

SOCIETY ACTIVITIES AND AWARDS

Bonner Prize

As a tribute to the memory of Tom W. Bonner, the American Physical Society has established a prize in his name to be awarded for outstanding experimental research in nuclear physics by an American physicist. The prize, which is expected to be given annually, will carry an honorarium of \$1000, supported by contributions from several sources, including the Texas Nuclear Corporation. Professor Bonner, who was chairman of the Physics Department at Rice University when he died unexpectedly in 1961 at the age of 51, was both a recognized authority and prolific contributor in the field of neutron physics. He also served professionally on the Neutron Cross Section Advisory Group of the Atomic Energy Commission, on the Council of the Oak Ridge Institute of Nuclear Studies, and as a consultant to the Los Alamos Scientific Laboratory.

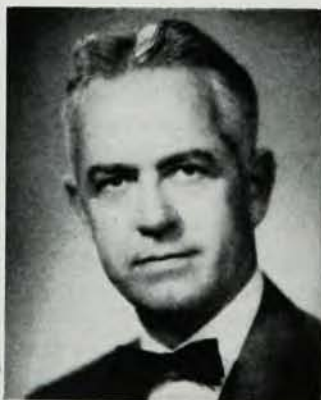
The first award of the Tom Bonner Prize was made during the APS Southwestern Meeting in Norman, Okla., at the end of February, to Henry H. Barschall of the University of Wisconsin. Dr. Barschall was cited "for his extended series of precise measurements of elastic and inelastic scattering of neutrons from nuclei, which led to the development of the absorbing optical model of the nucleus". A native of Germany, Dr. Barschall received his doctorate from Princeton University in 1940 and following appointments as instructor in physics at Princeton and the University of Kansas, joined the Los Alamos Laboratory in 1943. Dr. Barschall went to the University of Wisconsin in 1946, where he has served as professor of physics since 1950 and as chairman of the Physics Department during several periods, including 1963-64.

When Dr. Barschall joined the Wisconsin faculty in 1946, it was with the aim of using the 4-MeV accelerator to extend the knowledge of the neutron-nucleus interaction to higher energies. His initial experiments were simple measurements of the variation with neutron energy of the attenua-

tion of a fast neutron flux by appropriate thickness of various elements. For light nuclei, experiments employing small neutron energy spreads showed variations in cross section that corresponded to the Breit-Wigner description of the formation of discrete nuclear levels. But for heavy nuclei, the level density was much greater than the best neutron energy resolution obtainable. In these cases, the cross section averaged over many compound nucleus levels was obtained. It was expected that the latter experiments would be described by a theory proposed by Feshbach, Peaslee, and Weisskopf, which represented the nucleus as an absorbing sphere; a smooth monotonic decrease of the average total cross section as neutron energy increases was predicted. However, Barschall noted that for several elements, in specific energy regions, the average cross section increased with the neutron energy, in direct contradiction to these predictions. Encouraged by Weisskopf to look more thoroughly into the phenomenon, Barschall undertook a set of experiments which map-

ped out the average cross sections as a function of both the atomic weight and the neutron energy. Representing the results as a three-dimensional graph, he discovered a systematic behavior of the cross section surface. But it was clear that rather than monotonically decreasing, the surface had definite peaks and valleys. Feshbach, Porter, and Weisskopf soon pointed out that this surface could be represented in terms of the interaction of neutrons with a complex potential well, the real part representing the scattering, the imaginary part, the absorption of neutrons. The "black" nucleus was replaced by a "cloudy crystal ball". These initial experiments stimulated great activity at Wisconsin and elsewhere, aimed at more carefully delineating the values and ranges of validity of the parameters of the complex potential, now known as the optical model. The project was aided by the development both of monoenergetic neutron sources over wide energy ranges and of detectors less sensitive to the background of gamma rays and fast neutrons.

As techniques improved, measurements in a large number of laboratories extended the energy range of the measurements, distinguished the scattering from the various forms of absorption, and mapped out the angular distributions of the elastically scattered neutrons. In all of these areas, Dr. Barschall has contributed directly, and also indirectly by encouraging, criticizing, and supporting the work of others in the field.



Named in memory of the late Tom Bonner (above), the newly established Bonner Prize for outstanding research in nuclear physics was awarded in February to H. H. Barschall. In the photo at right, Dr. Barschall stands with APS president Felix Bloch as the latter reads the award citation.

