WILLIAM MADDOCK BAYLISS—PHYSIOLOGIST

BIOLOGICAL science suffers a severe loss in the death on August 27, 1924, of Sir William Maddock Bayliss, recognized the world over as one of the foremost contemporary physiologists. The term "physiologist," as applied to him, has a very broad connotation, for, like Claude Bernard, whom he so greatly admired, he thought of physiology as nothing less than "the science of life." He had been for some years past professor of general physiology at University College, Gower Street, London, and as a research worker had performed many brilliant experiments. But he was more than a remarkable specialist, for he coupled with this a depth of general insight and a breadth of intellectual horizon which marked him as one of the biological philosophers of the age.

It was the publication of his "Principles of General Physiology" (1915) that brought Professor Bayliss most definitely and prominently before the scientific world. This book professedly dealt with "abstract physiology," and appearing at a time when problems of the war occupied the attention of scientific men its prompt and general recognition could not have been expected. However, even under these unfavorable circumstances, the volume, packed as it is with source materials, historical information and hints on technique and method, made a profound impression and was characterized as "Principia Physiologica." Bayliss Clubs were formed, at least in America, and there was a sense of having reached objectivity in the science of living substance.

"Principles," which reached its third edition in 1920, is a unique volume occupying a unique place. Most of the problems considered in it are common to man and to all living creatures, animal or plant. It is a masterly presentation of those physical and chemical processes which underlie the dynamic changes known as the phenomena of life. It is common to neglect reading those articles which do not appear to concern one's own particular domain of science. Just here is where the uniqueness of Professor Bayliss and his work show up sharply. He saw the need and took the trouble to work in many fields, often not biological, and here he uncovered materials of fundamental import to his subject. He arranged these facts in such a way as to produce a work that is of much use to all who have interest in science.

It need hardly be said that Professor Bayliss addressed himself to a very difficult subject when he chose to discuss the basic processes which intervene in vital phenomena. He had to blaze new trails and make tentative judgments on many very unsettled questions. The admirable way in which he has handled these problems must have appealed to all his readers. His point of view in reference to the frontier of science may be illustrated by a quotation from the remarkable preface of this book, which is so much an autobiography that it has to be given first consideration if one writes anything about its author. He says:

> Truth is more likely to come out of error, if this is clear and definite, than out of confusion, and my experience teaches me that it is better to hold a well-understood and intelligible opinion, even if it should turn out to be wrong, than to be content with a muddle-headed mixture of conflicting views, sometimes miscalled impartiality, and often no better than no opinion at all. . . . It is not going too far to say that the greatness of a scientific investigator does not rest on the fact of his having never made a mistake, but rather on his readiness to admit that he has done so, whenever the contrary evidence is cogent enough.

Sir William was born in 1860, the only son of an iron manufacturer of Wolverhampton, England. He was of short stature, did not have a rugged constitution and was rather reticent in his disposition. For a while he engaged in his father's business with a view to learning it, but was not happy there. Being later apprenticed to a physician, he found that work much more to his liking and entered University College, London, in 1881, apparently with the desire of pursuing medicine. He came under the tuition and influence of Burdon-Sanderson, then professor of physiology. The following year he obtained a university scholarship in zoology and continued his studies. Sanderson was called to Oxford in 1883. After some discouragements and disinclinations in reference to certain medical subjects Bayliss seems to have concluded to give up the notion of becoming a physician and to have decided to devote himself to physiology. He followed Sanderson to Oxford in 1885 and from there took his degree in 1888. Returning to London he established a private laboratory in his father's house at Hampstead Heath. Here he did a great deal of reading and considerable experimenting but apparently gave little thought to publishing reports of his work. He associated himself with Schafer who had succeeded Sanderson at University College and with whom he had studied after Sanderson went to Oxford. About this time E. H. Starling, who was instructor in physiology at Guy's Hospital, also began research work in Schafer's laboratory. Bayliss and Starling became very close friends and collaborators. This happy cooperation has continued through the years and bore abundant fruitage in the many papers along the well-known lines: electrical phenomena of the heart, the regulation of the circulation, the movements of the intestines, pancreatic secretion and the action of the hormones.

