JAMES CURTIS BOOTH.

It has been pointed out by the present writer, elsewhere in these columns, that two distinct epochs can be shown in the development of science in the United States, one beginning with the teaching of chemistry by the elder Silliman at Yale College, early in the century, and the other beginning with the settlement of Louis Agassiz in Cambridge. Between these two eras there was a development of chemistry in Philadelphia, which may be traced back to the influence of Robert Hare, who was contemporaneous with Prof. Silliman, but which culminated in the opening of J. C. Booth's laboratory, in 1836, where many of our ablest chemists of a past generation received their early training. A course in this laboratory was considered necessary for the chemist of that time, and was regarded as of more value than a college diploma. Professor Booth continued long in the active practice of his profession, and his recent death, on March 21, 1888, at his residence of "Midhope," Haverford College Post Office, Pa., removes from us one of the most eminent of American chemists.

James Curtis Booth was the son of George and Ann Bolton Booth, and was born in Philadelphia on July 28, 1810. He received his early education at classical schools in Philadelphia, and then spent four years in Hartsville Seminary, in Bucks County, Pa., after which he studied at the University of Pennsylvania, where he was graduated in 1829. A year later he entered the Rensselaer Polytechnic Institute, and completed his course in 1831. He then went to Flushing, L. I., where, during the winter of 1831–32, he delivered an introductory course of lectures on chemistry. Deciding to follow that science as a profession, he went to Germany in December, 1832, and entered Friedrich Wöhler's private laboratory in Cassel, there being at that time no university laboratories arranged for the regular reception of students; and it is believed that he was the first American student to study analytical chemistry in Germany. After a year with Wöhler, he went to Berlin, and spent an equal amount of time with Gustav Magnus. The remainder of his three years abroad was devoted to the practical study of chemistry applied to the arts in the manufacturing centers of the Continent and England.

With an education probably unequaled at that time by any chemist in America, he returned to the United States, and in 1836 established in Philadelphia a laboratory for instruction in chemical analysis and applied chemistry. This institution soon acquired considerable distinction, being the first of its kind in this country, and during the course of a few years nearly fifty students availed themselves of his instruction, most of whom have since acquired distinction. The list includes John F. Frazer, professor of chemistry at the University of Pennsylvania in 1844–73; Thomas H. Garrett, his surviving partner in the analytical business; Campbell and Clarence Morfit, known by the handbook which they wrote; Richard S. McCulloh, professor of physics at Columbia College in 1857–63; Robert E. Rogers, professor of chemistry at the University of Pennsylvania in 1852–77; and Dr. William Camac of Philadelphia.

At first he was assisted by Dr. Martin H. Boyé, who remained with him until 1845, and in 1848 Thomas H. Garrett became his associate. The latter continued to manage the analytical department of the business until 1881, when Andrew A. Blair joined the firm, which, under the title of Booth, Garrett & Blair, have a high reputation as analysts, especially in the examination and determination of iron ores.

Meanwhile, in 1849, Mr. Booth received from President Zachary Taylor the appointment of melter and refiner at the U. S. mint in Philadelphia, which office he held until his death. His resignation was sent to the President on July 27, 1887, and accepted on January 7, 1888, to take effect on the qualification of his successor—an event which occurred after his death. In his official capacity, Mr. Booth was frequently consulted by the government on questions pertaining to chemistry, and his studies on the nickel ores of Pennsylvania led, in 1856, to the adoption of nickel as one of the components of the alloys used in the coinage of the cent issued in that year.

Soon after his return from Europe he was called on to take part in the geological survey of Pennsylvania, and during 1837–38 he had charge of the geological survey of the State of Delaware, in connection with which he issued the first and second "Annual Reports of the Delaware Geological Survey" (Dover, 1839) and "Memoirs of the Geological Survey of Delaware" (1841).

His partiality for applied chemistry led to his appointment as professor on that subject at the Franklin Institute, in Philadelphia, in 1836, and during the nine successive winters he continued his lectures, making three full courses of three years each, and exhaustive of the range of applied chemistry. It is much to be regretted that these full courses have not been resumed since 1845, except in single sporadic cases.

The University of Lewisburg conferred on him the degree of LL.D., 1867, and that of Ph.D. he received from the Rensselaer Polytechnic Institute in 1884. In January, 1839, he was elected a member of the American Philosophical Society, and in September, 1852, he was chosen a member of the Philadelphia Academy of Natural Sciences. He served as president of the American Chemical Society in 1884 and 1885, and was elected for a third time, but declined this honor, never before conferred on a member.

His bibliography, which is not very extensive, includes the following papers: "On the Deutarseniuret of Nickel from Reichelsdorf in Hessia" (1836); "Analysis of Various Ores of Lead, Silver, Copper, Zinc, Iron, etc., from King's Mine, Davidson County, N. C." (1841); "On Beet Root Sugar" (1842); "Chrome Iron Analysis" (1842); "Constitution of Glycerin and Oily Acids" (1848); "On Remingtonite, a New Cobalt Mineral" (1852); with Martin H. Boyé: "Analysis of Well Water in Philadelphia" (1842); "On the Extraction and Decolorization of Gelatin" (1842); "On the Preparation of Aluminous Mordants" (1842); "Conversion of Benzoic Acid in Hippuric Acid" (1843); and "Analysis of Three Kinds of Feldspar" (1844); with Thomas H. Garrett: "Experiments on Illumination with Mineral Oils" (1862); and with Campbell Morfit: "On the Analysis of Cast Iron" (1853). His larger works are: "Encyclopedia of Chemistry, Practical and Theoretical," in the preparation of which he was assisted by Martin H. Boyé, Richard S. McCulloh, and Campbell Morfit (Philadelphia, 1850), and "Recent Improvements in the Chemical Arts," issued by the Smithsonian Institution (Washington, 1852). Also he edited, with notes, a translation from the French of Regnault's "Elements of Chemistry" (two volumes, Philadelphia, 1853).

