Section on Historical Pharmacy

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THE CENTENARY OF THE DISCOVERY OF IODINE.

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In the beginning of the nineteenth century great changes took place all over Europe through Napoleon, the military Corsican, until he and his great army met their defeats at Moscow in 1812, at Leipsic, in 1813, and at Waterloo, in 1815. At the same time there was also a revolution in science going on, quite especially in chemistry. Since Anton Laurent Lavoisier (1743-1794) succeeded in abolishing all prejudices and in a masterly manner applied scientific principles to the explanation of chemical processes, a new clear way was opened to chemistry, and important fundamental principles and doctrines and a new chemical nomenclature were adopted.

In 1803 John Dalton (1766-1844), the noted physicist, gave the results of his researches, which lead to the foundation of the Atomic Theory, which was explained in his book, "New System of Chemical Philosophy," published in 1808. Dalton most certainly laid the cornerstone for a new theoretical chemistry. Three distinguished chemists born about the same year, a true triumvirate, namely, Berzelius, Davy and Gay-Lussac, representatives of three countries, Swenden, England and France, were especially instrumental in the construction of the "new chemistry." For this reason I beg to dwell upon these three men for one minute, in as much as this gradually leads up to the discovery of the elementary nature of iodine.

Baron Jons Jakob Berzelius (1779-1848) was one of the recognized authorities in chemistry. I want to emphasize the fact that Berzelius from 1802 was assistant, and from 1807, professor of medicine and pharmacy at the University of Stockholm, and pharmacy can be justly proud of having such an authority as one of its teachers. I can, however, not subscribe to the statement by T. P. Hilditch in "A Concise History of Chemistry," 1911, page 214, that Berzelius was a Swedish apothecary. The entire energy of Berzelius became devoted to one great aim, namely the minute investigation of chemical properties and the development of the atomic doctrine.

Sir Humphry Davy (1778-1829) served his apprenticeship with a certain Mr. Borlase, an apothecary of Penzance in Cornwall, but later studied physics and became professor at the Royal Institution in London. He first became prominent through the discovery of the intoxicating and stupefying properties of "laughing gas," our nitrous oxide. During the first thirteen years of the nineteenth century he accomplished his most memorable work, which effected a complete transformation in many branches of chemistry by the isolation of metals, that is the ele-

ments of the alkalies and the alkaline earths, by the galvanic current. An even still more important result was the discovery of the elementary nature of chlorine. It was Sir Humphry Davy who said: "Analogy is the fruitful parent of error."

Joseph Louis Gay-Lussac (1778-1850) was initiated into chemistry by the immortal Claude Louis Berthollet, the discoverer of potassium chlorate. Gay-Lussac became professor of chemistry at the École Polytechnique and professor of physics at the Sorbonne. As it is well known he was the discoverer of the so called "Law of Volumes," which proves the existence of a definite relation between the volume of a gas and its temperature. Gay-Lussac was assisted by Louis Jacques Thénard (1777-1857) professor of chemistry at the Collège de France, whose name is inscribed in the annals of chemistry and pharmacy as the discoverer of hydrogen peroxide.

At the time when Davy, Gay-Lussac and Thénard began their memorable investigations, hydrochloride acid gas was generally held to contain chemically combined water. The great Lavoisier was under the impression that it contained oxygen, and therefore gave it the name "Acidum Muriaticum," derived from "Muria," the Greek for saltwater, or seawater.

In 1810 Humphry Davy announced the epoch-making discovery that hydrochloric acid was a simple, indivisible chemical, containing no oxygen.

Many distinguished chemists at that time regarded chlorine as the oxide of a hypothetical element. Berthollet therefore in 1785 named chlorine "oxy-muriatic acid," which succeeded the name "dephlogisticated marine acid," given by Scheele.

Again Davy was the first to express the distinct opinion that chlorine was an element and suggested for it its present name in "Philosophical Transactions" for 1811, page 1. At first Gay-Lussac and Thénard did not want to agree to this, not wanting to disturb the chemical system of that time. It was the discovery of the elementary nature of iodine and its analogy to chlorine which proved the correctness of Davy's views.

The Discovery of Iodine.—Unlike the French apothecary, Antoine Jerome Balard, who discovered bromine in 1826 and whose memorial tablet is the first medallion which adorns the facade of the École Superieure de Pharmacie in Paris, another French pharmacist, Bernard Courtois, who discovered iodine in 1811, is not honored, in fact is almost forgotten, or is only too frequently mentioned in a disrespectful manner as a soap maker or soda manufacturer, or as a *salpêtrier*.