Bayliss married his colleague's sister, Gertrude E. Starling, in 1893.

When Schafer was called to Edinburgh and Starling was appointed to succeed him in 1899, Bayliss cast in his lot with his friend and brother in the department at University College. He became assistant, then assistant professor and finally professor of general physiology. Probably it was a very fortunate thing that Professor Bayliss was prevailed upon to enter the routine of teaching. Had he been allowed to continue in his own private laboratory, without any such demands shaping his interests, he doubtless would have made many important and critical experiments, but it is doubtful if "Principles" would ever have come from his pen. In 1910–11 during the illness of Professor Starling and again while he was engaged in war duties, 1915–19, Professor Bayliss acted as head of the department. For a time he was dean of the faculty of science. He was chairman of the Shock Committee of the Medical Research Council, a member of the Chemical Warfare Medical Committee and of the Research Committee of the Food Investigation Board. In 1903 he was elected fellow of the Royal Society and was a member of the council in 1913–15. He is well known as joint editor of *The Biochemical Journal* and just before his illness had assumed editorship of *Physiological Abstracts.*

Following the war, when men turned again to take up the threads of science for science sake, the recognition of Professor Bayliss came promptly. Among other honors received, the Copley Medal, which is the greatest distinction within the gift of the Royal Society, was bestowed on him in 1919, he was showered with honorary degrees and was knighted in 1922. Within the last few years he has published several books and monographs of note. The topics include: the nature of enzyme action, intravenous injection in wound-shock, the colloidal state in its medical and physiological aspects and the vaso-motor system, to name the more important. These volumes are based largely on research work carried out by himself and his colleagues. In all his writing there is exhibited a clearness of diction and a directness and fairness of judgment in reference to conflicting evidence on difficult problems that cause his books to be much sought in any library. He was the very embodiment of friendliness and cooperation. In his researches he concerned himself with what has been termed "the infinitely little" and in his personal relations he appreciated the untold value of "small things." His life and work exemplify the supreme effectiveness of that casual, quiet, simple and unassuming way of doing things that marked his manner.

STANFORD UNIVERSITY W. R. MILES

SCIENTIFIC EVENTS

MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

THE tentative program for the coming annual meeting of the American Society of Mechanical Engineers, to be held in New York from December 1 to 4, has been announced. The first day of the meeting has been set aside for council meeting, local sections conferences and technical committee meetings. The technical sessions start Tuesday morning, December 2, and will last through Thursday afternoon. While the program is well balanced in that it touches on all phases of mechanical engineering, it is noteworthy in the fact that there are several sessions with papers of importance and value to members of the society who are interested in the engineering problems of the machine shop.

On Tuesday morning the session devoted to research in machine design and operation will furnish the opportunity for the presentation of various methods of measuring hardness. J. O. Keller, the author of the paper, spent the summer in a series of investigations in which he made hardness measurements by the various known methods, tensile tests, machineability tests and magnetic analyses of pieces of the same material subjected to different heat treatments. His results will include a report of measurements by the Herbert pendulum hardness tester which is a comparatively novel device in this country. At the same session a research committee on metal springs will present a progress report. Although this committee has been organized for a short time it has set up a program and is ready to seek financial support for its research.

At the general session on Tuesday morning R. Eksergian will present a mathematical analysis of strength and proportions of wheels, wheel centers and hubs. This paper will bring a large amount of data to the designing engineers.

On Tuesday afternoon there will be a session devoted to general machine-shop practice with papers on the effect of inaccuracies of gear teeth on mechanical springs, and on ruling line standards by the application of light interference. The paper on inaccuracies in gear teeth was prepared as a thesis at Leland Stanford University by L. J. Franklin and Charles Smith. J. K. Wood, who wrote the paper on mechanical springs, is chairman of the special research committee on this subject and in the paper he presents the results of long experience in designing springs and gives four new formulas for this purpose. The last paper at the session by C. G. Peters and H. B. Lewis is a joint production of the Brown & Sharpe Manufacturing Co. and the Bureau of Standards.