JEAN-BAPTISTE-ANDRÉ DUMAS.

JEAN-BAPTISTE-ANDRÉ DUMAS was born at Alais, in the south of France, July 14, 1800. He was educated at the college of his native place, and appears to have been destined by his parents for the naval service; but his parents abandoned their plan, and apprenticed him to an apothecary of the town. He remained in this situation, however, but a short time. In 1816 he travelled on foot to Geneva, where he found employment in the pharmacy of Le Royer.

At that time Geneva was the centre of much scientific activity; and young Dumas had the opportunity of attending lectures on botany by de Candolle, on physics by Pictet, and on chemistry by Gaspard de la Rive.

About this time, young Dumas had the good fortune to render an important service to Dr. Coindet, to whom it had occurred that burnt sponge, then generally used as a remedy for goitre, might owe its efficacy to the presence of a small amount of iodine. Dumas not only proved the presence of iodine in the sponge, but also indicated the best method of administering what proved to be almost a specific remedy. It was in connection with this investigation that Dumas's name first appears in public, as the discovery produced a great sensation.

Soon after, Dumas formed an intimacy with Dr. J. L. Prévost, then recently returned from pursuing his studies in Edinburgh and Dublin, and was induced to undertake a series of physiological investigations, which for a time withdrew him from his strictly chemical studies. Several valuable papers on physiological subjects were published by Prévost and Dumas, which attracted the notice of Alexander von Humboldt, who, on visiting Geneva in 1822, sought out Dumas, and awakened in him a desire to seek a wider field of activity. In consequence he removed to Paris in 1823, where the reputation he had so deservedly earned at Geneva won for him a cordial reception.

In 1826 he married Mlle. Herminie Brongniart, the eldest daughter of Alexandre Brongniart, the illustrious geologist; and in after years his house became one of the chief resorts of the scientific society of Paris.

In 1828–29 Dumas united with Théodore Olivier and Eugène Péclet in founding the École centrale des arts et manufactures. In 1832 Dumas succeeded Gay-Lussac as professor at the Sorbonne; in 1835 he succeeded Thenard at the École polytechnique; and in 1839 he succeeded Deyeux at the École de médecine. Thus, before the age of forty, he filled successively, and for some time simultaneously, all the important professorships of chemistry in Paris except that of the College of France, with which he was never permanently connected.

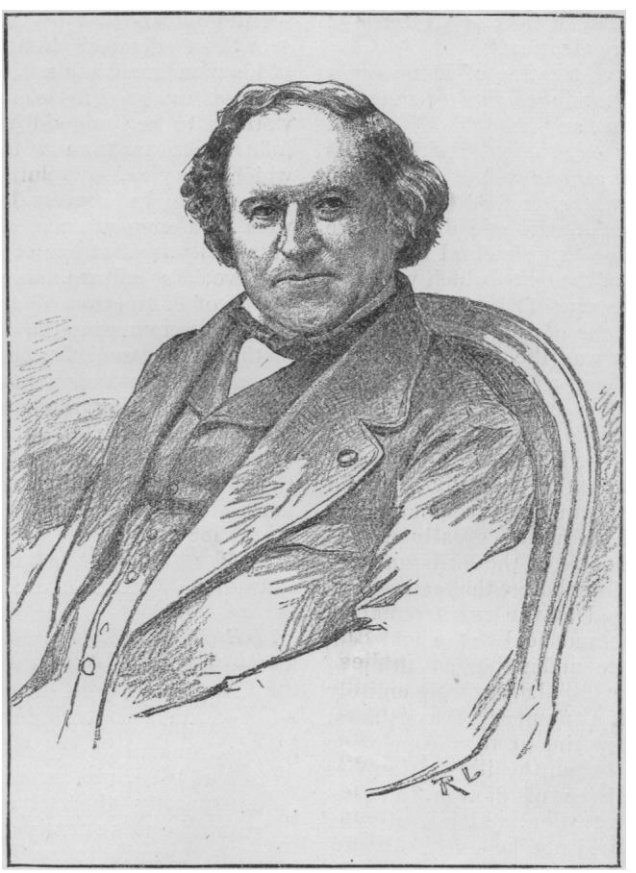
Dumas early recognized the importance of laboratory instruction in chemistry, for which there were no facilities at Paris when he first came there, and in 1832 founded a laboratory for research at his own expense.

