

Retiring This Year

Four Caltech faculty members will receive emeritus status in July—H. Frederic Bohnenblust, professor of mathematics; Edward W. Hughes, senior research associate in chemistry; Anthonie Van Harreveld, professor of physiology; and Vito A. Vanoni, professor of hydraulics.

At a faculty dinner at the Athenaeum on May 22, Robert P. Dilworth, professor of mathematics and chairman of the faculty, reviewed the distinguished careers of the four men. We quote from his remarks:

H. F. Bohnenblust

H. F. Bohnenblust, born in Switzerland, came to this country to do graduate work in mathematics at Princeton University in 1928. He completed his doctoral work in 1931 and was a member of the mathematics faculty at Princeton until 1945. Following a year at Indiana University, he joined the Caltech faculty in 1946.

Boni's administrative ability and fine judgment were quickly recognized, and he promptly became head of the mathematics faculty—serving in that capacity for 20 years. From 1956 to 1970 he was also dean of graduate studies, and his administrative contributions extended far beyond the campus. He has been president of the Association of Graduate Schools in the American Association of Universities, was a vice president of the American Mathematical Society, and is a member of several professional societies. He was co-editor of the "Annals of Mathematics" for 10 years.

Boni's research interests have been mainly concerned with that area of mathematical analysis known as functional analysis. This subject was just blossoming into a full-fledged research field when he began his mathematical career. Because of his enthusiasm and clear insight, his ideas had broad impact on the development of the field. The fact that this field is still one of the major research areas of mathematics is strong evidence that his ideas were indeed sound. Appropriately, one of the basic



H. F. Bohnenblust

results in the subject is the Bohnenblust-Sobczyk Theorem which is still quoted frequently by workers in the field. (It would probably be quoted even more frequently except for a certain understandable pronunciation problem.)

Although he established a solid reputation through his mathematical work, Boni has become even better known as a teacher of mathematics. He has, in an unusual way, the ability to make his subject matter superbly clear to students. He is one of the few members of the Caltech community to have had his picture on the cover of *Time*—as one



Edward Hughes

of the ten outstanding teachers in the nation.

There is one aspect to the teaching of mathematics that has always been a source of frustration to Boni. Many of the situations in the real world to which mathematical analysis applies are in a constant state of change. Parameters and the corresponding solutions are changing, but the diagrams drawn on the blackboards are static. They can be changed only by drawing a new diagram. With the advent of the high-speed computer and the CRT tube, Boni realized that here were tools which could overcome many of the deficiencies of blackboard and chalk. For the past several years he has been busy exploring the use of these new tools for this purpose. He is just getting well into this project, so it is clear that he will be busy for some time to come.

Edward W. Hughes

Edward W. Hughes came to Caltech in 1938, after getting his PhD at Cornell and spending three more years at Cornell as Resident Doctor. At Caltech he quickly assumed the post of Resident Bachelor. However, in 1951 he quietly went off to England for a year and to the astonishment of his colleagues returned with a wife.

Eddie has also been in the forefront of science. He introduced the techniques of the method of least squares into his professional field, crystallography; today, with high-speed computers having replaced the slide rule, least squares is the universally accepted method for handling the large amounts of data used in crystallography.

Eddie has acted as the official "greeter" for the chemistry division for many years, both in an official capacity as host for the divisional seminars and in an unofficial capacity as liaison for his wife, Ruth, who has provided housing, furniture, and solace to innumerable bewildered visitors and graduate students. The second instruction normally given to a newcomer to the division was to check in with the faculty office; the first, to check in with Ruth Hughes.

Eddie has long served as official photographer for the chemistry division, and his collection runs the complete gamut of campus life. He has also been the unofficial photographer for the American Crystallographic Association, which he served as president and as national committeeman, and for the Wildflowers and Trailblazers' Societies.

Anthonie Van Harreveld

Anthonie Van Harreveld was born and educated in Holland, completing his doctoral work at Amsterdam University in 1931. He began his professional career at the University of Utrecht and then came to Caltech in 1934.