It should be remembered that in those times of war when almost as much gunpowder was used as there was bread consumed, saltpeter became very scarce. As early as 1540 an edict was issued in France commissioning officials named "Salpêtriers," who were authorized to seek for saltpeter in stables, cellars and other places where it was found naturally. La Salpêtrière in Paris, the jail and insane asylum, became famous as one of the natural nitre factories in the world. It might also be of interest to the A. Ph. A. members assembled at Nashville, that the nearby celebrated Mammoth Cave in Kentucky does, or rather used to contain natural deposits of saltpeter, which were used in the manufacture of gun powder during the war, just about a century ago.

Bernard Courtois, the discoverer of iodine, was a pharmacist. He was born in Dijon in 1777 and at an early age he became apprenticed to the apothecary, Frémy, at Auxerre, the grandfather of the celebrated chemist, Edm. Francois

Frémy, whose name is intimately associated with the preparation of anhydrous hydrofluoric acid in 1869 and the fluorination substitution process. Later young Frémy and Courtois worked together in the laboratory of the celebrated Antoine Francois Fourcroy (1755-1809) professor of chemistry at the Jardin du Roi, another descendant of pharmacy, his father being the apothecary to the household of the Duke of Orleans. Other assistants of Fourcroy were Thénard, mentioned above, Armand S. Seguin (1765-1835) who as early as 1795 recognized that tannic acid was different from gallic acid, and Louis Nicolas Vauquelin, (1763-1829) another authority whose cradle stood in an apothecary shop in Normandy. Courtois also became assistant to Louis Jacques Thénard, who had studied pharmacy and chemistry under the celebrated Berthollet, Fourcroy and Vauquelin, and who became professor of chemistry at the École Polytechnique and at the Collège de France, and who was made a Peer of France in 1832 by King Charles X.

Armand S. Seguin, the former demonstrator under Fourcroy became immensely wealthy through the supply of drugs to the army during the republic, the empire and the restoration. Courtois was employed in the laboratory of the banker-chemist at Jouy en Josas, and was helpful in the isolation of a crytalline substance, having an alkaline reaction, from opium. Seguin brought his researches before the Institute de France on December 24, 1804, in a paper "Sur l'Opium," which paper, however, was not published until 1814 in the Annales de Chimie, Vol. 92, page 225. He came very near getting the Montyou prize of 2000 francs, which was captured by the German apothecary, Friedrich Wilhelm Adam Sertürner "because he was the first to recognize the basic character of morphine and has thus opened the way for future discoveries in pharmacy, chemistry and medicine." It must be mentioned that such an authority as Vauquelin gave credit to Courtois for the discovery of morphine in 1804.

Discovery of Iodine.—The foregoing proves that Courtois was well fitted to become a research chemist equally as renowned as his eminent teachers. But he became commercialized and took up technical chemistry for a livlihood and in 1804 began the manufacture of artificial saltpeter in the Rue du Rigard in Paris. He employed the ashes of sea weed, called "varec" in French and "kelp" in English, to prepare a lye, which, of course, contained principally sodium carbonate. This was decomposed with nitrate of lime, which formed a solution of sodium nitrate and the precipitate of calcium carbonate. When Courtois used this method in a copper boiler, he discovered that the solution attacked the metal. He at first suspected that the cause of this trouble lay in a poor quality of varec, but after numerous experiments he found that the ashes of all sea weeds had the same deteriorating effect. Courtois furthermore discovered that after the crystallization of soda from the lye of varec, the remaining mother liquor when accidently heated with sulphuric acid evolved beautiful violet vapors, which sublimed into scales having a grayish-black color and a bright metallic lustre. It was Courtois who discovered that when this substance was treated with ammonia an explosive compound was formed, and it was Courtois who recognized the corrosive action of the scales upon organic matter.

As usual, commercial or industrial chemists are too busy for further and deeper researches. Courtois had to make saltpeter and had no time to investigate the

violet vapors or the metallic scales. However, he communicated his experiments to his friend Clément, a chemist, who presented a report of these interesting experiments to the Academy of Sciences at Paris on November 20, 1813, one hundred years ago, and eighteen months after Courtois discovered the new substance.

It might be of historical interest, especially to pharmacists, that Charles Bernard Désormes and his son-in-law, Clément, whose first name, however, is not recorded in any of the numerous works which have been consulted by the author, operated an alum factory at Verberie. The names of Clément and Désormes are perhaps best known through their thorough investigation of carbon disulphide and their splendid pioneer work in thermo-chemistry.

