ANTOINE JEROME BALARD, PHARMACIST AND CHEMIST.*

BY JOHN E. KRAMER.

In perusing the history of science we find in bold letters the names of many great men, workers in this field whose accomplishments have won for them great renown. Yet, here and there, we see a name not so familiar, but still deserving more attention than has been accorded. Let us take, for example, the case of Antoine Joseph Balard, French pharmacist and chemist, born in Montpellier, France, September 30, 1802. His education was laid along the lines of pharmaceutical training and was acquired under the Faculty of Sciences of his native town. His teaching ability, however, was so pronounced that he soon became chemistry assistant, and later professor of Chemistry at the Royal College, the School of Pharmacy and the Faculty of Sciences at Montpellier.

Balard qualified as a pharmacist and established himself in business. What spare time he had after the demands of his professions had been met was spent in the work he liked best, chemical research. The scene of his activities, Montpellier, is situated on the Mediterranean Sea, and a nearby salt marsh provided material for much investigation. Certain startling reactions aroused his suspicions and after much intense work he came upon a substance which he ascertained to be a previously unknown element.

Because of its odor, when its fumes came in contact with the air, the element was named bromine, after the Greek word "bromos" meaning stench. The name, however, was bestowed upon the substance by the famous Gay-Lussac, after Balard had called it muride, from the world "muria," meaning brine. Needless to say, Gay-Lussac's appellation remains to this day as the proper one.

It is interesting to note that another famous man of that day, Liebig, had his hand, or rather, didn't have his hand in the early days of bromine. Some years before the discovery Liebig had been sent, for assay, as an unknown, some nearly pure bromine which had been obtained as a by-product in the manufacture of salt. He laid it aside, thinking it some other substance and, when bromine was announced, immediately placed his sample in his "Cupboard of Mistakes" to constantly remind him of his lost opportunity to be the discoverer of a new element.

Balard was only 24 years old when he came upon bromine, in 1826, and his reputation and fame from this discovery were instrumental in his election to the chair of Chemistry in the Faculty of Sciences in Paris, succeeding L. J. Thenard, French pharmacist and chemist, famous for his discovery of hydrogen peroxide. In 1844 he became a member of the Academy of Science and in 1851 he was appointed Professor of Chemistry in the College of France. In this latter eminent position he had the famous Berthelot as a student, then as assistant and later as a colleague.

The sea water which furnished him his clues for the discovery of bromine also induced him to devote much time to the problem of extracting soda and potash from the briny deep. Fate was cruel in this instance, for just as he had mastered the problem, rich deposits of the substances he sought were found in the Stassfurt district. He also conducted much research on bleaching compounds of chlorine,

* Section on Historical Pharmacy, A. PH. A., Washington meeting, 1934.

and was the first to advance the theory that bleaching powder is a double compound of calcium chloride and hypochlorite.

Organic chemistry provided another field of investigation for Balard and we find records of his papers on the decomposition of ammonium oxalate, forming oxamic acid, papers on amyl alcohol, cyanides and the difference in composition between nitric and sulphuric ethers. He was a frequent contributor to the "Annales de Chimie et de Physique."

In 1868 he was made Inspector General of Superior Instruction in France and on March 30, 1876, his death occurred in the city of Paris.

ANTOINE JEROME BALARD.

Let us take a look at Balard's character, for his attitude toward life and work was responsible for a great forward step in the advancement of Science. It seems that this pharmacist-chemist, who had brought fame to himself in the discovery of bromine, was more or less content to ease along on the strength of what he had done. With the praise that was bestowed upon him, he might have reacted in one of two ways. He might have become conceited and overbearing or he might have been fired with the great ambition to find new worlds to conquer. But, instead, he chose the middle path, continuing in his unperturbed, even manner to perform his experiments in the back room of his pharmacy, or else, as was his wont, wander around to the laboratories of his friends, seeing what they were doing, listening to their plans and making suggestions from his own wealth of information. Goodness knows how many of his casual suggestions were put to work to the glory and fame of the user.

However, we do know of one such instance. Louis Pasteur, whose discoveries and works are so well known and so beneficial to us all, was in the midst of his efforts to solve the very perplexing problem of where microbes came from. Some of the scientists of the day were backing the spontaneous generation theory, but Pasteur was of the idea that they came from the air, and were wafted by the air, on dust particles, to all the places where microbes were found. Pasteur found his theory hard to prove, for, try as he might, he could not get his yeast mixtures, the medium of microbe cultivation that he used, dust free. Every time he heated his flasks, dust-laden air would rush in and in a short time the microbes could be seen increased manifold. Pasteur was up against a blank wall when Balard strolled in, heard the story, summed up the situation and rather nonchalantly suggested that Pasteur draw the necks of his flasks into the shape of an "S" lying on its side, patterned after the neck of a swan busily engaged in picking some article from the surface of the water. The suggestion made, Balard continued on his visitation rounds, and re-

turned some time later to have Pasteur excitedly tell him of the success of the experiment. Air had come back into the flasks through these queer shaped necks but no microbes had developed. The germ-laden dust had been unable to go up through the up-turn of the horizontal "S."

But proof was still necessary, so Balard suggested that Pasteur shake his flasks so that some of the culture medium wash through the entire neck and then return to the main body of the flask. Once more Balard sauntered out of the great man's laboratory, and once more Pasteur feverishly followed his advice. Just as Balard had contended, the necks of the flasks gave up enough microbes to make the yeast soup swarm with newer generations in a very short time. The spontaneous generation theory was shattered, and Pasteur was credited with the entire task. De Kruif, in his "Microbe Hunters," describes Balard's nature very admirably in just one sentence. Telling of a brilliant meeting of great scientists at which time Pasteur did his very efficient theory-exploding, the author said, "If Balard was there, you may be sure he applauded as enthusiastically as the rest. A rare soul was Balard."

Although we find the preceding paragraph to be surprisingly true, Pasteur was deeply grateful to Balard for past favors done. Balard had been one of Pasteur's teachers and personal advisers, and had been instrumental in obtaining Pasteur's connections with various investigations and with certain institutions. That he was appreciative is shown when the position of Inspector General of Higher Education was left vacant. Pasteur was immediately proposed for the post but at the same time Balard put in his application, whereupon Pasteur made this gracious gesture in writing, "Your Excellency must know that twenty years ago, when I left the École Normale, I was made a curator, thanks to M. Balard, who was then a professor at the École Normale. A grateful pupil cannot enter into competition with a revered master, especially for a post where considerations of age and experience should have great weight." Balard, consequently, received the position.

Unambitious and indolent, rather given to watching others than doing his own work, Balard was content to let life take its course and human events pass their way unhampered by any more interference from him. He is not as well remembered as others he taught in his school, helped in their laboratories and probably served in the capacity of a pharmacist, and who have received the recognition of time and history and remain forever in the minds of men.

REFERENCES.

"Four Thousand Years of Pharmacy," C. H. LaWall.
"Lippincott's Pronouncing Biographical Dictionary" (1915).
"Encyclopædia Britannica," 11th and 14th Editions, American.
"Microbe Hunters," Paul De Kruif.
"Pasteur," Duclaux.
"The Life of Pasteur," R. Vallery-Radot.

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE.

The formation of State Associations was but the beginning of the work which the AMERICAN PHARMACEUTICAL ASSOCIATION has done to touch the life and the individual pharmacist and the health of the public.