ADDISON EMERY VERRILL: PIONEER ZOOLOGIST

IN an attempt to gain some conception of the zoological influence of the life work of Professor Addison Emery Verrill, whose death occurred on December 10, 1926, there is brought to mind the enormous progress which has been made in the science of zoology during his lifetime. Beginning his scientific studies at the time of the arrival of Louis Agassiz in this country, bringing with him the concepts of comparative morphology which were commencing to supplant the earlier systematic work in Europe, Verrill was able to follow the entire course of zoological progress to its culmination in the experimental methods of the present day.

Although Verrill did not directly participate in these more modern phases of biological research, he fully realized that much of the more recent work has been possible only because of the foundations laid by a small group of able men who, since the middle of the last century, have explored the vast fields containing previously undiscovered forms of life and have thus made known the morphology, natural history and relationships of the organisms available for more specialized and experimental investigation.

Among these pioneer zoologists the name of Verrill stands out prominently because of the amount and accuracy of his contributions to our knowledge of marine invertebrates. More than a thousand species, including representatives of nearly all groups, were discovered and described by him, and their relationships to previously known forms were diagnosed with almost unerring accuracy and with a facility that amounted almost to genius.

He was much more than a systematic zoologist, however; he was a real naturalist in that he was always interested in the natural history of the animals which he studied as well as the morphological characters which distinguished the species new to science. His work on the natural history of the marine invertebrates of southern New England was the first extensive ecological study of its kind in America, and his Vineyard Sound report (published in 1871) was the standard reference book for all students of the seashore life of the region for more than thirty years.

Entering Harvard as one of the early pupils of Louis Agassiz, young Verrill, even while an undergraduate student, explored zoologically and geologically the island of Anticosti and parts of the coast of Labrador. Receiving his bachelor's degree at Harvard in 1862, he remained as assistant to Agassiz in the Museum of Comparative Zoology, for two years a position in which he had already served while still an undergraduate. During this time he made a comprehensive study of the radiate animals and systematized the classification of the coelenterates.

In 1864 Verrill was called by Yale to bring to that institution the new science of zoology as developed by Agassiz and to serve as her first professor of that subject. This position he held for forty-three years, until his retirement in 1907, at which time he was made professor emeritus.

When appointed at Yale he was but 25 years of age, having been born at Greenwood, Maine, February 9, 1839. It is perhaps needless to state that a naturalist of such exceptional ability in his manhood exhibited similar talents in his boyhood. At the age of thirteen he had learned to recognize the minerals and rocks of his native town. He later made a collection of nearly a thousand species of plants, each of which he remembered throughout the remainder of his life, and at seventeen he began a collection of the local shells, insects, amphibia, reptiles, birds and mammals, making the identification, when possible, with the aid of such few books as were available and noting especially the kinds which were different from any described in his books. In this way, and wholly without other assistance, he laid a broad foundation for the taxonomic studies which were to constitute his life work. These boyhood studies in natural history began to bear fruit in the years 1862 and 1863 when he published no less than twenty-two papers, of which two were on minerals, one on plants, three on corals and their allies, seven on birds, four on animals, three on amphibians and the others on general natural history. Most of these were brief taxonomic papers or lists of species, but one of them, on the revision of the Polypi of the eastern coast of the United States, showed a remarkable comprehension of the principles of taxonomy.

In 1871, when the United States Fish Commission inaugurated a comprehensive survey of the waters off the coast of New England with the object of securing information regarding the environment of the commercial fisheries, Verrill was selected as the logical person to take charge of the scientific investigations. And from that time until 1887 there came into his hands an almost continual stream of material dredged from the ocean bottom and containing a great number of forms of animal life quite different from any that had been previously known. These were busy years, with numerous publications describing the new things that were discovered, and before the work was discontinued the Peabody Museum at Yale had become the repository of hundreds of thousands of specimens, among them being several hundred species previously unknown.

