the restoration of motor control following nerve injury in mammals. It is not too much to say that his recent studies of patients with section of the corpus callosum are epochal. . . . These are fundamental contributions to our knowledge of the nature of man."



John Pettigrew



John Pettigrew, who was recently appointed assistant professor of biology, comes to Caltech this month from Australia—by way of a three-year postdoctoral stint at UC Berkeley. His research has been concerned with how mammals perceive their environment and the importance of early experience in the development of this perception. He is the co-discoverer of a class of "binocular" nerve cells in the cat which measures depth by the amount of difference in the fields of vision of each eye. Pettigrew was born in Wagga Wagga, New South Wales, and received his BS, MS, and MD from the University of Sydney.