to the construction of the hulls of great steamships without rivets. Metals previously unweldable were easily joined, and complicated and expensive mechanical methods were made simple, cheap and reliable.

He made many important contributions to the field of radiology, and was the first to make stereoscopic X-ray pictures.

He did early pioneer work with the electric resistance furnace and developed a method of manufacturing that beautiful material, fused quartz, by electrical means, which gives every evidence of being the best yet devised.

He made the first important research into the nature of the laws governing the electric arc. The results of this investigation were published in the Franklin Institute Journal in 1879, and disclosed among other things the important fact that the resistance of the arc varied inversely with the current, which accounted for the instability of an arc unless operated from a circuit having constant current characteristics.

During the years since this first research he has made many other scientific researches to some of which I have briefly alluded, and has contributed hundreds of articles on scientific and engineering subjects.

This incomplete and imperfect sketch will, perhaps, serve to indicate the extent and variety of Dr. Thomson's knowledge and the range of his mental activities, and the ingenuity and great practical value of his work. He has not been content to make some astonishing discovery or invention and then lapse into comparative quietude, but during his entire life has been a continuous worker. Thomson, perhaps more than any other inventor since the days of Henry and Faraday, combines in his person profound and accurate scientific knowledge with most extraordinary technical skill.

He has received numerous honorary degrees, Master of Arts, Yale, 1890; Doctor of Philosophy, Tufts College, 1894; Doctor of Science, Harvard, 1909; Doctor of Laws, University of Pennsylvania, 1924; Doctor of Science, Victoria University, Manchester, 1924.

Dr. Thomson received the Grand Prix in Paris, 1889, and again in 1900, for electrical inventions, and was decorated by the French government as an officer of the Legion of Honor. In 1904 he received the Grand Prix at St. Louis. He was given the Rumford Medal in 1902, and in 1910 was the first recipient of the Edison Medal. In addition, he has been awarded the Elliott Cresson Medal, the John Fritz Medal, the Hughes Medal of the Royal Society, London, and last year the greatest of all English medals, the Kelvin Medal.

It would therefore seem singularly fitting that he should now be the recipient of the Franklin Medal, given by the Franklin Institute, the scene of his earliest pioneer work in the electrical field. It is with the greatest pleasure that I present to you Dr. Elihu Thomson for the receipt of the Franklin Medal.

WILLIAM JAMES BEAL: AN AMERICAN PIONEER IN SCIENCE

THE student who now-a-days begins the study of botany in a laboratory with its fine equipment of microscopes, microtomes, ample laboratory space and an abundance of help on the part of laboratory instructors would find little in common with the early life of the late Dr. Beal, who began his botanical studies at a time when the idea of laboratory work by the student of botany was unheard of. The men of Dr. Beal's generation had to dig out their botany almost alone, and without most of the things now considered to be absolute necessities. The early scientific training and inspirations of his life are told most sympathetically in a little volume entitled "An American Pioneer in Science" and published privately by the authors, Ray Stannard Baker and Jessie Beal Baker, the latter the daughter of Dr. Beal.

Born in Adrian, Michigan, in 1833, Dr. Beal lived the life of a pioneer in the then frontier. Indians still lived in the vicinity and the woods abounded in wild animals. Schools were few and newspapers and books exceedingly rare. Yet the young pioneer gained what training was possible in the schools and academies of his vicinity and entered the University of Michigan, graduating with the class of 1859, all but one or two of whose members he was destined to outlive. He became a teacher in the Friends' Academy at Union Springs, New York. In the early sixties he entered Harvard, studying under Dr. Asa Gray, Dr. Charles W. Eliot and Louis Agassiz. The last named was the one whose impression was greatest, for he introduced Dr. Beal to the laboratory method of study, a method not then used at Harvard by either Eliot or Gray. After two years as professor of botany at the old Chicago University, Dr. Beal was called in 1870 to the Agricultural College of Michigan, serving as professor of botany, horticulture and forestry until gradually the departments of horticulture and, later, forestry were established, thus leaving him to his especially beloved botany. Following the inspiration gained from Agassiz, it was not many years until Dr. Beal introduced the laboratory method of instruction for botany, at a time when this was a startling innovation.

