

## obituaries

the human race, man has speculated on the wonders of his environment, but there is and can be nothing in even his wildest speculation in any way comparable to the actual facts of nature. For just this reason, the true objective study of science offers a never ending and wholly satisfying human endeavor; at least I have found it so."

A. CARL HELMHOLTZ  
*University of California, Berkeley*

### Robert V. Pole

The physics community lost one of its most creative thinkers and one of its finest people when Robert Pole's private plane crashed in a snow storm in the Sierra Nevada mountains on 16 February 1980. Born in Yugoslavia, Pole received his degree in electrical engineering in 1953 from the University of Zagreb. He showed early evidence of his creativity and independence when, in the Cold War days of 1955, he obtained the plans for the disposition of the Yugoslav border guards from a good friend and then climbed out over the Alps to settle in West Germany.

After two years with ELNA GmbH in Hamburg, Pole emigrated to the US and joined General Electric in Syracuse, N.Y. Upon his arrival, he took the first four letters of his very long, difficult to pronounce Slavic name and changed his first name to Robert (after Hemingway's hero in *For Whom the Bell Tolls*). In 1961 he moved to the IBM Watson Research Center, where he quickly established his reputation for inventiveness. Some 20 US patents in laser scanning, holography and optical information processing have been issued in his name. Pole's work led IBM to honor him with two Outstanding Invention Awards and an Outstanding Contribution Award.

In spite of his heavy commitments to IBM Research, Pole found the time to become a major contributor to the affairs of the Optical Society of America, of which he was a fellow. At the time of his death he was on the steering committee for the CLEOS (Conference on Lasers and Electro-optical Systems) meeting and chairman of the OSA Nominating Committee. Indeed, he was returning from selecting a site for a future CLEOS meeting when his plane went down. Although the scientific community at large knows of Pole through his many technical contributions, his family and friends remember him as a cheerful, fun-loving man who lived his life to the fullest. It was after he transferred to the IBM San Jose Research Laboratory in 1972 that he

began his love affair with flying that was ultimately to prove his undoing. He took to flying with the same infectious enthusiasm and imagination that he showed in everything he liked to do. We will all greatly miss the pleasure of his company and the challenge of his mind.

ROBERT A. MYERS  
*IBM Watson Research Center  
Yorktown Heights, NY*

### W. H. Zachariasen

W. H. (Willie) Zachariasen died last Christmas at the age of 73. His contributions, extending over half a century, were vast and crucial. They range from being the father of the theory of glass to the first accurate and concise atomic picture of the melting process.

His scientific contributions are so rich and varied that here we can list only a few of them. He was a leader in the field of x-ray diffraction, both as experimenter and theorist, as well as a master at deducing structures from x-ray powder diffraction data. Zachariasen was the first to establish the ionic radii, and he identified the contraction that established the then new 5f series. Throughout his life, he continued to refine bond-distance formulations and studied stacking disorder, high-pressure phases, and thermal diffuse scattering. As Linus Pauling said "I feel that he [Zachariasen] is to be classed among the outstanding scientists of the twentieth century."

Zachariasen published his first paper at age 19, beginning his 55-year period of unique contributions to the scientific literature. Three years later, in 1922, the University of Oslo granted him his PhD. In 1928-29 he was a fellow at the laboratory of Sir Lawrence Bragg. The following year, Zachariasen, still only 24 years old, joined the faculty of physics

#### ZACHARIASEN



at the University of Chicago. There during the next 44 years, he was a professor, department head during the critical post-war years and also dean of the physical sciences.

During World War II he played a role for which he was uniquely suited. In the course of the Manhattan Project's urgent effort to understand the new element plutonium, he examined hundreds of samples. His brilliant work in unravelling the mysteries of plutonium could hardly have been carried out by anyone else. The complexities connected with the plutonium metal phases, their large number (six) and the ease of transfer among the four plutonium aqueous valence states were at first unbelievable. He showed magnificent intuition in deducing the complicated metallic structures from x-ray powder data alone. For example, Beta-plutonium is monoclinic and the first 17 x-ray reflections are absent. Nevertheless, Zachariasen went on to solve the structure, which consisted of locating seven types of plutonium atoms in the asymmetric unit. Indeed, he solved the structure using only a slide rule, pen and paper. Even in competition with others using the largest computers, he was unsurpassed. *The Theory of X-Ray Diffraction in Crystals*, a landmark advance in x-ray crystallography, was his outstanding book. Zachariasen was the first to solve crystal structures using "direct methods." His work on extinction was fundamental and showed the way to deeper understanding.

Without him science in general, and x-ray crystallography in particular, would have been a much poorer discipline than it is today. In so many ways, he was the authority, whether it was a question of ethics or a problem in science. We will miss him greatly.

MASSIMO MAREZIO

*National Center for Scientific Research  
Paris, France*

BERND MATTHIAS

*University of California, San Diego*

*Bell Laboratories*

ROBERT PENNEMAN

*Los Alamos Scientific Laboratory*

### Lyle W. Phillips

Lyle W. Phillips, 69, a former National Science Foundation official who retired in 1978, died at his home in Chevy Chase, Maryland on 31 March 1980.

Phillips was one of the physicists who responded to the post-Sputnik call for broad improvements in American science. At that time he headed the department of physics at the University of Buffalo. Acutely aware of the needs of secondary-school teachers in that area, he established for them a special training program in physics.



With little in the way of external resources, he devised ways to help teachers become more effective and to provide or invent essential equipment that they could use in their classrooms.

This experience, coupled with his natural inclination to help people learn, led Phillips in 1959 to accept a position with the National Science Foundation's program for Special Projects in Science Education. After two years as program director for Undergraduate Science Education he left the Foundation briefly (1961-62) to serve as executive secretary of the Commission on College Physics. On his return to NSF he served in a variety of posts, the principal one being a nine-year stint (1965-74) as director of the Division of Undergraduate Education in Science.

This was a period of rapid growth for the Foundation's Directorate for Science Education, and Phillips had a strong influence on nearly every one of its programs aimed at undergraduates. He either devised or helped shape such familiar programs as Student Originated Studies, the Chautauqua-Type Short Courses for College Teachers and the College Science Improvement Program. Many people recognize Phillips as the creator of the special program for minorities that later became the Minority Institutions Science Improvement Program. This was an outgrowth of his deep personal concern for people who wanted to learn but who did not enjoy the opportunities available to the more affluent segments of the society.

Born in Arthur, North Dakota, Phillips earned his bachelor's degree at North Dakota State University. After completing a master's degree at the University of Buffalo he continued his graduate studies at the University of Illinois. He had an outstanding record there as a graduate student (PhD, 1939) and as a teacher (1939-44). From 1939 to 1940 Phillips pursued his work on atomic spectra as a fellow in molecular structure at the University of Chicago. Following two years of industrial experience with the Armstrong Cork Company, he joined the faculty of the University of Buffalo in 1946 and was appointed head of the department of physics the following year.

Phillips was an effective leader by virtue of his extraordinarily agile and creative mind, his unshakeable integrity, his great reserves of inner strength, and his intense personal energy and drive. His sometimes overflowing impatience with slower colleagues and his sharp wit often concealed the generous, even sentimental character that lay at his core.

ALFRED F. BORG  
National Science Foundation □



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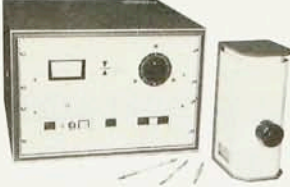
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