NATIONAL ACADEMY OF SCIENCES
OF THE UNITED STATES OF AMERICA
BIOGRAPHICAL MEMOIRS
VOLUME XIV—SECOND MEMOIR

BIOGRAPHICAL MEMOIR

OF

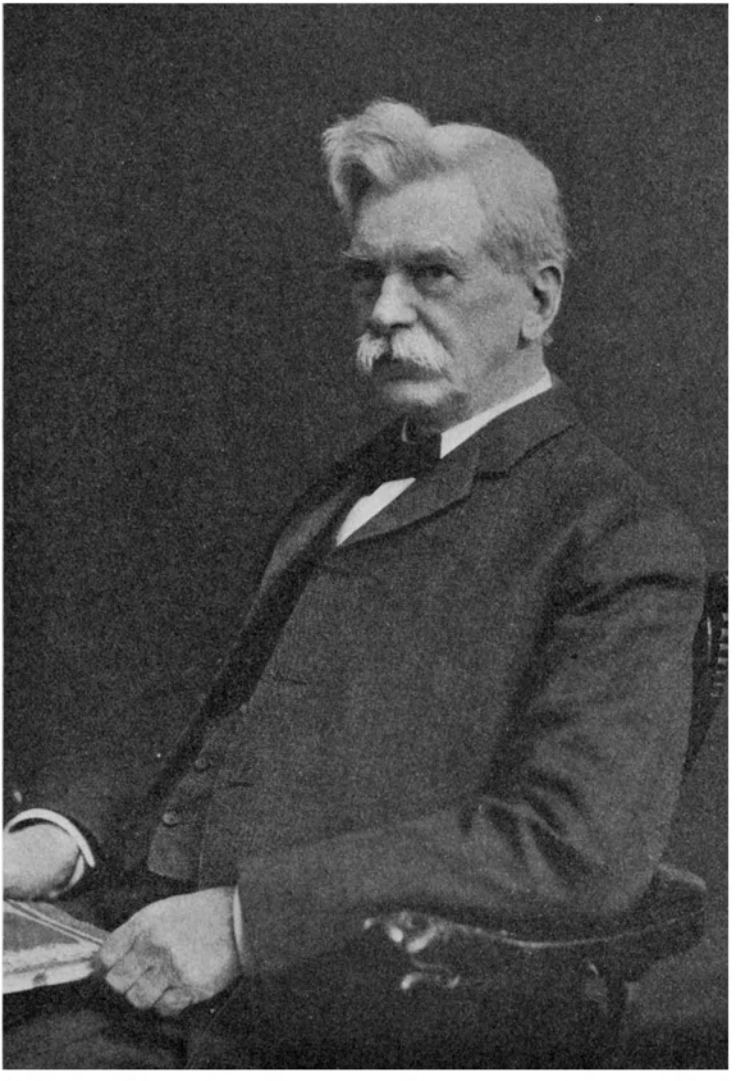
ADDISON EMERY VERRILL

1839-1926

BY

WESLEY R. COE

PRESENTED TO THE ACADEMY AT THE AUTUMN MEETING, 1929



A. E. Verrill

ADDISON EMERY VERRILL

1839-1926

BY WESLEY R. COE
Yale University

PART I. BIOGRAPHY

ADDISON EMERY VERRILL, for forty-three years professor of zoology at Yale University, whose death occurred at Santa Barbara, California, December 10, 1926, had been a member of this Academy for more than half a century, having been elected to membership in 1872. He was within about two months of having completed his eighty-eighth year, for he was born at Greenwood, Maine, February 9, 1839.

Professor Verrill was of old New England stock, the second son of George Washington and Lucy (Hillborn) Verrill. The Verrill line descended from an ancestor who settled in Gloucester, Mass., about 1720, and the Hillborn line from a Quaker who settled in Pennsylvania previous to 1688. The names of Cordwell, Garland, Stevens, Shreeve, Waterhouse, and of other substantial pre-revolutionary families make up his American ancestry.

In 1864, when Louis Agassiz, at Harvard, and Joseph Leidy, at Philadelphia, and a few others had developed the study of animal life to such an extent that zoology had begun to be recognized in America as one of the sciences, Yale College called upon Agassiz for a young man who would bring the new science to New Haven. Fortunately Agassiz then had as assistant in the Museum of Comparative Zoology the man who served as professor of zoology at Yale until he was retired as professor-emeritus in 1907. When appointed at Yale, Verrill was only 25 years of age, having received his bachelor's degree from Harvard two years previously.

