

# The Role of Research

## *a university has a responsibility to discover knowledge*

**A**FTER receiving a Ph.D. in physics from the University of Michigan in 1946, Dr. Richard G. Fowler sifted through the offers from several colleges and universities and decided on the University of Oklahoma.

He was drawn here chiefly by the reputation of Dr. J. Rud Nielsen, who was one of a handful of the world's physicists doing research in the field of infra-red spectroscopy. Dr. Fowler had learned of Dr. Nielsen's work through scientific journals and from the academic grapevine which winds among universities. He was interested in working with the renowned physicist, and when an offer came to teach at Norman, he accepted eagerly.

Upon arriving at the University, Dr. Fowler found conditions less than ideal. Dr. Nielsen, a pioneer in his field, was also having to blaze trails at the University in order to get his work done. Operating with little space and practically no funds, Dr. Nielsen was struggling to keep his project going. If the professor had any notions of an ivy tower, he was finding it difficult to get any ivy, much less a tower. The administration was doing its best, but there just wasn't enough in the coffers. The physics department had an annual travel budget of \$100 for its eight members, so going afield in search of supporting funds was impossible.

Lack of room to work was another handicap. A heat tunnel in the basement of the administration building had been converted into a laboratory of sorts. A corridor in the same building had been walled off to give Dr. Nielsen another room.

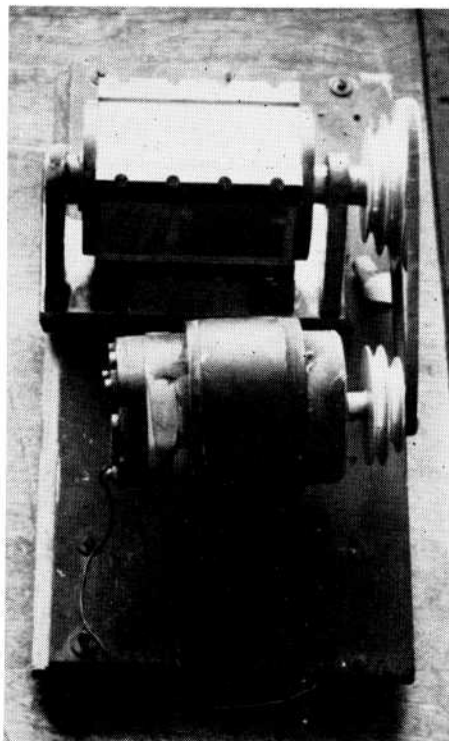
To complicate matters further, Dr. Fowler found that Dr. Nielsen had only one instrument with which to work. Two scientists trying to carry out experiments on one piece of equipment is like two cooks on the same stove. It's difficult for either to get anything done.

The problem of finding room to conduct research had been eased with the construc-

tion of the present physics building in 1948, and Dr. Fowler decided to strike out alone in another direction. At Michigan Dr. Fowler's doctoral thesis had dealt with gaseous electronics, the way electricity behaves when it passes through a gas; research in this field has given us such practical things as neon and fluorescent lights and today is critical in the exploration of space.

In 1944 Dr. Fowler had read about an experiment conducted by a physicist in England who had described a "very curious phenomenon." He had observed that when electricity is passed through a gas very quickly, the gas expands away as a flame. Dr. Fowler felt that the Englishman had given improper reasons for what had happened and decided to duplicate the experiment to discover what really had occurred.

A series of fortunate accidents then com-



This crude piece of homemade equipment, total cost approximately \$2, launched Dr. Fowler into a new field of research in plasma physics.

bined to lead Dr. Fowler and the two graduate students he had enlisted into virgin territory, to be first in an unexplored region.

In attempting to imitate the Englishman's experiment, limited funds, or to be blunt, poverty ironically played an important part in the discovery of the new path. Dr. Fowler and his assistants built the simple, inelegant device which is pictured on this page, at bargain store prices. It fell short of being an exact replica of the Englishman's apparatus. Another graduate student was called upon to blow a glass tube. The student was an incompetent glass-blower, and the tube didn't follow the specifications necessary to duplicate the Englishman's tube. As a result, the gas behaved differently, burning in bursts like roman candles. What was observed was unexpected, titilating. Through chance, Dr. Fowler and his students had stumbled upon a fork in the road. Their intended route was a well traveled one; the other veered off toward the unknown. Like good explorers, they headed for the virgin wilderness.

Money is needed for a successful expedition, and the need for support soon became crucial, even desperate. When the University was unable to provide the needed funds, Dr. Fowler turned to a newly created government department, part of the Defense Department, whose purpose was to encourage the carrying on of vital research in the nation's universities. The department was the Office of Naval Research, created in 1948, from which the National Science Foundation later was patterned.

After he and his students had made a substantial investigation, Dr. Fowler, becoming expert in the art of fund-scrounging, dug up the necessary money to travel to Washington. There he made a presentation to the ONR which was promising enough to merit a one-year appropriation of \$5,000. This grant elated the researchers and enabled them to push on with renewed confidence. Later, at a national

meeting of physicists, Dr. Fowler was able to impress the ONR further with his results so that money was provided to buy a much-needed oscilloscope to replace the out-dated equipment previously used.

Later another discovery overturned an incorrect concept about electrons which had been accepted for years. For more than a decade the Office of Naval Research continued to back the research with increasing support. Dr. Fowler finally has been able to return to the fork in the road where he made his turn nearly 10 years ago and travel down that intended path, too.

