ART. XXIX.—*De Verneuil. Eulogy of M. DAUBRÉE, June 4, 1873.*

THE distinguished associate of whom the Academy has just been deprived, alike eminent in character and intelligence, affords us an example, too rare among us, of an independent position consecrated with zeal to science and crowned with important discoveries.

PHILIPPE EDOUARD POULLETIER DE VERNEUIL, born at Paris, Feb. 12th, 1805, was destined to the magistracy, and had attained to twenty-five years of age, when the events of 1830 put an end to his plans in that direction.

At the moment when he hesitated as to what pursuit to devote himself, geology was making marked progress. No only was it admitted that the crust of the earth, instead of having always remained unchanged, as the school of Werner demanded, had undergone foldings and fractures which revealed transformations in its structure, but it was becoming possible to determine the relation in age of these phenomena. It was under such circumstances that M. de Verneuil felt himself drawn toward geology, and that he followed with great ardor the lectures in which M. Elie de Beaumont developed these new ideas. The great questions connected with the history of the globe soon took strong hold of him, and he resolved not to remain a mere spectator of the discoveries of others.

Recognizing the fact that in geology, as in all the sciences of observation, the study of nature alone can give a full understanding of her phenomena, he desired to travel. He chose at first the country of Wales, which at that very time the investigations of two distinguished English geologists, Sedgwick and Murchison, were rendering classic, for they were establishing divisions and a fixed order of superposition in the great group of ancient beds which, up to that time, had been confounded under the general name of Transition formations. As has more than once happened, this first journey had a decisive influence upon the future direction of the researches of M. de Verneuil, and upon the character of the services to science by which he was to become distinguished.

His desire to see and compare soon led him to the east. He turned toward Turkey, following down the Danube, on which steam navigation was just then introduced, and, led on by meeting those who sympathized in his objects, he went through Moldavia and Bessarabia to Odessa in the Crimea, and even to the frontiers of Circassia, and later toward the Bosphorus. The memoir on the Crimea which he then published was accompanied by descriptions of new and interesting fossils described by

M. Deshayes. This savant, who now came to the aid of stratigraphical geology by his profound knowledge of fossil shells, took much pleasure in instructing de Verneuil in this important study in a private course rendered illustrious by distinguished auditors, themselves soon to become eminent geologists.

After having made, in 1838, a special study of the lower beds of the Bas-Boulonnais, M. de Verneuil had already become an authority in the determination of fossils. Thus, in 1839, when Sedgwick and Murchison wished to compare the oldest formations of the countries of the Rhine and of Belgium with those of England, they desired de Verneuil to accompany them in their explorations. Absorbed as they had been in the study of stratigraphical relations, they found the necessity of his co-operation, which was the more important to them since M. de Verneuil had already travelled over and studied these countries. In the memoir which they published, these English geologists made full acknowledgment of the assistance their companion had afforded them by generously putting at their disposition the rich collections he had made in person. In connection with M. d'Archiac,—whose name we cannot pronounce without recalling our great sorrow in the loss of this distinguished student, our most excellent associate,—M. de Verneuil published in 1841 a description of the fossils of the older beds of the Rhenish provinces. The work is preceded by a general sketch of the fauna of the so-called Paleozoic formations, and followed by a table of the organic remains up to that time discovered in the Devonian system of Europe.

This journey made apparent the advantage, I had almost said the absolute necessity, in order to carry out such explorations with accuracy, of having always at hand a trained paleontologist like M. de Verneuil. At this time he was in fact almost alone in his knowledge of fossils. So, when Murchison, desiring to study further the geological formation which he had so well defined in the northwest of Europe, formed the project of exploring Russia, he again sought the companionship of M. de Verneuil. The facility with which Murchison could at a glance appreciate the characteristics of strata could never in that way alone have enabled him, able as he was, to reach sure distinctions in a region so vast, where, moreover, the rocks are so seldom uncovered. These two savants supplemented each other in the happiest manner.

The labor of three summers, 1840 to 1842, enabled Murchison, Verneuil, and Keyserling, to explore a region comprising more than half of Europe. It is just to say that the Emperor Nicholas warmly favored this enterprise, the grandeur and utility of which he fully appreciated; and that many learned men, Russians and foreigners, had published papers on various

isolated parts of the region. Traveling by different routes, and meeting from time to time to compare their observations, the three savants gave a very wide range to the field of their operations. The nearly horizontal position of all the formations beyond the chain of the Urals is in marked contrast with the manner in which the same groups are upturned and broken in Western Europe; and the great extent of the beds favors a rapid acquaintance with them. The work upon Russia in Europe and the Ural Mountains, accompanied as is well known by geological maps representing each of those countries, appeared in 1845. It is a monument raised to the knowledge of the immense region to which it relates, and at the same time to the fundamental principles of geology. The introduction of the Permian system into science was one of the great results of this exploration.

As the conclusions rest entirely on the exact determination of fossil species, it was essential to give to this part of the work all the care and all the range which it required. The whole of the second volume, which contains, so to speak, the justifying testimony, is, in all that pertains to the Paleozoic fauna, the personal work of M. de Verneuil, assisted by Count Keyserling. The fauna of the secondary formations was intrusted to M. Alcide d'Orbigny, at that time the authority in this department of the science. Viewing together the four Paleozoic systems, the authors show that the succession of organized beings is almost exactly the same as in the other countries of Europe.