THE LATE JAMES CURTIS BOOTH.

Electrolytic Deposit of Pure Iron.

For obtaining fixed or detachable deposits of chemically pure and very homogeneous iron, Mr. Barthol employs the following process:

A bath of carbonate of iron is prepared with $18\frac{3}{4}$ ounces of sulphate of iron to $2\frac{1}{2}$ gallons of water, and $4\frac{3}{4}$ pounds of carbonate of soda to $2\frac{1}{2}$ gallons of water. To this is added 5 gallons of water acidulated with sulphuric acid, and there is thus obtained an electrolytic liquid in which, on the one hand, are immersed the objects to be covered, and, on the other, an iron or steel anode of the size of the object to be coated with pure iron.—*Revue Scientifique.*

THE physicians are vigorously discussing the ethics of patenting instruments invented by members of the profession, in the *Medical Journal.* They never hesitate about copyrighting a book, though, the *Sanitary News* has discovered.

Ventilation of the Beds of the Sick.

In the Cambridge (Mass.) Hospital there is an arrangement for the ventilation of the beds not generally known It is so effective that I wish to describe it. Beneath each bed is a ventilating tube of about eight inches in diameter, fifty square inches area, leading directly through the floor to a foul air tank, beneath which it communicates with the main ventilating chimney. About 2,000 cubic feet of air an hour is thus drawn from beneath each bed. This ventilating tube is connected with the bed above by a four inch pipe of tinned plate, with a proper cover and joints, which passes around the side or foot of the bed and into it beneath the clothing. This pipe is lengthened with one of the same size of pasteboard or other substance, a non-conductor of heat, reaching to any part of the bed. By this simple means foul air is removed as fast as formed, the bed kept free from odor, and the patient's body is no longer surrounded with contaminating gases. As the air presses inward through the porous bed clothing, none escapes into the ward. Further, a two inch flexible pipe is adjusted to that just described, and slipped over the hollow handle of the bed pan when in use, carrying off odor from that also. In the same hospital similar means connect the beds in the private wards with the chimney of an ordinary fireplace, up which the pipe reaches about four feet to insure a good draught with a moderate fire; the part in the chimney is of black iron. The advantages of such an arrangement in cases of sloughs, foul ulcers, cancers, and in fevers with frequent fæcal dejections, are obvious. It may be supposed that the passage of air through the bed would cool it too much. Practically it does not. Probably the quantity of air passing is about the same as in beds ordinarily at the same temperature of the room, but in a different direction.—*N. Y. Medical Journal.*

The Chemistry of Plants.

The activity characterizing many branches of scientific research has yielded wonderful results during recent years. We look upon continued developments with an indifference which but yesterday would have been wonderment. The phases of human progress follow in such rapid succession that we fail at times to note their continuity. But the momentum of research and thought is nevertheless daily demonstrated, and with each demonstration it receives a new impetus which suggests the final possibility of a solution of all mysteries.

While perhaps not in greater activity, still in apparent results the mechanical sciences lead, and from their direct appeal to the more evident interests of the people probably always will be regarded as the most important form of development. In the fields of research of more difficult conquests the results are correspondingly meager, and in no branch is this more true than in that of organic chemistry, especially that pertaining to the chemistry of plants. In referring to this subject the *Western Druggist* says there is little doubt that the organic principles existing in plants are as yet very imperfectly understood. The question of their relations to each other, the influence of variation in climate and soil, the presence and effect of ferments, which appear to be one of the most important at present, are problems which the pharmacologist is called upon to explain more clearly. Recently the active principles of several drugs have been localized in their respective parts of the plants—amygdalin and emulsin in almond, and atropine in belladonna. It is hoped that these and similar investigations will pave the way to a better understanding of the cause, origin, and chemistry of the proximate organic principles, that a systematic science may be formed from the present chaotic mass.

What a Ton of Coal Yields.

A ton of coal yields about 8,000 cubic feet of gas and 1,500 pounds of coke. The purification of the gas furnishes 45 gallons of ammonia water, from which is obtained sulphate of ammonia for agricultural purposes, and about 130 pounds of tar. It is here that the operation becomes especially interesting, for from this last named product are obtained 70 pounds of pitch, 18 of creosote, 9 of naphtha, 13 of heavy oils, 6 of naphthaline, 4 of naphthol, 2 of alizarine, about 1 each of phenol, aurine, and aniline (the substance to which we are indebted for so wonderful colors), 10 ounces of toluidine, 6 of anthracene, and 12 of toluene. Finally, it will interest photographers to know that hydroquinon, that product that has been so much spoken of recently, and which was at first obtained from cinchona, is now obtained from coal by industrial processes.—*La Science en Famille.*