ROBERT F. BACHER

Professor of physics, and chairman of the division of physics, mathematics and astronomy

AS PROFESSOR OF PHYSICS; chairman of the division of physics, mathematics and astronomy; and director of the Norman Bridge Laboratory of Physics, Robert F. Bacher not only has one of the most important jobs on the Caltech faculty—he's got the longest string of titles on campus as well.

He has held these titles since 1949, when he came to Caltech from the United States Atomic Energy Commission. It wasn't his introduction to Caltech though; he'd spent a year here as a National Research Council fellow in 1930-31.

A graduate of the University of Michigan (1926), Bacher became interested in atomic spectra while working for his Ph.D. at Michigan. After he got his doctorate in 1930, he spent a year at Caltech, where he began collecting material on atomic spectra, then continued this work during the next year at MIT.

In 1932-33 Bacher had a fellowship at the University of Michigan, but by the fall of 1933 there were no fellowships—and no jobs—to be had anywhere. Bacher stayed on at Michigan, where he was at least given the use of the laboratories. Though he had no job, he had no obligations either, and the year turned out to be a profitable one scientifically.

In 1934 he went to Columbia University, where he taught a course in elementary physics, and one in atomic spectra—besides continuing his own studies of atomic energy relations.

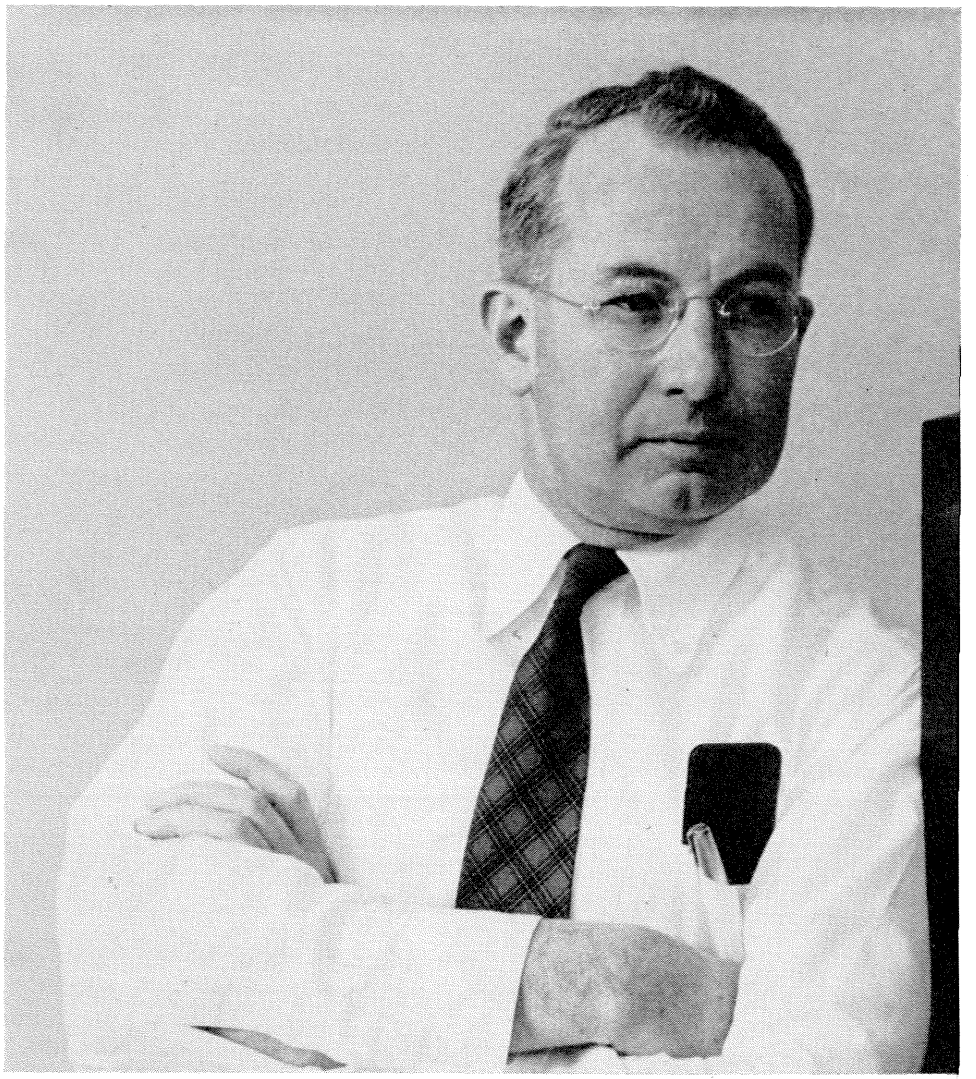
When he went to Cornell University in 1935 he began an association that lasted for almost 14 years. Cornell, in 1935, was building the first small cyclotron in the East. Also, at that time, Cornell had some excellent spectroscopic equipment which was not being used much. All in all, it seemed an ideal place to work in the field of nuclear physics—and that was just what Bacher wanted to do. His interests in atomic spectra had led him to the study of hyperfine structure (which is due to the nuclear magnetic moment) and this work, in turn, led to an interest in nuclear physics.

