fessor Hastings throws much light on this situation. He writes:

It will surprise no reader of the numerous biographical notes concerning Professor Gibbs to learn that a man of so judicial a temperament was a very successful man of affairs. Happily for science, his position in the University was not such as to render that fact conspicuous, else he might have been called upon for work which, in view of his consciousness (conscientiousness) and inherent modesty, could easily have seriously interfered with his scientific pursuits. He did, however, give his services as a trustee to the affairs of the Hopkins Grammar School of New Haven, and he acted for many years (17) as treasurer of its funds, which had come down in part from colonial times.

Gibbs was extremely painstaking in everything that he did and pronounced judgment only after mature consideration. In faculty meetings, he spoke seldom, but when he spoke, it was to the point. It is said that on one occasion, after a lengthy discussion as to the relative merits of the languages and mathematics, Gibbs said: "Mathematics is a language too." Gibbs was kindly in disposition, considerate and ready to be of help to his students. He had a sense of humor and smiled easily. He never sought for honors or advancement except as they came through recognition of his work. Such honors came to him in great abundance. They need not be enumerated here; I mention only the Copley Medal awarded him by the Royal Society of London, in 1901. He was made an honorary member of nearly every scientific organization of note and received honorary degrees from many of the leading universities of the world.

Outstanding qualities of Gibbs's character are his modesty and his devotion to science. He had not a few traits in common with Michael Faraday. At the beginning of the most productive period of his career, Faraday renounced all consulting work, from which he derived an income of from 500 to 1,000 pounds per annum—his salary at the Royal Institution was 100 pounds; for nine years following his appointment as professor of mathematical physics at Yale, Gibbs served without compensation. Gibbs, like Faraday, had great physical insight. Faraday, without mathematical training, invented the concept of the electromagnetic field, which later provided Maxwell with the foundation for the electromagnetic theory; Gibbs, with little experience with material systems, invented new physical concepts, that have served as a basis for the development of chemistry during the past fifty years.

Of the inner workings of Gibbs's mind, we know little; he left behind few letters and no notes. We can best judge the quality of the man by what he said of his colleague, Hubert Anson Newton, in the Biographical Memoir which he wrote for the National Academy of Sciences. Here, in speaking of his friend, he unconsciously reveals himself. After discussing Professor Newton's scientific contributions, Gibbs writes:

But these papers show more than the type of mind of the author; they give no uncertain testimony concerning the character of the man. In all these papers we see a love of honest work, an aversion to shams, a caution in the enunciation of conclusions, a distrust of rash generalizations and speculations based on uncertain premises. He was never anxious to add one more guess on doubtful matters in the hope of hitting the truth, or what might pass as such for a time, but was always ready to take infinite pains in the most careful testing of every theory. With these qualities was united a modesty which forbade the pushing of his own claims and desired no reputation except the unsought tribute of competent judges.

These words of Gibbs characterize Gibbs himself much more truly than anything that I might hope to say.

OBITUARY

PROFESSOR S. P. L. SORENSEN

THE American students who were privileged to work with Professor Sørensen and the many who found inspiration in his scientific articles regret the death of this distinguished scientist on February 12.

Sørensen succeeded Kjeldahl as director of the chemical division of the Carlsberg Laboratory, in Copenhagen. Each of these men, in addition to many other contributions, hit upon something that has made his name a household word in chemical laboratories.

It would be trivial to say that Sørensen introduced the symbol p_H for a unit in a scale of acidity. The significance of the fact that this symbol has become almost as common as that for degree centigrade pertains to an aspect of science that too often is neglected. By means of his logarithmic scale Sørensen was able to place on one chart or one sort of chart several of the relations in acid-base systems that were known in principle but that had not vividly impressed potential users of the theory. In terms of his new exposition Sørensen evaluated those stable mixtures of acids and their salts that are called buffer mixtures and the zones of transformation of many indicators. Having systematized the indicator method of determining pH values Sørensen revealed something of its wide usefulness by resolving an old problem in enzyme chemistry, namely, the dependence of the activities of specific enzymes upon the degrees of acidity of the solutions. Here, then, in the classical paper "Études Enzymatiques," II (1909), supplemented by a more detailed mathematical analysis in 1912, was presented that rare combination of a vivid exposition of principles, exact quantitative data that

not merely illustrated the principles but also were immediately applicable as standards of reference and an illustration of the applications of a tool.

