

MEMORIAL RESOLUTION HERBERT CONRAD “HOBEY” De STAEBLER

(1929-2008)

Herbert Conrad (Hobey) DeStaebler died June 13, 2008 at the age of 79. Hobey was born in St. Louis, Missouri, and completed both his undergraduate and his Ph.D. degrees in physics at MIT. His thesis research was on strange particle production by cosmic rays, studying data from the Pic du Midi. He came to Stanford in 1956 and joined the High Energy Physics Laboratory (HEPL) at Stanford where he began working with the group using the electron beams produced by the electron accelerator to study structure of protons and neutrons. Shortly after his arrival, he became one of a small group of physicists who developed a preliminary design study for a 10,000-foot linear electron accelerator. This group called its design Project M, for Monster. The facility that they designed was eventually built as the Stanford Linear Accelerator Center (SLAC), and is now known as SLAC National Accelerator Laboratory. Hobey played an important role in the design work, making calculations of the radiation that could be generated by such an accelerator and thereby understanding what shielding was required to make accelerator operations completely safe. His work determined aspects of the eventual configuration of the accelerator and the shielding hills surrounding the research area.

Once the project was funded, Hobey devoted his professional life to SLAC. He turned his attention to designing the experimental facilities needed to exploit the new accelerator. As a senior physicist in the electron scattering group established by W. K. H. “Pief” Panofsky, Hobey was involved in the planning and construction of the Spectrometer Facility to build these devices aimed at measuring electron scattering rates off protons or neutrons over a wide range of angles and resulting electron energies.

The electron scattering group eventually performed two major experiments that each played a crucial role in the development of the “Standard Model” of particle physics, and Hobey was an important contributor to each of them. The scattering experiments began in 1966, under the leadership of Richard Taylor from SLAC and Henry Kendall and Jerome Freidman from MIT. While the initial results were rather straightforward extrapolations of results at lower energies, when the experiments examined processes in which the electron scattering transferred extra energy to the proton—enough to cause breakup of the proton—large-angle scattering probabilities were bigger than had been expected. Hobey was invaluable as the group checked many things—corrections, backgrounds, etc. He often functioned as judge as results were discussed; his analytic approach helped discriminate which ideas fit the evidence. With theoretical input from James Bjorken, these experiments were eventually understood to be evidence that demonstrates the physical existence of quarks inside the proton. This evidence earned a Nobel Prize in 1990 for Taylor, Kendall and Friedman, who took Hobey and other key members of their collaboration to Stockholm with them as an acknowledgement of their important role in this result. Hobey became a Professor of Applied research at SLAC faculty in 1974.

The second critical scattering experiment was undertaken in the mid 70’s. The theoretical effort to combine the weak and electromagnetic forces was challenged by experiments looking for predicted weak interaction effects in atoms that appeared to disagree

with the theory. However, the predictions from the theory had uncertainties due to the complication of understanding the details of the relevant atomic structure physics. Charles Prescott suggested that a measurement of the scattering of polarized electrons on hydrogen would provide a more direct and easier-to-interpret test of the theory. The difficulty with this proposal was that such an experiment would require an intense polarized electron beam. An electron source that provided such a beam was developed, and HobeY made major contributions to the precise beam controls needed to accelerate and transport a highly polarized beam to the target, and to measure the level of polarization at the target location. This experiment confirmed theoretical predictions arising from the Glashow-Weinberg-Salaam theory of the weak and electromagnetic forces. The three theorists were awarded the Nobel Prize in 1979, the year following the publication of this SLAC experiment.

As a part of the scattering experiments, HobeY, together with Jerry Pine, designed and built the first set up that could use the SLAC electron beam to create a positron beam. Positrons are the antiparticles of electrons; comparisons of positron and electron scattering results provided a useful test of the underlying physics of the scattering process. Later, the ability to produce intense positron beams was a critical component in the development of storage rings and eventually of the Stanford Linear Collider, facilities that collide oppositely moving beams of electrons and positrons. These facilities were the key to the ongoing series of new research opportunities that kept the SLAC at the forefront of particle physics for over forty years.

In the years following the scattering experiments, HobeY continued to be a valued part of the experimental program at SLAC—first with the DELCO detector at PEP, building a new more powerful positron converter, and later as a member of the Mark II Collaboration at the Stanford Linear Collider. In recent years he played a significant role in the B Factory facility as the manager of the crucial interface between the accelerator, PEP-II, and the detector, BaBar. In doing so, he led the studies and helped develop the simulation tools for modeling the production of unwanted particles that create experimental noise, or backgrounds, at the e^+e^- collision points. He also participated in the design and construction of the PEP-II interaction point and the Babar detector hardware that surrounded it. In each collaboration, his exacting attention to detail and his careful analytic approach to problems that arose made him an essential member of the team.

In addition to his contributions to the physics programs, HobeY was always an important resource for SLAC. Throughout his career, he continued to play an active role in the safety program at the lab, and was especially helpful in evaluating and handling the safety challenges that arose in connection with the experimental use of non-standard pieces of hazardous equipment. HobeY's ability to analyze and calculate risks associated with these unique situations, combined with his good sense, kept SLAC employees safe.

For half a century, HobeY was an important figure at SLAC—his quiet manner and his dedication to getting it right served the laboratory well. He retired from SLAC in 2003. He was an avid mountaineer who spent many vacations hiking the backcountry at Yosemite and Kings Canyon National Parks. In addition to Margaret, his wife of more than 40 years, he is survived by two sons, Jim and Peter; and a brother Stephen.

Committee:

Helen R. Quinn, (Chair)
Jean M. Deken, SLAC archivist

Herbert De Staebler Memorial Resolution—continued...

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