The various investigations which have been carried on with so much activity in North America have made us well acquainted with the wonderful development of stratified deposits in that part of the world, remarkable not only for the thickness of the beds, but also for their geographical extent, comprising not less than thirty-four degrees of latitude and fifteen degrees of longitude. But with wise independence, the American geologists did not consider, in laying down the subdivision, the groups that in Europe appeared to be their analogues; moreover, the data were entirely wanting for an exact comparison. When it is possible to follow deposits from one country to another without interruption, it is easy to trace out correspondances among them; but this cannot be done between two continents separated by 3,000 miles.

In the spring of 1846, the publication relating to Russia was hardly completed, when M. de Verneuil undertook to bridge over this enormous interval. He was anxious to follow out and compare for the two continents the sedimentary strata, from the lowest fossiliferous beds up to the coal. Such was the task laid down for himself by this intrepid pioneer in

science. His study had exclusively for its base the species which he examined in local collections or those which he himself gathered from the deposits. He established the fact that in countries so remote the first appearance of life was very similar in forms, and that the same types were developed successively and in a parallel manner through all the series of Paleozoic beds; that there is on both sides of the ocean a striking agreement in the succession of life.

De Verneuil has then the double credit, on one hand, of carrying to the United States an intimate knowledge of the divisions in the Paleozoic strata established in Europe, and on the other, of bringing back to Europe the results of American investigations, and the possibility of profiting by them: de Verneuil resolved the complex question by his own labors. His modest presentation of the parallelism of the Paleozoic rocks of the two countries has lost nothing of its merit, notwithstanding the constant advance of the science; it is still a fundamental position. This memoir established the place to which paleontology is entitled in investigations relating to the history of the globe. This is perhaps the crowning labor of M. de Verneuil.

There is, however, another enterprise which bears still higher testimony to his boundless devotion to science and his indefatigable perseverance. Spain had been less studied than any other part of Europe, when M. de Verneuil thought of turning his steps thither. He was also drawn to it by Blainville, who did not believe in the universality of the laws of paleontology. If the succession of the beds, and of the fauna characterizing them, seemed to be established over the northern portions of the two continents of Europe and America, this great naturalist supposed that in Spain, in the south principally, the order of succession of fossil species might be reversed, or at least modified; an idea which was far from being realized.

From 1849 to 1862, de Verneuil made not less than a dozen trips into the peninsula, sometimes alone, and sometimes with M. Edouard Collomb, who was already known by his investigations of ancient glaciers. Sometimes also he was accompanied by young naturalists, who went for the sake of his instructions. The geological map of Spain, and the memoirs published after these laborious excursions, among others that which is rendered signal by the discovery of the Primordial fauna, did not interest Spain alone, where they incited others to labor, but the whole scientific world.

It is greatly to be regretted that the author of so many precious observations did not find time to put them in order and work them out as a whole, as he did in Russia.

In 1854, de Verneuil was made member at large of the Academy of Sciences at Paris. The Royal Society of London and other foreign societies had enrolled him among their associates.

His taste for traveling, which was so important in its results to geology, was not lessened when the increasing failure of his sight deprived him of its chief pleasure. The privations he endured in rough or inhospitable countries had never diminished his zeal, or his good humor. Many times he ran great risks, as when he ventured dangerously near a volcanic eruption at Vesuvius or at the island of Santorin.

A clear judgment, and a complete independence of all preconceived ideas, guided him in his deductions. Far from being absorbed in his own special studies, he interested himself in various other branches of human knowledge. He was perfect master of many modern languages; and this was one of the means which insured him success in the countries he explored. Moreover, the fine arts were not excluded from his pleasures; he had cultivated his talent for music even to becoming a skillful composer. Few persons possessed more natural benevolence than he. His extreme kindness was not only apparent in the ordinary intercourse of society, but was manifested in many generous deeds. He discussed the opinions of his opponents with calmness and good temper. Exquisite loyalty and sincere modesty were the dominant traits of his noble character. He found more pleasure in bringing forward the discoveries of another than his own, and, perhaps for that reason, more than one of his associates failed to appreciate the full extent of his merits.

During the illness which for three months interfered with his activity, he continued to interest himself warmly in all the facts of science as well as in very different questions; through all, his good humor never failed. He preserved his serenity even to the last, and died, as a Christian, on the 29th of May, 1873, having almost completed his 68th year.

M. de Verneuil had called to his aid all the resources of paleontology, particularly those pertaining to the Paleozoic strata. In this respect he held perhaps the first rank among geologists on both continents. Moreover, he was at once the pioneer and the master in the knowledge of North American geology.

It was not only by his published works that de Verneuil contributed to the advance of science. He has raised to himself a monument in his collections, in which he brought together types of the choicest fossils selected from the various regions he had explored. Strangers from all countries, as well as French savants, have availed themselves of his valuable collections,

which with the utmost liberality he put at their service, besides aiding them with the results of his own studies. In this way he was a center for the study of paleontology, whence radiated light in every direction.

To continue, even after he had gone, the exercise of his generosity toward all students, he has desired that his collections—certainly unique—should be always at their disposal, and to this end he bequeathed them to the Gallery of the School of Mines.

The memory of our excellent member will always be held in reverence among the geologists and paleontologists of the world.