The political and social upheaval of 1848 seemed at the time to endanger the stability in France of every thing which a cultivated and learned man holds most dear; and Dumas was not one to consider his own preferences, when he felt he could aid in averting the calamities which threatened his country. Immediately after the revolution of February, he accepted a seat in the legislative assembly. Shortly afterwards the president of the republic called him to fill the office of minister of agriculture and commerce. During the second empire he was elevated to the rank of senator, and shortly after his entrance into the senate he became vice-president of the high council of education. In order to reform the abuses into which many of the higher educational institutions of Paris had fallen, he accepted a place in the municipal council of Paris, over which he subsequently presided from 1859 to 1870.

In 1868 Dumas was appointed master of the mint of France; but with the fall of the second empire, in 1870, his political career came to an abrupt termination. Some years previously he had resigned his professorships; and now, at the age of seventy, he found himself for the first time free to devote his leisure to the noble work of encouraging research, and thus promoting the advancement of science. He had reached an age when active investigation was almost an impossibility, but his commanding position gave him the opportunity of exerting a most powerful influence; and this he used with great effect. In early life he had been elected, in 1832, a member of the Academy of sciences; in 1868 he had succeeded Flourens as its permanent secretary; and in 1875 he was elected a member of the French academy as successor to Guizot, — a distinction rarely attained by a man of science. It was, however, as permanent secretary of the Academy of sciences that Dumas exerted, during the last years of his life, his greatest influence.

When the writer last saw Dumas, in the winter of 1881–82, the great chemist had still all the vivacity of youth, and it was difficult to realize his age. He took a lively interest

in all questions of chemical philosophy, which he discussed with great earnestness and warmth. There were the same fire and the same exuberance of fancy which had enchanted me in his lectures thirty years before. At an age when most men hold speculation in small esteem, I was much struck with his criticism of a contemporary, who, he said, had no imagination, although he spoke with the highest praise of his experimental skill. At that time Dumas showed no signs of impaired strength; but during the following year his health began to fail, and he died on the 11th of April, at Cannes, where he had sought a retreat from the severity of the winter climate of Paris.



Dumas was not only eminent as an investigator of nature, but even more eminent as a teacher and an administrator. Without attempting to detail Dumas's numerous contributions to chemical knowledge, we will here only refer to three important investigations, which produced a marked influence in the progress of chemical science.

After his removal to Paris he took up the problem which the relations of the molecular volumes of aeriform substances present; and his paper on some points of the atomic theory had an important influence in developing our modern chemical philosophy. We are surprised that Dumas did not at once realize the consequences which the doctrine of equal molecular volumes involves in the interpretation of the constitution of chemical compounds, and the clear distinction between 'the physically smallest particles' and 'the chemically smallest particles,' or the molecules and the atoms, as we now call the physical and the chemical units. But more than a quarter of a century passed before the full harvest of this fruitful hypothesis could be reaped.

But if this investigation of gas and vapor densities brought a great strain upon the dualistic system, the second of the three great investigations of Dumas, to which we have referred, led to its complete overthrow. The most important of the experimental results were the substitution products obtained by the action of chlorine gas on acetic acid; and the capital point made, was that chlorine could be substituted in acetic acid for a large part of the hydrogen without destroying the acid relations of the product; and the inference was, that the qualities of a compound substance depend, not simply on the nature of the elements of which it consists, but also on the manner or type according to which these elements are combined.

To the chemists of the present day these results and inferences seem so natural that it is difficult to understand the spirit with which they were received forty years ago. But it must be remembered that at that time the conceptions of chemists were wholly moulded in the dualistic system. It was thought that chemical action depended upon the antagonism between metals and metalloids, bases and acids, acid salts and basic salts, and that the qualities of the products resulted from the blending of such opposite virtues. That chlorine should unite with hydrogen was natural, for no two

substances could be more unlike; but that chlorine should supply the place of hydrogen in a chemical compound was a conception which the dualists scouted as absurd.

