Obituary

Selig Hecht
1892-1947

Selig Hecht, professor of biophysics at Columbia University, died suddenly on September 18, 1947, at the age of 55. Since the publication of his paper on "The Photic Sensitivity of *Ciona intestinalis*" (*J. gen. Physiol.*, 1918, **1**, 147), he had become a foremost authority in his field, the physiology of vision.

Selig Hecht was born in Glogow, Austria, on February 8, 1892. He received his education in the public school system of New York City, obtaining his B.Sc. degree from the College of the City of New York in 1913. In 1913–14 he was a pharmacologist with the U. S. Department of Agriculture, going thence to Harvard for graduate training under G. H. Parker.

From 1917, when he obtained his Ph.D., to 1921, Hecht was assistant professor of physiology at the College of Medicine, Creighton University. For the next 5 years, as a National Research Council Fellow in chemistry, he worked at Liverpool and Cambridge Universities in England, at the Naples Zoological Laboratory, at the University of Berlin, and at the Harvard Medical School. During these years he acquired a wide international acquaintance and a circle of friends which he maintained and cherished.

Going to Columbia University in 1926, Hecht organized the Laboratory of Biophysics and in 1928 became professor of biophysics. He set and maintained an extraordinarily high standard for the work of his laboratory, which he developed as one of the productive research centers of the country. Nearly a score of students whom he trained branched out in widely divergent aspects of general physiology and are actively engaged in research in biology, biochemistry, physiology, biophysics, and ophthalmology.

Except for his earliest scientific explorations, Selig Hecht worked entirely on the problems of photoreception and vision, and few investigators have ever become such masters of their field. He pioneered in applying physicochemical principles to sensory physiology, using these principles lucidly and logically to demonstrate the existence of distinct chemical reactions in photoreception, to formulate quantitatively his concept of the sensory state, and to extend its applications to many visual phenomena.

Hecht's wide biological knowledge gave him facility in finding the material most suitable for attacking a complex problem, and his mastery of general physiology enabled him to extend his findings with simpler organisms to the problems of human vision. The basic discovery of the photosensory reactions came from work on the clam, *Mya arenaria*, and the tunicate, *Ciona intestinalis*. With brilliant insight and with a perfection of technique he went on to study dark adaptation, scotopic visibility, visual acuity, intensity discrimination, and critical fusion frequency in man. These studies, and his work on the photochemistry of visual purple, demonstrated his ability to apply the methods of chemical kinetics to physiology. This ability he always combined with an awareness of the biological realities of his problems. Thus, in all his measurements of human vision he paid close attention to the duplex nature of vertebrate photoreception and to the particular anatomical distribution of the rods and cones in the human eye. Again, as a biologist, he deliberately chose a very different visual system, the ommatidial eye of insects, to test theories of visual acuity and intensity discrimination which seemed valid for human vision.

His mastery and use of the older data of his field were quite unusual, as was his appreciation of the relative merit of the classical researches. This is exemplified by a quotation from one of his early papers (*J. opt. Soc. Amer.*, 1924, **9**, 211), which also gives a sample of the elegant and lively style of Hecht's 110 scientific publications:

> Anyone acquainted with the field of physiological optics knows that there exists a staggering mass of literature describing different phases of the subject, . . . (and) it is, therefore, with much trepidation that one presumes to write a paper concerned with the phenomena of vision. My hope, however, in doing so, is not to add to the existing material, but rather to subtract from it. If one can succeed in bringing a number of scattered phenomena into orderly arrangement, one decreases by so much the welter of unrelated facts that constitutes the present literature of visual science.

Hecht's best-known work of recent years was the determination of minimal quantal requirements at the threshold of vision for the human eye. A sound theoretical approach was combined with ingenuity and precise technique. Characteristically, the approach was made by two independent methods which gave the same result.

Hecht's wide knowledge of human vision was devoted during the war to problems of military importance. He served on the Subcommittee of Visual Problems, Division of Medical Sciences, National Re-

search Council, and on the Army-Navy OSRD Vision Committee, and was official investigator for several contracts with the Army, Navy, and Air Forces.