Today 12 government laboratories, 10 corporations and a like number of universities are conducting research with apparatus which has grown from the patterns developed at O.U. The competition is now severe, but the University is continuing as a leader.

The University in the past two decades has grown in stature as well as in size. Much of its growth in prestige can be attributed to its increased support of research. The title of *research professor* has been created. Appointed by the regents, these men are encouraged to devote more time to research—experiments, studying and writing. The research professor is a faculty member who has made distinguished contributions to knowledge and has demonstrated over a period of years vigorous leadership in his field of interest.

Says Dr. Fowler, who became a research professor in 1960: "Research does important things for a university. It is one of the functions of a university, and it's the thing which marks the distinction between a university and a college. Both colleges and universities teach. Both are custodians of the knowledge of the past, and both trans-

mit such knowledge to people. But the university is also charged with a second responsibility and that is to add to knowledge, to serve as a spring of learning and to discover the things which will be taught tomorrow.

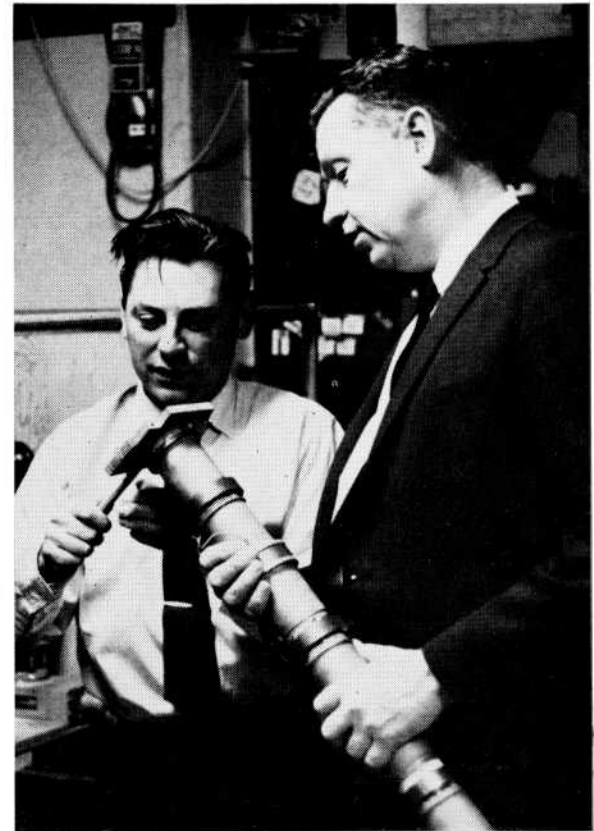
"The external function of research to a university is that it provides the reputation on which that university stands. Universities are recognized by each other not so much on the fact they do good teaching but that they do good research. If you say this school is a great school, and you're speaking of a university, invariably you're speaking of the research activity of that school. Very few are known purely for their teaching.

"But research serves a very important internal function: it keeps the faculty on its toes, it keeps the members alive, and therefore, it is very likely that where you find good research going on, you will also find good teaching going on, too. There has been a tremendous growth in the attitude of our University toward research in the last 20 years. I think that in this period we have really come of age. We have changed from a large college to a university worthy of the name."

Without research a graduate program is impossible. While working on Dr. Fowler's original project 26 students have received master's degrees and doctorates. "A strong research program attracts outstanding teachers," Dr. Fowler testifies. "We have a lean, vigorous department, and good research is the chief reason for it."

Research here has attracted visitors from abroad. "Since 1956," says Dr. Fowler, "more than 20 men from other countries have come here to work with us. Innumerable others just pass through as visitors who have heard that something interesting is going on here. This always has a tremendous impact on the students. It gives them confidence. It makes them realize that they really are a part of the scientific community. They discover that scientists are alike the world over and that they are a part of that world."

The physics department is but one University department engaged in research. Creative scholars are emerging from many schools and colleges. Whether it's the discovery of new knowledge or ways to bring intellectual achievements into social usage, research is the sort of intellectual activity characteristic of a good university and essential to it.—PAUL GALLOWAY



In the top picture, Dr. Fowler (right) looks over part of a new apparatus with Sydney M. Hamberger, visiting professor from Culham Laboratory, England. In the bottom picture, he checks progress with a graduate student.



## Research Professors

- Dr. Leonard R. Wilson . . . . . geology
- Dr. Maurice H. Merrill . . . . . law
- Dr. J. Rud Nielsen . . . . . physics
- Dr. Gilbert C. Fite . . . . . history
- Dr. Simon H. Wender . . . . . chemistry
- Dr. Richard G. Fowler . . . . . physics
- Dr. Gustav E. Mueller . . . . . philosophy
- Dr. John R. Pritchard . . . . . English
- Dr. Muzafer Sherif . . . . . psychology
- Dr. George M. Sutton . . . . . zoology
- Spencer H. Norton . . . . . music
- Dr. George M. Ewing . . . . . mathematics
- Dr. Ronald B. Shuman . . . . . business management
- Dr. R. L. Huntington . . . . . chemical engineering
- Dr. Cedomir M. Sliepcevic . . . . . engineering
- Dr. Howard C. Larsh . . . . . botany, microbiology