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OF

ALBERT SAUVEUR

1863–1939

BY

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The nineteenth century was the age of steel; the twentieth begins the age of steels, many and better steels, on the use of which modern industries depend. New alloys of iron and improving methods of their treatment in the furnace have revolutionized the heavy industries and enormously increased the range and efficiency of consumers' goods. That social betterment is largely the product of metallography, and a leader in the development of this science was Albert Sauveur. He was the Dean of American metallographers and a pioneering genius, recognized by the steel manufacturers of the whole world. His works do follow him, for his "Metallography and Heat Treatment of Iron and Steel" is still standard authority on the subject, and his many students continue to spread the influence of Sauveur's fundamental ideas.

Albert Sauveur, born in Louvain, Belgium, on June 21, 1863, was of French blood—the son of Lambert Sauveur (Préfet of the Athénée Royal in that city) and Hortense (Franquin) Sauveur. He was educated at the Athénée Royal; at the Liège School of Mines (1881-1886); and at the Massachusetts Institute of Technology, where, in 1889, he won the degree of Bachelor of Science in Mining and Metallurgy. Immediately after graduation he accepted a position in the chemical laboratory of the Pennsylvania Steel Company at Steelton, Pennsylvania. In his "Metallurgical Reminiscences" (1937) he wrote: "Life in a steel mill chemical laboratory lacks enchantment. I entered it every morning at seven o'clock to leave it at six o'clock. To be sure, on Saturdays we stopped our labor at 5 P. M., but as we had only fifty minutes for refreshment at noon you will see that we worked, if that is the correct way to express it, exactly sixty hours per week.

"While I had been told that I would be paid $50 per month for my services, when my first pay check arrived I found to my disappointment and indignation that it was only for $40. Lest

you infer that a college education was worth very little in those days, you should recall that unskilled labor was being paid $1.00 for ten hours work whereas I received $1.67, from which it follows that a college education was worth sixty-seven cents."

After eighteen months of an unsatisfactory program of work assigned to him at Steelton, he accepted employment in the Bessemer mill of the Illinois Steel Company, South Chicago. He was given a room to himself and supplied with an old-fashioned vertical microscope. With this equipment he was instructed to "study the structure of steel and the ailments to which his flesh is heir." "Five happy years were spent in this way, nearly each day made brighter by what seemed to me a little advance in a research in which I was now deeply interested, which was to continue forty-five years. . . . This early introduction of the microscope into the steel mill laboratory we owe solely to the vision of W. R. Walker, of blessed memory, . . . at the time general manager of the South Works of the Illinois Steel Company." In his "Reminiscences" he also noted that Sorby's classic paper on the microstructure of steel had been published in 1886, and that Osmond and Werth in France and Martens in Germany were also making contributions to the new science. After the year 1891, when Sauveur began his own independent work, he kept in close touch with the American Howe, the English Arnold, Roberts-Austen, Hadfield, and Stead, and the French Le Chatelier—"all stars of the first magnitude in the metallurgical sky."

With his crude microscope he pioneered further, making the first American microphotographs showing the internal structure of steel. Ever since, this method has been profitably used on a wholesale scale. He was soon able to prove to the officials of his steel company that they had been giving the wrong treatment to their metal, and he detailed the proof in his first publication: "The Microstructure of Steel" (1893), a paper later translated into French, German, and Russian. Although he had guided the steel company to a more scientific and effective way of manufacturing steel designed for heavy duty, a new general manager did not understand what Sauveur had done in adding millions of dollars to the company's products, and directed that

the scientific laboratory should be abolished! Sauveur then opened a private laboratory in Boston, and, in 1898, had the courage to begin the publication of a quarterly journal called "Metallographist," later issued under the name "Iron and Steel Magazine." During seven years this journal did much to stimulate interest in the new science. In 1912 he published his "Metallography and Heat Treatment of Iron and Steel," a book now in its fourth edition and with total sale of nearly 20,000 copies. About this time he opened a correspondence course in metallography, with ultimate enrollment of 1500 students. The value of his ideas was clearly shown by the fact that, between 1896 and 1901, ten of the leading steel companies in the United States equipped themselves for the microscopical examination of their many varieties of steel.

Sauveur's principal contributions to the science and art of metallurgy may be summarized under four heads: (1) improvement in the technique of the microphotography of metals, an indispensable method of comparing internal structure and therefore the conditions that control usefulness to man; (2) research on the nature of the constituents of the many alloys, and on the important matter of establishing international nomenclature for those constituents; (3) discovery of the mechanism involved in the tempering of steel, with results so vital to the industry; and (4) prolonged and fruitful study of the effect of heat treatments on the grain, and therefore strength and toughness, of the iron alloys. In the words of Leon Guillet and Albert Portevin, Sauveur was "constructeur et créateur d'outillage métallographique, expérimentateur et savant, éditeur et propagandiste, professeur et éducateur," who "personifia la nouvelle science des métaux sous tous ses aspects et il leur a rendu d'inappréciables services. . . . Son oeuvre restera comme une des plus parfaites expression de l'époque créatrice de l'histoire de la métallurgie scientifique."