Largely because of this excellence of exposition, elaborated by Michaelis and others, there followed one of the most remarkable movements in the history of science. Every science having to do with water solutions soon instituted the measurement and control of "hydrogen-ion concentration" by the methods that Sørensen polished and in the terms that he introduced.

At a time when protein solutions were regarded as subject to study only by the unique methods of colloid chemistry Sørensen boldly applied the classical methods that work well in the study of the simple amino acids. Here, however, were problems requiring meticulous regard for detail, and because he had regard for what the problem demanded Sørensen's papers on protein solutions make difficult reading. In them will be found many of the bases of modern work, notably the application of Gibbs's phase rule in determining the homogeneity or heterogeneity of protein preparations, and the characterization of proteins by their isoelectric points and other indices of their properties as amphoteric electrolytes.

The meticulous exactitude that Sørensen displayed in his work on proteins is characteristic of his work as a whole—work that extended to analytical methods on the one hand and to organic synthesis on the other.

Born on a small farm near Slagelse on Sealand, Denmark, Sørensen developed early a penchant for science. He twice won the university's gold medal for outstanding work in science at the University of Copenhagen. After serving as assistant chemist in the Royal Technical College he became director of the chemical division of the Carlsberg Laboratory two years after receiving his doctor's degree in 1899. He became president of the Danish Academy of Sciences and last year was made a foreign associate of our National Academy of Sciences. He had honorary degrees from many universities.

In 1924 Professor Sørensen and his wife, with whom he had then and has since published several papers on proteins, visited America. We who had drawn inspiration from the written word were then impressed anew by this charming couple. Of a retiring disposition Professor Sørensen was every inch the gentleman who commanded respect by the quality of his thought and who won affection by the kindliness that shone in every glance and gesture.

WM. MANSFIELD CLARK
THE JOHNS HOPKINS UNIVERSITY
SCHOOL OF MEDICINE

FABIAN FRANKLIN

FABIAN FRANKLIN was born in Eger, Hungary, on January 18, 1853. He obtained his Ph.B. degree from Columbian University (now George Washington University) in 1869 and entered the department of mathematics of the newly established Johns Hopkins University in 1877. He remained at the university as fellow from 1877 to 1879, assistant from 1879 to 1882, associate from 1882 to 1889, associate professor from 1887 to 1892 and professor of mathematics from 1892 to 1895, at which time he resigned his position to enter professionally the field of journalism. He died on January 8, 1939.

Professor Franklin was a very unusual and inspiring teacher. After a lapse of almost half a century former students still remember how clear and satisfying his lectures were. He was never content to expound a theory as it was developed by its author, and his hearers had the distinct impression that the matter being presented had been thoroughly digested by the lecturer and carried the stamp of his individuality and artistic nature. He was most conscientious and painstaking with his students, frequently going to great pains to answer a question whose import the student barely realized. His simple demeanor and dignity of person commanded the instant respect of his students, a respect which was never lost.

In his mathematics itself were reflected the wide interests of his inquiring mind. This was a definite fault of his genius. To leave a mark in mathematics requires an *esprit de suite* which doggedly pursues to the bitter end some path into the unknown. The professional mathematician, on noting a characteristic flash of genius or originality in one of Franklin's short papers, may well wish that he had not been so versatile nor so interested in politics or world affairs; but such wishes are idle. In the short period of some fifteen years before he definitely abandoned mathematics for journalism, he published some thirty papers, most of which appeared in the *American Journal of Mathematics* or the Johns Hopkins University circulars. His earlier work on invariant theory shows clearly the influence of Sylvester, whilst his papers on circular coordinates and on bicircular curves demonstrate his geometrical insight. His elementary proof of a theorem on partitions has become classic.

In 1895, when Franklin was forty-two years old, he retired from his professorship of mathematics at the Johns Hopkins University to become editor of the Baltimore *News*. Later he became associate editor of *The New York Evening Post* and editor of the *Weekly Review*. He was a distinguished writer on economic, social and political subjects. His wife, Christine Ladd-Franklin, known for her work in psychology and logic, died in 1930.

F. D. MURNAGHAN
THE JOHNS HOPKINS UNIVERSITY

EARL E. HOOVER

EARL E. HOOVER, biologist of the New Hampshire State Department of Fish and Game, died at Con-