By the second investigation, as by the first, although Dumas gave a most fruitful conception to chemistry, he only took the first step in developing it. His conception of chemical types was very indefinite; and Laurent wrote of it a few years later, "Dumas's theory is too general; by its poetic coloring, it lends itself to false interpretations; it is a programme of which we await the realization."

The third great investigation of Dumas was his revision of the atomic weights of many of the chemical elements, and in none of his work did he show greater experimental skill. His determination of the atomic weight of oxygen by the synthesis of water, and of that of carbon by the synthesis of carbonic dioxide, are models of quantitative experimental work.

That exuberance of fancy to which we have referred made Dumas one of the most successful of teachers, and one of the most fascinating of lecturers. It was the privilege of the writer to attend the larger part of two of his courses of lectures given in Paris in the winters of 1848 and 1851, and he remembers distinctly the impression produced. Besides the well-arranged material and the carefully prepared experiment, there was an elegance and pomp of circumstance which added greatly to the effect. The large theatre of the Sorbonne was filled to overflowing long before the hour. The lecturer always entered at the exact moment, in full evening dress, and held to the end of a two-hours' lecture the unflagging attention of his audience. The manipulations were entirely left to the care of a number of assistants, who brought each experiment to a conclusion at the exact moment when the illustration was required. An elegance of diction, an appropriateness of illustration, and a beauty of exposition, which could not be excelled, were displayed throughout; and the enthusiasm of a French audience added to the animation of the scene.

To the writer, the lectures of Dumas were brought in contrast to those of Faraday. Both were perfect of their kind, but very different. Faraday's method was far more simple and natural, and he excelled Dumas in bringing home to young minds abstruse truths by the logic of well-arranged consecutive experiment. With Dumas there was no attempt to popularize science: he excelled in clearness and elegance of exposition. He exhausted the subject which he treated, and was able to throw a glow of interest around details which by most teachers would have been made dry and profitless.

In the early part of his life, Dumas was a voluminous writer, and in 1828 published the 'Traité de chimie appliquée aux arts' in eight large octavo volumes, with an atlas of plates in quarto. But, besides this extended treatise, two volumes of lectures are his only important literary works. He published numerous papers in scientific journals, which, as we have seen, produced a most marked effect on the growth of chemical science. But the number of his monographs is not large, compared with those of many of his contemporaries; and his work is to be judged by its importance and influence rather than by the extent of the field which it covers.

It was to be expected that a man working with such eminent success in so many spheres of activity, and at one of the chief centres of the world's culture, should be loaded with marks of distinction of every kind. It would be idle to enumerate the orders of knighthood or the learned societies to which he belonged; for, so far from their honoring him, he honored them in accepting their membership. It is a pleasure, however, to remember that he lived to realize his highest ambitions, and to enjoy the fruits of his well-earned renown. France has added his name in the Pantheon

'Aux grands hommes la patrie reconnaissante.'

THE MONK-SEAL OF THE WEST INDIES, MONACHUS TROPICALIS GRAY.

An old English navigator and privateer, William Dampier, while straining his eyes for Spanish galleons in the Caribbean Sea during the season of 1675, was astonished at finding many seals sunning themselves on the Alacrane Islands: he was surprised, for he did not look for these animals in tropical waters, and hence he made voluminous notes of them.[1] To this memorandum we are obliged to turn for all the knowledge that we have to-day of the rare form of which we offer the accompanying drawing. The specimen from which it was taken is now believed to be the only one in existence; for the one which was in the British museum, collected in 1843 by Gosse and Hill, has been destroyed. The one which we figure is now in the new National museum at Washington: it was recently taken on the coast of Cuba, bought of some Cubans by Professor Felipé

[1] Dampier, Voyage round the world, ii. 2, 3d ed., 1705, p. 23.