

part will arise in industry and come into the university as research projects in which the university and industry participate, on a cooperative basis. Research to increase fundamental knowledge and research to apply that knowledge will thereby be enriched, the immediate beneficiaries being the university and industry, and through them, the public. Thus, the establishment of a department of applied science in a university, along the indicated lines, would, in relation to effort and expenditure, do more to vitalize and stimulate research, both fundamental and applied, than any other comparable measure; and its output of well-trained graduates and postgraduates would make a

further major contribution towards increasing our total output of results at high levels of quality.

I am not unaware that the picture I have tried to present of a department of applied science, with its laboratories of instrumentology, may remind some of you of certain passages in Revelations, describing visions of a great city of white marble, in which the streets are paved with gold. Should that be your impression, my comment is that without vision we shall make no progress; and if, perchance, we are granted vision, shall we not think in terms sufficiently inspiring to set a goal for which it will be worth our while to strive?

OBITUARY

WILLIAM HENRY HOWELL 1860-1945

THE death of Dr. William H. Howell on February 6, 1945, marks the passing of the first group of professional physiologists in the United States, and of the galaxy of talent entrusted with the organization of the departments of the Medical School of the Johns Hopkins University prior to the opening of its doors to students of medicine in 1893. With his death America has lost one of the leading figures in physiological science.

William Henry Howell, born in Baltimore on February 20, 1860, was the son of George Henry and Virginia Magruder Howell. William Henry was educated in the public schools of Baltimore. In his senior year at City College, as the Baltimore high school is designated, he left school to become assistant to the professor of physics and chemistry. In the fall of 1878 he entered the Johns Hopkins University as an undergraduate student in the chemical-biological course to prepare himself for the study of medicine. Upon his graduation in 1881 he was awarded a graduate scholarship and because of this he matriculated in the graduate school as a candidate for the degree of doctor of philosophy, instead of following his original intention to study medicine. However, while pursuing his graduate studies he took extramural courses in anatomy and attended clinics at the Medical School of the University of Maryland. He was awarded the Ph.D. degree in 1884.

In 1885 he was made chief assistant in biology under his teacher, Newell Martin. Subsequently he was promoted to the grade of associate and, finally, associate professor of biology, in which capacity he gave the lectures in animal physiology in the undergraduate courses. In 1889 he was appointed lecturer and in 1890 professor of physiology in the University of Michigan. In 1892 he accepted appointment as associate professor under Dr. H. P. Bowditch at the

Harvard Medical School and in 1893 he became the first professor of physiology of the Medical School of the Johns Hopkins University.

For twelve years, from 1899 until 1911, he served as dean of the Medical School, succeeding Dr. Welch, the first dean. When the School of Hygiene and Public Health of the Johns Hopkins University was founded in 1918 he severed his connection with the Medical School to accept appointment as assistant director and professor of physiology in the School of Hygiene. Eight years later he succeeded Dr. Welch as director of that school. He retired in 1931, but was provided with a laboratory by the university and, with funds supplied first by a research foundation, and subsequently from the fluid research fund of the Medical School, he continued with research almost to the day of his death, though he knew he had arteriosclerosis and was having some heart attacks. At 5:00 A.M. on February 6th he was seized with a severe attack and died almost immediately. His mind retained its pristine clearness to the end.

Throughout his career Dr. Howell's prime interest was research, though he never allowed that interest to interfere with the meticulous performance of his duties as teacher and as administrator. He was deeply but, to all appearances, calmly absorbed in his research problems. The conduct of his researches seemed unhurried, even when conversation indicated that interesting developments were imminent. Though research was the occupation that gave him his greatest satisfactions, one gains the impression from statements he has made that it was for him at the same time a discipline. Yet he never turned over any of the detail to others; he never at any time had a trained research assistant. Whatever turn a problem took, whether into physics, as when he was dealing with fibrin crystals, or into chemistry, as when cephalin and heparin were isolated, he acquired and carried through the necessary techniques. Even after his retirement he

declined offers of technical assistance. "I'd get along faster," he is reported to have said, "if I got an expert organic chemist to work with me, but it is more fun to do it myself."