In 1899 Sauveur was called to Harvard University, where, in succession, he became: Instructor in Metallurgy (1899-1901); Assistant Professor (1901-1905); Professor (1905-1924); Gordon McKay Professor (1924-1935); Professor Emeritus,

after 1935. During those years he published many technical papers, listed in the following bibliography. His writings, like his university lectures and conversation, were remarkably lucid, proving complete mastery of our language, which he had made his own only after his twenty-third year.

On June 4, 1891, Sauveur was married to Mary Prince Jones of Spencer, Massachusetts. Their children included Albert (deceased), Hortense (now Mrs. Romeyn Taylor), and Mary Isabella (now Mrs. George C. Eaton).

A man of the world, the world has showered honors upon him. His honorary degrees include: Sc.D., Case School of Applied Science, 1921; Sc.D., University of Grenoble, France, 1924; Sc.D., University of San Marcos, Peru, 1925; D. Eng., Lehigh University, 1926; S.D., Harvard University, 1935. In 1919 he was awarded the Elliott Cresson Gold Medal of the Franklin Institute; in 1924, the Bessemer Medal of the Iron and Steel Institute of Great Britain. He was the first recipient of the Albert Sauveur Achievement Medal of the American Society for Metals. Posthumously, the Association of Graduate Engineers of the University of Liège honored him with the Trasenster Medal, and the Franklin Institute honored itself by enrolling Sauveur's name among the men to whom the Franklin Medal has been voted. France and his native Belgium recognized his distinction by electing him Officier of the Légion d'Honneur, Officier d'Académie, and Officier of the Order of Leopold.

Sauveur was a member of the National Academy of Sciences, of the American Academy of Arts and Sciences, of the American Philosophical Society, of the Iron and Steel Institute of Great Britain, the Iron and Steel Institute of America, of Sigma Xi, and of Tau Beta Pi. He was elected to honorary membership in the American Institute of Mining and Metallurgical Engineers, the American Society for Metals, the Society of Engineers of the Liège School of Mines, the Société des Ingénieurs Civils de France, and the Société de l'Industrie Nationale (France); and to corresponding membership in the Société d'Encouragement pour l'Industrie Nationale (France).

During the period 1917-1919 he served as metallurgist for the American Aviation Commission in France, and also as metallurgical expert in the French Ministry of Munitions. In 1924 he was the Henry Marion Howe lecturer to the American Institute of Mining and Metallurgical Engineers; in 1929, Henry de Mille lecturer to the American Society for Steel Testing; in 1938, Marburg lecturer to the American Society for Testing Materials. He was a United States delegate to the Pan-American Scientific Congress at Lima, Peru (1924). For many years he was steadily retained as metallurgical consultant by several large corporations using special steels in the manufacture of factory and domestic tools.

But Albert Sauveur was much more than a master of his craft. Like one of his own steels, his spirit was exquisitely tempered for service among all sorts of men—a spirit of intelligence and cooperation that made for complete happiness in his family, and for the love and respect of students and colleagues alike. His insistence on clearness of thought was coupled with deep sympathy with, and understanding of, all with whom he worked. He "allied French finesse with Anglo-Saxon humor." These inborn graces of the soul and his never-failing, perfect courtesy explain the unique, unforgettable charm of Albert Sauveur. It is a glory for Belgium to have produced him, and for America to have facilitated, however imperfectly, his development as a pioneer in science and as a man who was truly and thoroughly civilized.

KEY TO ABBREVIATIONS USED IN BIBLIOGRAPHY

Amer. Inst. Min. Eng. = American Institute of Mining Engineers.
Amer. Inst. Min. & Met. Eng. = American Institute of Mining and Metallurgical Engineers.
Amer. Iron & Steel Inst. = American Iron and Steel Institute.
Amer. Phil. Soc. = American Philosophical Society.
Amer. Soc. Metals = American Society for Metals.
Amer. Soc. Steel Treat. = American Society for Steel Treating.
Amer. Soc. Test. Mat. = American Society for Testing Materials.
Chem. & Met. Eng. = Chemical and Metallurgical Engineers.
Electro. & Met. Ind. = Electrochemical and Metallurgical Industry.
Eng. Mag. = Engineering Magazine.
Eng. & Min. Journ. = *Engineering and Mining Journal.*
Harvard Eng. Journ. = Harvard Engineering Journal.
Int. Assoc. Test. Mat. = International Association for Testing Materials.
Int. Eng. Cong. = International Engineering Congress.
Iron & Steel Mag. = Iron and Steel Magazine.
Iron Trade Rev. = The Iron Trade Review.
Journ., Iron & Steel Inst. = Journal, Iron and Steel Institute.
Met. & Chem. Eng. = Metallurgical and Chemical Engineering.
Nat. Acad. Sci. = National Academy of Sciences.
Proc. Amer. Soc. Test. Mat. = Proceedings, American Society for Testing Materials.
Proc. Eng. Soc. W. Pa. = Proceedings, Engineers' Society of Western Pennsylvania.
Sci. Amer. = Scientific American.
Tech. Quar. = Technology Quarterly, Massachusetts Institute of Technology.
Trans. Amer. Inst. Min. Eng. = Transactions, American Institute of Mining Engineers.
Trans. Amer. Soc. Min. & Met. Eng. = Transactions, American Society of Mining and Metallurgical Engineers.
Trans. Amer. Soc. Steel Treat. = Transactions, American Society for Steel Treating.

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