Besides his investigations and teaching work in botany, the subject of forestry received great attention. Dr. Beal was one of the first to preach conservation of forests, although that word was not then used. He lived to see the day when his predictions came true and many of the methods suggested by him were brought into practice. He was always more of a stu-

dent of the plant as a living object than as a subject for minute dissection, and therefore tried to interest his students in that aspect of botany, although recognizing the need for the other and giving instruction in it. Always the practical sides of a problem seemed to interest Dr. Beal. He felt that botany should be truly a handmaid to agriculture. Thus he carried on studies on weeds, the viability of seeds, etc. Yet a scientific discovery, if fundamental, was always able to arouse his enthusiasm, even if its practical aspects were not in the least discernible.

To the end of his long life the botany of the great out-of-doors was Dr. Beal's great delight. Even in his last months, when unable to walk on account of illness, he would have his chair wheeled out-of-doors and would call attention to various things of botanical interest.

Dr. Beal came of Quaker stock and preserved to the end the sterling honesty of action and speech instilled in him by his parents. Laziness he could not abide. He sought no vacations and never could bring himself to "loaf." Thus it was possible for him with no assistance in the greater part of his teaching career to train so many men who have carried forward the torch laid down by him at his death on May 12, 1924. His work lives after him in the many botanists and other scientists for whom he was the inspiration.

ERNST A. BESSEY
MICHIGAN AGRICULTURAL COLLEGE

SCIENTIFIC EVENTS

THE CENTENARY OF HUXLEY

THE centenary of the birth of Huxley was celebrated on May 4 by the Imperial College of Science and Technology with a lecture by Professor E. B. Poulton, an exhibition in the department of zoology, and a reception given by Lord and Lady Buckmaster. Lord Buckmaster is chairman of the governing body of the college. Mr. Herbert Wright presided and the vote of thanks to the lecturer was moved by Sir Charles Sherrington.

According to the report in the London *Times*, the lecturer began his address with a message from Sir Ray Lankester, the life-long friend of Huxley. He then discussed the early days of Huxley, and described some of the disappointments that he faced and overcame and some of the obstacles that impeded him when first he began to seek work of a definitely scientific character. The heights that Huxley reached, said Professor Poulton, were attained only by dauntless effort and determination.

The lecturer, continuing, referred to Huxley's keen sense of humor, and described how in admonishing an acquaintance he said: "You do not suffer fools gladly, you gladly make fools suffer." In declining an invitation to a spiritualistic gathering he said that it might all be true, for anything that he knew to the contrary, but he could not get up any interest in the subject, and disembodied gossip had no more interest for him than any other form of gossip. In discussing the controversial side of Huxley's career, Professor Poulton said that in disputes there was never any bitterness or estrangement; difference was never allowed to spread beyond the issue. Though Huxley became so effective a speaker, it was only the result of determination and practice. Before delivering his first lecture he said: "I can now quite understand how it feels to be going to be hanged." The clear and beautiful style of his writing was developed in the same way, and very often he would write an essay half a dozen times before he was satisfied with it. To Huxley Tennyson was the first poet since Lucretius who had understood the drift of science.

Much had been written in the press lately, the lecturer continued, about the need for books on economic subjects, but so far as he knew no reference had been made to Huxley's essays on that subject. Much misery would have been spared to the world if the advice he gave had been followed; he wanted to be remembered as a man who loved the people.

The best of Huxley's work, Professor Poulton said, was in his lectures to working men. They were greatly touched by what he did for them, and loved him for it. The great thing in his career was his defense of Darwin, leading on to the wider subject of his defense of freedom of thought. The lecturer discussed the weight of the traditional beliefs that lay in the path of the development of scientific inquiry at the time when Huxley was at the height of his career. No doubt his hard fight for a principle gave pain to many, but he never intentionally gave pain nor flippantly attacked the beliefs of others, and the privilege of the present freedom that we enjoy to pursue scientific investigations is due more to Huxley than to anybody else.

The chairman, in his speech, said that it was hoped that it might be possible to raise a permanent memorial to Huxley. The exhibition included rare books and a selection of Huxley's drawings in the Huxley Library, and a number of scientific exhibits elsewhere. There were exhibits and demonstrations by the various departments of the Imperial College of Science and Technology in the evening.

THE REORGANIZATION OF THE DEPARTMENT OF THE INTERIOR

AT the closing session of the administrative council of the American Engineering Council in Philadelphia on May 10, support was pledged to the reorganization