Instead of distributing this mass of material to specialists as is the rule at the present day, Verrill

covered all the groups of invertebrates except the protozoa, and it was his intention to summarize the results of his extensive studies on the marine invertebrates of the New England coast by writing a monograph on each group. Several groups were completed and published, but other manuscripts, with hundreds of drawings, were left unfinished at the time of his death.

For his was the spirit of the pioneer, ever seeking new forms of animal life for study, and having exhausted the more interesting forms from New England he next turned his attention to the Bermudas, making three trips to the islands. In 1901–1902 he published two volumes, containing not only the results of his studies in his special field, but also a brief historical survey of the settlement and social colonial development of the islands, their physiography and geology, and the effects of civilization on the native flora and fauna, the whole forming a very comprehensive summary of the natural history of this popular vacation land.

For nearly twenty years after reaching the retiring age limit, in 1907, Verrill continued his studies with unabated energy, publishing in this period a series of papers which constitute in many respects his most important contributions to science. These reflect his maturity of judgment and his accumulated knowledge from so many years of research.

These works summarize his knowledge of the corals and allied animals, the starfishes and allies, and the crustacea, covering more than a thousand pages and illustrated by some two hundred plates. Some time before his death he had placed in the hands of the publishers his most extensive monograph, on the Alcyonaria, consisting of upwards of a thousand pages and 150 plates. There is also awaiting publication a report on the crustacea of Connecticut with over a hundred plates. A more detailed summary of his contributions to zoology and a condensed bibliography of his publications may be found in the *American Journal of Science,* May, 1927.

Verrill's work was continued almost uninterruptedly until the last few weeks of his life. Even at the age of eighty-five, still sturdy and vigorous, he embarked on a new voyage of discovery on Kauai Island, in the Hawaiian group, with all the enthusiasm that he had shown when Agassiz sent him to Labrador and Anticosti in his student days. Two years spent at that island, and nearly a thousand lots of marine invertebrates were collected, including numbers of the new species which he was seeking. His remarkable vitality, however, was at last exhausted and after bringing the collection back to New Haven he was unable to complete its study. In the autumn of 1926 he left for California to spend the winter with his son, but he died a few weeks after his arrival. He was within two months of having completed his eighty-eighth year.

His publications extended over a period of forty-four years. During this long period of activity he published more than 350 papers on geological and biological subjects, making known to science more than a thousand new species of marine invertebrates, and revised the classification of almost every group. That he was able to accomplish so much is due not only to the very unusual number of years that he was able to work, but also to his ability to continue the most arduous mental tasks for many hours each day, with never a thought of recreation and an almost incredible minimum of sleep. That his diagnoses were so accurate and that he could cover so wide a field is due in part to his marvelous memory; he seldom forgot anything of importance connected with his work and could recall the characteristics of almost every one of the thousand animals to which he had given names.

The definition of all the zoological terms in the 1890 edition of Webster's International Dictionary were prepared by Verrill, and by him the hundreds of accompanying illustrations were selected. One can hardly open this great volume without having before his eyes testimony of Verrill's remarkable breadth of scholarship.

For forty-five years (1865–1910) he was in charge of the zoological collection belonging to Yale University. Through his agency the collections increased from almost nothing to one of the most extensive in any university museum in the country.

The honorary degree of M.A. was conferred upon him by Yale and he was honored by being appointed lecturer at the Lowell Institute in Boston in 1899. He was a member of the National Academy of Sciences, for some years president of the Connecticut Academy of Arts and Sciences, a corresponding member of the Societé Zoologique de France, a fellow of the American Association for the Advancement of Science and a member of many learned societies. From 1869 to 1920 he was associate editor of the *American Journal of Science* and he served as professor of comparative anatomy and entomology at the University of Wisconsin in 1868–70 and as a curator of the Boston Society of Natural History for some years, in addition to his professorship at Yale.

In 1865 Professor Verrill married Flora Louisa Smith, a sister of the late Professor Sidney I. Smith, of Yale. Mrs. Verrill died in 1915. Four of their six children survive, the two sons being Major George E. Verrill and Alpheus Hyatt Verrill.

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