Howell's scientific publications include some eighty titles. Starting as a student of Newell Martin, it was but natural that his attention would be attracted to the fields that interested his teacher, namely, the physiology of the heart, of the circulation and of the blood. And so we find that Howell's first papers deal with the heart beat and with certain aspects of the physiology of blood; indeed, coagulation of the blood and the physiological action of the salt content of the blood can be regarded as his major fields of research.

One of his earliest contributions consisted in showing that serum albumin is not essential to the nourishment of the heart, as had been asserted by European physiologists, but that it was the inorganic content of their perfusion solutions that had maintained the beat of the heart. It was his interest in salt action that led to the demonstration by him of the possible significance of potassium as an inhibitor of the heart. Potassium is now known to be intimately connected with at least some of the acetylcholine mechanisms of impulse transmission. However, its exact role in that process remains to be determined.

Howell's name is conspicuously identified with the investigation of the process of blood coagulation; he is credited, among many other significant findings, with the isolation of some of the more important chemical factors that play a role in coagulation, such as cephalin and heparin. At the age of 77 he published a finding of the greatest interest, namely, that in extrauterine life blood platelets, a source of cephalin, are formed primarily in the lungs; and just prior to his death he was busily investigating a new blood coagulant.

The position Dr. Howell occupied in American physiology may be evaluated by the recognition accorded him by his colleagues. He was one of the twenty-eight charter members of the American Physiological Society and, excepting Hare and Jastrow, was the youngest of the group. To him was accorded the honor of reading the first paper at the first meeting of the society. He was its third president and was younger by many years than were either of his predecessors at the time they served in that capacity. He was re-elected to the office five times. He was chosen by the American physiologists to be the president of the first and only International Physiological Congress to meet in the Americas. He was editor of the "American Textbook of Physiology," published in 1896, the first cooperative effort of the kind on this side of the water. He was a member of numerous national honor societies and an honorary member of several foreign

societies. He was the possessor, also, of a number of honorary degrees, including his M.D. degree, which was given by the University of Michigan.

One of Dr. Howell's striking personal characteristics was a mildness and cheerfulness of manner, yet he held firm but carefully weighed convictions. They were never, however, obtruded on casual acquaintances. His strength of intellect, his wisdom, his moral fiber gave him the peace of mind and the sympathetic understanding of his fellow men that were so apparent to all who knew him well. He enjoyed particularly the simple things in life—music, the out-of-doors and the comradeship of his family. He possessed a remarkable ability to express his thoughts in conversation, in the classroom and before assemblages, whether scientific or general, with a directness and a simplicity of verbiage that invariably charmed his hearers. He will be remembered not only as an accomplished and meticulous investigator, an inspiring teacher and as an able and considerate administrator, but equally for his personal attributes—a calm, simple philosophy of life and the ability to live in the light of that philosophy.

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EDWARD O. SPERLING

IN the closing words of many a scientific paper there will be found a heartfelt tribute to some skilful artisan, heartfelt because the author knew that the artisan's skill was beyond his own. Glass-blower, instrument maker, optician, these craftsmen have all played their part in the advancement of science and indeed have made many a brilliant research possible.

Edward Sperling was a master craftsman in the art of blowing glass. Joining the staff of the National Bureau of Standards in 1907, he devoted his skill for the succeeding thirty-eight years to the construction of equipment which would facilitate the bureau's work. Recognition of his ingenuity and masterly workmanship quickly spread beyond the confines of Washington. Scientists the country over asked for his help in constructing equipment that was beyond the skill of other men. Although his formal education did not go beyond that of the public schools, the Civil Service Commission gave him in his later years a unique professional status comparable with that of scientists holding doctorate degrees. He was in truth the dean of his profession in Washington.

The last rites were said for Edward Sperling on May 14 in the presence of bureau scientists with whom he had worked for years. The importance of his contributions in helping others can hardly be over-emphasized. Laboratory after laboratory bears in shining glass mute evidence of his skill. But the