It is perhaps needless to state that a naturalist of such exceptional ability in his manhood exhibited similar talents in his boyhood. Before his thirteenth year he had learned to recognize the varieties of rocks and minerals to be found in his native town and had assembled a collection of considerable

size. The following year he turned his attention to the study and collection of wild flowers. He soon had an herbarium of several hundred species, each of which he could recognize and name almost instantly throughout the rest of his life. At seventeen he had acquired 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 to him, and noting especially the kinds which were different from any described in his books. In this way he laid a broad foundation for the taxonomic studies which were to constitute such a large part of his life work. By these boyhood activities he trained his powers of observation and developed a keenness in logical deduction which were destined to serve him for more than seventy years in the interpretation of the significance of the facts which came under his observation.

Shortly after his fourteenth birthday young Verrill's family moved to the not distant town of Norway, Maine, and the boy entered the local academy known as the Norway Liberal Institute. Here he pursued such studies as would prepare him for entrance to Harvard University and thereby to the laboratory of Louis Agassiz, but his real education was obtained in the woods and in the fields and almost entirely without the aid of books.

He arrived in Cambridge in May, 1859, and soon realized his ambition of working under the direction of the great Agassiz. He often referred to his first experience in the laboratory of that distinguished zoologist. Instead of listening to lectures and studying books, he was asked what field of zoology most appealed to him. On replying that he was most interested in birds, Agassiz directed him to make a study of the goose. After some weeks, when young Verrill had completed what seemed to him an absolutely exhaustive study of every part of the bird's external and internal anatomy, Agassiz genially pointed out to him the incompleteness of his investigation and gave him directions for several months' additional work before the subject was deemed sufficiently mastered. A new topic of study was then introduced.

In this connection the embryology of birds was studied and Agassiz suggested that the embryos of the diving sea birds might throw some light on problems connected with the relationships and evolution of that group. In order to secure these embryos, Verrill went to the island of Grand Menan, in the Bay of Fundy, and at the end of the summer (1859) brought back to the Museum of Comparative Zoology about 1200 embryos in addition to numerous skeletons of the birds and some skeletons of fishes.

The following summer he joined two fellow students, Alpheus Hyatt and N. S. Shaler, in a study of the marine invertebrates on the coast of Maine, and this was Verrill's introduction to those groups of animals to which he was destined to devote the major part of his long and active life.

Each of these three young explorers later became distinguished, two of them being elected to membership in the National Academy of Sciences, and their close association during these and other summer months must have been of mutual benefit, for each represented a distinct type of mental activity. Hyatt was essentially a philosopher, ever lost in speculations concerning the significance of the adaptations of the animals which he discovered. Hyatt's friendship was continued through life, and in his honor Verrill named his second son, Alpheus Hyatt Verrill, who has become well known as the author of many books on popular science.

Shaler, on the other hand, was gifted in generalizations and in the popularization of science, having so rare a personal charm and such facility in the elucidation of scientific truths that he later became Harvard's most popular and beloved science teacher.

Verrill, in contrast, was the painstaking, hard-working investigator to whom no detail seemed trivial enough to be neglected; one who was willing to devote himself to the task of discovering the most minute of such morphological characteristics as might distinguish two closely allied species of animals, no matter how great the personal sacrifice. Moreover, he could just as patiently struggle with the ambiguous writings of the earlier naturalists, sometimes straightening out a tangled synonymy which would have discouraged almost anyone else.

In the summer of 1861, Hyatt, Shaler and Verrill set forth on a second expedition; this time to investigate the little-known island of Anticosti, in the Gulf of St. Lawrence, and portions of the coast of Labrador. A small fishing schooner, *The Inlet,* was chartered and Captain Small secured as master. The three students and a friend made up the entire crew. The expedition was a complete success, the various members of the party later publishing accounts of their discoveries in regard to the geology, palaeontology, botany and zoology of the regions visited. Verrill wrote on the mammals, birds and plants. (See papers No. 2, 3, in the bibliography.)

In his junior undergraduate year, 1860, he was appointed by Agassiz as assistant in the Museum of Comparative Zoology. He retained this position during his senior year and for the two years following his graduation (1862).

The versatility of his boyhood studies in natural history now began to bear fruit, for in the years 1862 and 1863 he published no less than 22 papers, of which two were on minerals, one on plants, three on corals and their allies, seven on birds, four on mammals, three on amphibians and the others on general natural history. Most of these were brief taxonomic papers of local species, but one of them, on the revision of the Polypi of the eastern coast of the United States (No. 140), showed a remarkable comprehension of the principles of taxonomy and formulated a system of classification which has continued in use to the present day.