For his work on vision Hecht received the Frederick Ives Medal of the Optical Society of America in 1941. He was elected to the National Academy of Sciences in 1944. He was a member of many scientific societies which reflected his interests in physics (Optical Society), in physiology (American Physiological Society), and in biology (American Society of Naturalists).

Selig Hecht did not confine his interests to science alone. He was a musician and painter, a devotee of literature and the arts. These enthusiasms, as well as his interest in the political and social currents of the times, he shared with his students, imparting to them his sense of the connection of science, the arts, and society.

An important facet of Hecht's personality was his awareness of the social aspects of science. He was authoritatively acquainted with current views on, and experiments in, improving science teaching in the colleges and was a participant in his own university's studies of this subject. He devoted considerable time and effort transmitting to very wide circles his love for science. His lecture courses at the New School for Social Research were of such caliber that Dr. Alvin Johnson, president emeritus of the New School, characterized Selig Hecht as "absolutely the best teacher I have ever known." Hecht's last book (*Explaining the atom.* New York: Viking, 1947), on atomic energy for the general public, has received wide praise for its clear and very readable approach. This book was a result of his interest and experience in popular science education, and of his concern for a world facing the task of controlling atomic energy by converting it from a weapon of great destruction to a powerful tool of civilization. Because of this concern, Hecht was an active member of the Emergency Committee of Atomic Scientists—the only one of this small group who was not a nuclear scientist.

Hecht's scientific work stands as one of the finest examples in the expanding field of biophysics. His powerful intellect, insight, and wit have established him as an outstanding figure, but not many of the thousands of scientists who read his papers or who heard him lecture can realize the years of disciplined, rigorous training that were behind his lucid style. Early in his career as an independent investigator, he attacked advanced mathematics and statistics, studying every morning from 7 to 9 o'clock, even during a period of severe illness in his family. Those who saw Selig Hecht in his laboratory during the years when he was developing his theory of color vision saw him scintillating with new ideas, deriving hitherto unsuspected relationships, checking them by length recalculations of Koenig's and other classical data, and devising new experiments. Yet few who saw his genius and energy could have suspected that during these years he was subject to severe, frequent, long bouts of migraine.

All who came in contact with Selig Hecht immediately grasped one of his most important attributes, his joyousness. Hecht enjoyed everything he did, in science, in his painting, in living with his family, his friends, and his colleagues. This joy filled him with enthusiasm for his every activity. It was an essential ingredient in his excellence as a scientist, lecturer, teacher, and writer. To the task in hand he gave everything of himself. He loved intellectual exercise, and, when the occasion seemed to demand it, intellectual combat. Yet this joy made Hecht friendly, sympathetic, and always approachable.

The loss of Selig Hecht is more than the loss of an outstanding scientist. It is a personal loss to friends in every part of the world. His sympathy, his criticisms, sometimes caustic yet friendly, made him a strong stimulant. The scientific world is a duller place without him.

BRIAN O'BRIEN

The University of Rochester

HARRY GRUNDFEST

Columbia University College of Physicians and Surgeons

EMIL SMITH

University of Utah Medical School

At a meeting of the Army-Navy-NRC Vision Committee shortly after Dr. Hecht's death, the following resolution was adopted by members and associates:

Resolved that in the death of Dr. Selig Hecht, professor of biophysics at Columbia University, on September 18, 1947, visual science, not only in the United States but throughout the world, has suffered an irreparable loss. His fundamental contributions to this broad field were manifold. Among them, the following must be listed: early work on lower organisms which gave rise to his fruitful formulations on the kinetics of photo-reception; his validation of many of these ideas in direct studies of visual purple; his redetermination of many basic visual functions through the application of improved biophysical techniques and creative theoretical thought; his imaginative theoretical treatment and attack on color vision; and his resolution of the problem of the quantum relations in the photo-sensory process. Our understanding and experimental control of basic facts of visual science have been advanced immeasurably by the results of his creative imagination combined with intellectual clarity and honesty.