At Cornell he began some neutron experiments, using radon-beryllium sources. In 1938, when he was put in charge of the University's cyclotron, he continued the neutron experiments on this machine. This proved to be a particularly fruitful field of research—and one which ultimately led Bacher to work both on radar and on the atomic bomb project. Some of his experiments, using the Cornell cyclotron, had to do with measuring neutron time of flight over a fixed distance. The times were small, and measured in millionths of seconds—and this work with small time led Bacher naturally into the field of radar. (The neutron work itself led, later, to his working on the atomic bomb project.)

In 1940 Bacher was invited to join the Radiation Laboratory, the radar project which had been set up at the Massachusetts Institute of Technology, headed by Lee DuBridge. Bacher took a leave of absence from Cornell and joined the Lab in 1941, where he was put in charge of radar receiver and indicator components and radar beacons.

In 1943 the Lab sent Bacher and his old Columbia colleague, I. I. Rabi, to serve as advisors to J. Robert Oppenheimer, who was then trying to set up the Manhattan District Laboratory in Los Alamos, New Mexico. In no time at all, Bacher graduated from the role of advisor and was put to work on the atomic bomb project—in 1943-44 as head of the experimental physics division; in 1944-45 as head of the bomb physics division.

At the end of the war Bacher went back to Cornell, where he became the first director of the University's new Laboratory of Nuclear Studies, and immediately set about building an electron synchrotron. Work was well under way on this in 1946 when Bacher was called to New York to serve as a scientific advisor to Bernard Ba-



ruch, who was then head of the United Nations Atomic Energy Commission. The late Professor Richard Tolman was spending full time in New York as chief scientific advisor to Baruch, and through the summer of 1946 Bacher divided his time between the New York conferences and the Cornell laboratory. Then, that fall, when the United States Atomic Energy Commission was established, Bacher was appointed a member of it—the only scientist in the group.

Bacher served on the AEC for three years, and left before the completion of his second appointment to come to Caltech and work once again with Lee DuBridge, who was now the new president of the Institute. Champing at the bit to get back into the field of high energy physics once more, Bacher got work started on an electron synchrotron at Caltech almost as soon as he arrived in Pasadena.

By the summer of 1952 the synchrotron was operating at 500 million volts, and in 1955 it was completely rebuilt to operate at a billion volts or more. In recent months the group of physicists working with the machine at Caltech has succeeded in the photo-production of heavy mesons and hyperons from hydrogen. These are unstable particles, produced in violent nuclear interaction—and a study of the production of these particles, scientists believe, will lead them to a better understanding of nuclear forces.

Bacher is a member of the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts and Sciences, and the Physical Society—among others. He was given the President's Medal for Merit in 1946, for his war work. He is a trustee of the Rand Corporation, a director of the Consolidated Electrodynamics Corporation, and, in recent months, has been serving on a committee set up by the Edison Electric Institute to advise the power industry on what it should do to develop atomic power.

In 1932, Bacher, in collaboration with Samuel Goudsmit—with whom he had been working at the University of Michigan—produced a book which had a fairly spectacular publishing history. The book, which collected the known energy levels of atoms, was called *Atomic Energy States*. It had what may charitably be called a "modest" sale—until after World War II, when there was a surging demand for the book, and it quickly and completely sold out. It was almost 15 years old, and the subject matter was essentially obsolete—but the title, at this late date, couldn't have been timelier.