Discovery of the Elementary Nature of Iodine.—Sir Humphry Davy, the "traveling chemist," on his way to Italy, by special invitation of Emperor Napoleon, stopped over in Paris and was present at the reading of this paper by Clément. Up to that time no suggestion was made either by Courtois or Clément of the elementary nature of this substance. Clément gave the English chemist some of the crystals and asked him to further investigate them. Sir Humphry Davy, who in 1811 had discovered that chlorine was an element, suspected the very same thing of this substance and commenced experiments at once which convinced him of the truth of this surmise.

However, Gay-Lussac, the French chemist, got ahead of the slower English authority by presenting the very same facts in a paper which he read at the Academy of Sciences on December 6, 1813. Five days after the reading of this paper, Sir Humphry Davy, complained of this trick played by the French chemist, in a letter to Mons. le Chevalier George Leopold Cuvier, the Commissioner of Education, making the claim of priority. The matter was referred to Ferdinand Hoefer, the great French historian, who thoroughly investigated the circumstances, and thereupon announced that Sir Humphry Davy was entitled to the discovery of the elementary nature of iodine. Even the French historian Raoul Jagnaux in his *Histoire dc la Chimie,* I, pp. 522-524, who quotes the pharmacist-chemist Wurtz on the title page:

> "La chimie est une science francaise
> Elle fut constituée par Lavoisier d' immortelle mémoire."

(Chemistry is a French Science which Lavoisier made immortal), gives credit to Sir Humphry Davy as the first to recognize the elementary nature of iodine. It is therefore surprising that most of the books give this credit to Gay-Lussac, whose name has been made immortal by his classic "Mémoirs d' Iode," published in 1814.

Etymology of the word Iodine.—Sir Humphry Davy named the substance "Violaceous Gas," on account of the color of the vapor. From the Greek *"iodes,"* that is violet-colored, Gay-Lussac named the element "Iode" in French, from which the Latin "Iodum," the German "Jod" and the English "Iodine" are derived. Therefore Gay-Lussac deserves credit for the proper name of this element. The Greek "Ion" for "violet" was originally "Fion," from which the Latin "Viola," and the German, English and French "Violet" are derived.

Introduction of Iodine in Therapeutics.—Jean Francois Coindet (1774-1834), the founder of a generation of physicians, studied in Edinburgh and became one

of the best known physicians of his time, settling in Geneva, Switzerland. Spongia Usta, or burned sponge, was largely used at that time against scrofula and goiter and Coindet suspected that iodine was its active constituent, the same as in sea weed, which was verified by Jean Baptiste Dumas (1800-1884), the celebrated pharmacist-chemist of Geneva and Paris. Coindet thereupon promptly introduced iodine and preparations of iodine into therapy for the same purpose with great success. J. G. A. L. Lugol (1786-1851), the celebrated physician at the Hospital Saint Louis in Paris, was also instrumental in introducing iodine into therapy and his name will live forever in pharmacy and medicine on account of Lugol's solution.

Rewards.—In the case of iodine, science has been thankful to the pharmacist who discovered the substance, and also to the physician who introduced it into medicine. In 1832 the Academy of Science in Paris awarded 6000 francs to Bernard Courtois, who had been ruined financially in 1815 by the competition of natural, duty-free saltpeter from Chili with artificial saltpeter, or sodium nitrate, which he was manufacturing. However Courtois became a spendthrift and died in poverty in Paris in 1838.

The Academy of Science also awarded a prize of 3000 francs to Coindet, the physician who had so promptly made medical use of the discovery of Courtois.

Conclusion.—May this story of the discovery of iodine and the determination of its elementary nature, just one hundred years ago, serve as an example of the interesting history of pharmacy and chemistry! May it arouse and strengthen the interest in the history of our noble profession and may the discoveries and work of the "fathers of pharmacy," men actively engaged in the drug business, be an everlasting credit to pharmacy!

HISTORICAL SKETCH OF THE ALBANY COLLEGE OF PHARMACY.

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The idea of organizing a school of pharmacy in Albany originated with two gentlemen interested in pharmaceutical and educational matters in the late seventies. A conference, at which several representative pharmacists were present, was held November 18, 1878, and it was decided that a meeting of the pharmacists of the city should be called for the purpose of determining whether it was advisable to form a pharmaceutical association with a view to the establishment of a school of pharmacy to be conducted by such association. A meeting was called by Dr. Willis G. Tucker, of the medical college faculty, and Mr. Gustavus Michaelis, of the Albany Pharmaceutical Company, for December 2, and at this meeting, which was held in the chemical lecture room of the medical college and attended by about twenty Albany pharmacists, a committee was appointed to prepare a plan of organization. So little interest, however, was shown in the matter that no subsequent meeting was called, nor was any further action taken to secure the organization of a school by the Albany pharmacists.

In the fall of 1880 the project was revived, and Dr. Tucker and Mr. Michaelis