He has served the biology teaching program well as a lecturer in Biology I, maintaining the tradition established by Thomas Hunt Morgan of having senior members of the staff teach this basic course. But first of all he is a research scientist. His work involves the nervous system, including the structure and interactions of neurons, the effects of chemicals in the nervous system, the effects of asphyxiation of the spinal cord on the spinal reflexes, and the creation of memory traces in the brain.

Van Harreveld has devoted his major research efforts to the study of the



Anthonie Van Harreveld

distribution of water in the brain. It is this work which has brought him worldwide recognition and fame.

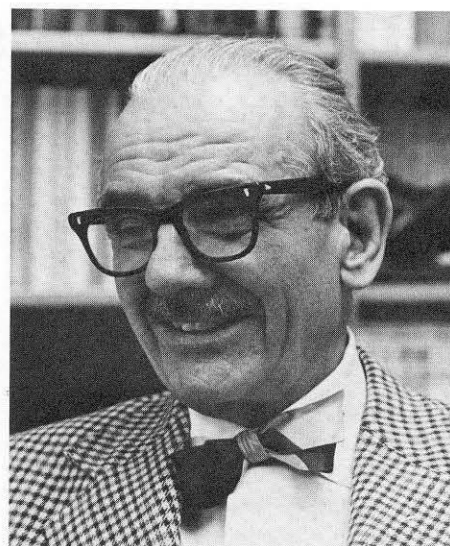
The studies of brain tissue by the electron microscopists had convinced them (and most brain physiologists) that the cells of the brain were solid against one another. From his study of what happens to the brain in asphyxia and spreading depression, Van H came to quite the opposite conclusion—namely, that in the normal brain there is substantial space filled with water that runs between the cells, and that furthermore this water can move in a mad rush from outside the cells to their insides, swelling them and making them butt against one another.

In order to show that this hypothesis was correct, it was necessary to design experiments which would detect the extracellular water. This was far from easy, since the standard detection techniques simply caused the water to disappear into the cells. With great ingenuity, and persistence, Van H designed a series of experiments that demonstrated the existence and stability of the extracellular water. He then went on to discover some of the chemical mechanisms which control the stability of the brain's water. Recently he has shown that a chemical released during spreading depression that brings the cell boundaries close together plays a role in the changes which occur in memory formation.

Vito Vanoni

Vito Vanoni made his first appearance on the Caltech campus 52 years ago when he enrolled as an undergraduate student. He then went on to earn his BS (1926), MS (1932), and PhD (1940) degrees in civil engineering, and began his official academic career at the Institute in 1942, when he was appointed assistant professor of hydraulics—having spent the intervening years in a mixture of studies, work, and research.

Though he has been on the Caltech faculty for 32 years, he has taught his specialty—sedimentation—to more foreign students than Americans. What's more, he's done it mostly in Spanish. In 1959 he took part in a U.S. government-funded AID project to upgrade the education of practicing Chilean engi-



Vito Vanoni

neers. The project seemed so worthwhile—both to Vanoni and to the Chileans—that he did it again in 1962. His Chilean students indicated their appreciation by translating his lectures (given in English at that time) into Spanish and publishing them as a text. News of such a practical and successful idea has a way of crossing national borders, and in 1967 he was invited by the Venezuelan government to lecture at the University of Venezuela, an invitation he was able to accept and carry out in Spanish. He did so again in 1971, '72, and '73, and will be off to Caracas again this summer.

Vito is internationally known as a consultant on water projects and problems, but his very special interest for many years has been the movement of water in its natural state, in rivers and floods (*aqua motus naturalis*). Like a river, Vito himself has meandered over the globe in pursuit of his studies. Having a special interest in sediment transport by rivers, he collected samples of sand from the Amazon, the Orinoco, and the Parana, the Nile (which he pursued to its source in Lake Victoria), the Yukon (from which he panned gold dust), the Volga, the Sepic River in New Guinea, the Skang River in Malaysia, the Colorado River, and the River Jordan. In addition to his academic research, Vito has also carried out applied research on the stability of water in harbors, and on wave action, and numerous engineering projects have profited from this work. □