Each summer from 1863 to 1870 Verrill continued his studies on the marine invertebrates found along the coast of Maine, and extended his collections by means of dredgings off the coast and in the Bay of Fundy. During the college year he worked up these collections and recorded the distribution of the various species, giving special attention to those that were new to science. Of the latter he published full and accurate diagnostic descriptions, for he had an almost incredible faculty for discriminating between trivial individual variations and true specific distinctions.

In these years also, he was fortunate in securing for the Yale Museum extensive collections of marine invertebrates from

both the east and west coasts of Central and South America. These, of course, contained many new species of coelenterates and echinoderms, and formed the basis of numerous rather brief publications as well as material for his later, more comprehensive monographs.

On his arrival at Yale, Professor Verrill immediately set about the development of a zoological museum out of the old "Natural History Cabinet" which the Yale Natural History Society had long before established in one of the small buildings of the University, but cramped quarters gave little opportunity for exhibiting his collections. The building of the Peabody Museum of Natural History in 1875 offered space for more extensive exhibits and he, with Professor Sidney I. Smith and several assistants, prepared and arranged a zoological collection for public exhibition which for many years compared favorably with that of any college museum in the country. Professor Verrill remained in charge of the zoological collections until 1910, by which time they had increased until they contained more extensive series of marine invertebrates than were to be found in any American museum with the exception of the United States National Museum and possibly also the Museum of Comparative Zoology at Harvard.

The building which held these collections was removed in 1916 and the zoological material was later installed in the new Peabody Museum of Natural History, where it is now available for reference and further comparative studies.

Shortly after coming to Yale, Verrill fitted up a dredge operated from a sailboat, and on many Saturdays and Sundays during term time, with the assistance of several of his students, made a very thorough zoological survey of New Haven Harbor and adjacent portions of Long Island Sound. To the end of his life he retained ownership of one of the Thimble Islands, about fourteen miles east of New Haven. Here, for nearly forty years, he spent the summer months with his family, offering cordial hospitality to his students and keeping yearly records of such changes as occurred in the invertebrate fauna of the adjacent shores.

In 1871, when the United States Fish Commission inaugu-

rated 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. He published upwards of a hundred papers on these collections of the Fish Commission, describing the hundred or more new species which came into his hands and supplementing the diagnoses of those which had been previously reported. Among them were representatives of previously unknown orders, families and genera.

In connection with these surveys the sea-bottoms off the coast, from Cape Hatteras to Newfoundland and out to depths of over 4000 meters beneath the Gulf Stream, were explored by means of the dredge. Several new types of collecting apparatus, such as the cradle-sieve, hopper-sieve, and rake dredge are stated to have been invented by Professor Verrill, and to him also belongs the credit of perfecting the rope tangle for collecting sea-stars and other spiny inhabitants of the sea-bottom. This tangle, or mop, is now used extensively by oyster-growers to catch and destroy the starfish preying on their growing crops of oysters, and without it oyster-culture on a commercial scale would be impossible in extensive areas on our seacoast.

From 1883 to 1886 he had the able assistance of Dr. James E. Benedict, who sorted and provisionally classified the great bulk of the collections, thus making relatively easy the recognition of the many species which were new to science.

After the death of Professor Baird in 1887 these dredging operations were discontinued and Verrill began a summary of the results. Taking up the collections group by group he planned a series of monographs to cover each of the groups of marine invertebrates of New England and adjacent waters. The nemerteans and the planarians were thus completed, while the annelids and other groups remained as unfinished manuscripts at the time of his death.

Having described the more remarkable species of invertebrates found on the New England coast, Verrill turned to other fields which might prove more productive, for his was the spirit of the pioneer, ever seeking new forms of animal life for study. He first selected the Bermuda islands, whence he had received so many of the corals which he had studied. In 1898 and 1901, and again in 1916, he spent some months at these islands. In 1898 he was accompanied by three of his students, and in 1901 by his son as artist and photographer. A large number of marine invertebrates were collected and studied, sufficient material being secured to require several years for its investigation.

The breadth of his research on the Bermuda islands is indicated by the title page of the first of the two fully illustrated volumes which he later published, the title being "The Bermuda Islands; an account of the scenery, climate, productions, physiography, natural history and geology, with sketches of their discovery and early history, and the changes in their fauna and flora due to man." This volume covers 548 pages, with 38 plates and 250 text-figures. The second volume, on the geology and marine zoology of the islands, is of about the same extent. The separate papers which comprise these volumes were first published in the Connecticut Academy of Arts and Sciences and subsequently issued as a private enterprise of the author.