Dr. Hecht's contributions as a scientist were by no means restricted to his work in the laboratory. From

the beginning of the recent war he gave unsparingly of his time and knowledge to the solution of a wide range of military problems. He served as a distinguished member of our Committee and of other national advisory committees. He was counselor and expert consultant on numerous occasions and directed many researches, and individually conducted both field and laboratory investigations to answer specific critical military problems. At the end of the war, he enthusiastically embraced the role of educator of the public in basic concepts and implications of atomic energy. The role of educator was not new to him; he had long been recognized as a great teacher effective in training and stimulating workers in diverse scientific fields. As colleague, friend, and critic, he was unique and has left an impress, both personal and scientific, that will endure.

NEWS and Notes

The program of biological research at Pt. Barrow, Alaska, described in *Science* (August 22, 1947, p. 164) is now well under way. Through the Navy Department we have been able to obtain the four views of the installation shown on this week's cover. These are: (*upper left*) original laboratory, a quonset hut, 20 by 40 feet; (*upper right*) interior view of original physiological laboratory; (*lower left*) Laurence Irving, of Swarthmore College, scientific director of the Arctic Research Station, and an assistant, Walter Flagg, also of Swarthmore; (*lower right*) animal quarters for specimens under study. We are informed that at the present time there are three laboratories, all 40 by 100 feet, one for the Natural Sciences, one for the Physical Sciences, and the third for the Engineering Sciences. The first two are two-story structures.

About People

Wendell M. Stanley, Nobel Prize winner in chemistry in 1946, will go to the University of California, Berkeley, in July as professor of biochemistry and director of a new Virus Laboratory. In addition to directing biochemical research on the Berkeley campus and at the Medical School in San Francisco, Dr. Stanley will cooperate closely with the state-wide program of the College of Agriculture in the same field. The proposed virus research center will be the only one of its kind anywhere in the world in a university.

Serge A. Korff, Lowell Greenberg, and **L. G. Collyer,** of New York University's College of Engineering, flew to Puerto Rico on January 16. While there, they will make cosmic-ray observations as part of a long-range program designed to determine intensity variation of these rays in various parts of the world. Tests to be conducted will also include the charting of cosmic-ray strength with respect to altitudes up to 20 miles. Rubber balloons 5′ in diameter will carry aloft a number of instruments for making the desired measurements.

M. H. McVickar, agronomist, Virginia Agricultural Experiment Station, has been appointed chief agronomist, National Fertilizer Association, effective February 1.

H. J. Muller, professor of zoology, Indiana University, will deliver the fifth Harvey Lecture of the current series at the New York Academy of Medicine on February 19, 1948. Dr. Muller will speak on "Evidence of the Precision of Genetic Adaptation."

Robert Taylor Baldwin, secretary and treasurer, Chlorine Institute, New York, retired December 31 as treasurer of the American Chemical Society after 16 years of service.

Robert L. Pendleton, Office of Foreign Agricultural Relations, U. S. Department of Agriculture, and Johns Hopkins University, left December 31 with an agricultural commission of the Food and Agriculture Organization to spend three months studying ways to improve the agriculture of Siam. The Mission's headquarters will be in Bangkok.

Grants and Awards

Charles Allen Thomas, executive vice-president and technical director, Monsanto Chemical Company, St. Louis, Missouri, will receive the 1948 gold medal of the American Institute of Chemists. Presentation of the medal will be made at the annual meeting of the Institute in New York City, May 8. According to Foster D. Snell, president of the Institute, Dr. Thomas will receive the award for his work in the development of atomic energy, his leadership in research, particularly synthetic resins, and his administrative ability and encouragement of basic research.

The Society of American Foresters' official organ, *The Journal of Forestry,* carried in the August 1947 issue an article on "Cheatgrass—A Challenge to Range Research." This article, by A. C. Hull, Jr., and Joseph F. Pechanec, forest ecologists at the Intermountain Forest and Range Experiment Station, Ogden, Utah, has received the Journal's 1947 award of $100 because of its contribution to scientific knowledge, its readability, timeliness, and importance to the profession.

Donald H. Menzel, of the Harvard Observatory, has won the $500 A. Cressy Morrison prize awarded each year by the New York Academy of Sciences for the best paper dealing with research in particular fields. Dr. Menzel's paper dealt with the energy sources of giant stars. The award also went to the Harvard astronomer in 1926 and 1928 for two other papers on different aspects of the subject.