The sponges, the corals and other coelenterates, the land snails and slugs, the insects, myriopods and arachnids, the crustacea and pycnogonida, the echinoderms, the tunicates and molluscoidea were each taken up for study, and the distribution and natural history of each species were described.

For several years prior to 1890 his work on the marine invertebrates was interrupted while he worked on Webster's International Dictionary. To Verrill belongs the credit for the excellence of all the zoological definitions and their accompanying illustrations in this monumental publication. He also coöperated in the supplement to this dictionary, published in 1900.

Verrill's publications extend over a period of about sixty-four years and include more than 300 titles on zoological and geological subjects. That he was able to accomplish so much and in such a wide range of subjects is due not only to his inherited mental ability but also, and in large measure, to his most unusual physique. A man to whom illness or even fatigue was almost unknown from early manhood to his eighty-seventh year, he was capable of a prodigious amount of labor, both mental and physical.

And yet he is said to have been a rather frail child, his health during boyhood being so delicate that his parents feared he might have tuberculosis. He always credited the great vigor of his mature years to the fact that it was so necessary in his boyhood to guard his health most carefully and also to his absolute avoidance of tobacco and all forms of alcohol.

For more than thirty years during the prime of life he was able to keep at the most arduous tasks for many hours a day; in fact it was known to those most closely associated with him that he sometimes worked right through from one day to the next, with at most a brief nap in the early evening. Habits of labor that would speedily have wrecked the life of an ordinary man appeared to contribute to his well-being. But he never used artificial stimulants.

Sleep to him during periods of his most active labors seemed to be in large measure a casual indulgence, taken, quite frequently, while fully dressed and reclining in his desk chair or on a couch conveniently placed in his study. An after-dinner nap from perhaps eight o'clock until nine, then, absorbed in study, writing or drawing, and quite oblivious of time, he would sometimes work until near daybreak; then a little sleep on the couch before breakfast and off to his laboratory. The noon-day meal was often forgotten, while his reluctance to

leave his work frequently resulted in his being from two to four hours late to dinner. Not rarely also the lecture hour passed by unnoticed.

A man of large stature, his massive head covered with abundant locks of wavy hair, and with piercing blue eyes, he made a striking figure in any company. Genial and kindly when he could be persuaded to indulge in social affairs, his self-contained disposition and retiring nature allowed him to make but few intimate friendships.

So marvelous was his memory concerning scientific matters (and yet so poor regarding his personal appointments) that he was able to recall the name and distinguishing characteristics of nearly every one of upwards of a thousand species of animals which he had described as new to science. He was a skillful artist, and had such powers of visualization that with a stubby bit of pencil he could make a satisfactory drawing of almost any species he had ever seen. Finally, his ability to quote references to the literature of the groups on which he worked was truly astonishing. Such an encyclopedic mind not only guarded him against the duplication of generic and specific names already applied, but enabled him to disentangle confusions in synonymy which were baffling to others.

For nearly twenty years after reaching the retiring age limit, in 1907, and when most of his former contemporaries were either dead or living in retired leisure, 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 of manuscript and 150 plates. There is also awaiting publication

a report on the crustacea of Southern New England with over a hundred plates.

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 were 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 continue 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. His body lies in Evergreen Cemetery, New Haven.

The honorary degree of M. A. was conferred upon him by Yale and he was honored by being twice appointed as lecturer at the Lowell Institute in Boston. 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 the Boston Society of Natural History, American Academy of Arts and Sciences, Wisconsin Academy of Science, Essex Institute, New York Academy of Sciences, Philadelphia Academy of Natural Sciences, California Academy of Science, American Society of Naturalists, American Society of Zoologists and of other 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 from 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.

Several brief accounts of the life and work of Professor Verrill were published shortly after his death. The following contain brief summaries of his principal contributions to science.

Addison Emery Verrill: Pioneer Zoologist, by Wesley R. Coe. Science, vol. 66, 1927, pp. 28-29.

Addison Emery Verrill and his contributions to zoology, by Wesley R. Coe. Amer. Jour. Sci., vol. 13, 1927, pp. 377-387.

Addison Emery Verrill: the life and work of Yale's first Professor of Zoology, by Wesley R. Coe. Yale Alumni Weekly, vol. 36, 1927, pp. 1053-1054.

His genealogy may be found in "Genealogical and Family Histories of Connecticut," vol. 1, pp. 233-238, 1911.

PART 2. CONTRIBUTIONS TO SCIENCE

In an attempt to gain some conception of the zoological influence of the life work of Professor Verrill, there is brought to mind the enormous progress which was 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 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 first quarter of the present century.

Verrill did not directly participate in these more modern phases of biological research and had little patience with those who were acquainted with animals only under laboratory conditions. He sought always to emphasize the fact 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 thereby 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 con-

tributions to our knowledge of marine invertebrates. A very large number of 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.

The exact number of such hitherto undescribed forms which he discovered was not known even to Verrill himself, but he often stated that it was well above a thousand. In later life he expected to summarize his earlier investigations and to treat each group in monographic form but he found time to complete only a few of the groups. His constant urge was to move on into new fields when the outstanding products of the old were exhausted, postponing for a later time the less promising objects. The type specimens of many of Verrill's species are among the zoological collections of the Peabody Museum of Natural History at Yale University. Most of the others may be found at the United States National Museum. A few appear to have been lost to science, for Verrill was sometimes so busy describing his new species that he neglected to label the type specimens, and in some cases they cannot now be found.

I. NATURAL HISTORY, GEOLOGICAL AND BOTANICAL STUDIES

When young Verrill's family moved to Norway, Maine, there was a new environment for the fourteen-year-old naturalist to explore, with somewhat different geological formations than were to be found in the vicinity of his birthplace and here, and in neighboring towns, he discovered deposits of tin-ore, zircon, chrysoberyl crystals of large size, and amazon stone which had not been previously reported. These geological studies were the forerunner of later geological investigations of a professional nature, and it was only through the magnetic influence of Louis Agassiz that he eventually gave to zoology the major portion of his life's work.

Yet he never abandoned his interest in geology and after his appointment at Yale University as professor of zoology he taught physical and historical geology for twenty-four years to large classes of students in the Sheffield Scientific School. Dur-

ing the same years (1870-1894) Professor James D. Dana gave similar instruction to students registered in Yale College.

During several summers he was employed as a geological expert by various coal and iron mining companies and is said to have had a remarkable success in the location of productive properties.

Wherever Verrill went—to Labrador, Anticosti Island, Bermuda, Yellowstone, Hawaii—the geological formations claimed his first attention. The geology of the Bermuda Islands was very thoroughly investigated during his several visits to the islands. One paper on the geology of the islands (No. 82) was published in 1900, while their physiography was fully discussed in his volume "The Bermuda Islands" (No. 89). These were followed a few years later by detailed descriptions of all the geological formations on the various parts of the islands and a comprehensive account of the paleontology (No. 94). The part which each of the various groups of organisms plays in the formation of geological deposits was fully discussed and the organisms themselves illustrated. In the paleontological studies the relationship of the fossil fauna and flora to those of modern times was given particular attention.

Although he made no pretense of his botanical knowledge, he learned to recognize the species of almost every flowering plant which he encountered. He was quick to realize that his boyhood collection of several hundred species contained some that were not at that time recorded for the United States. The plants are enumerated in his report on the natural history of Anticosti (No. 3), and in his volume on the Bermuda Islands (No. 89) 156 species of native flowering plants and most of the introduced varieties are each recorded as to habitat, general interest and economic importance.

Even after reaching the age of 85 years he learned in a few months the names and characteristics of practically all the species of plants growing in the Hawaiian island of Kauai.

2. MAMMALS, BIRDS, FISHES AND OTHER VERTEBRATES

In his boyhood natural history studies, the larger animals of his vicinity naturally attracted young Verrill's first attention,

and his first published papers deal with these groups. These are catalogues of local species and new locality records, but they show remarkable keenness in the discrimination of species and in the observation of the animals' habits of life. One of his early papers on the Geographical Distribution of North American Birds (No. 120) first called attention to the fact that the latitudinal distribution of birds is closely correlated with the mean temperature of their breeding season.

Later papers (No. 79, 131, 132) emphasize the importance of the color adaptations of birds, mammals and fishes for nocturnal protection, a phase of natural selection that had been generally overlooked previously. These were followed by other papers (No. 80, 130) containing important observations on the diurnal and nocturnal changes in colors as protective adaptation in fishes and in the squid. These papers also present observations on the sleeping habits of these animals.

His last papers on birds discuss the mysterious Cahow of the Bermudas (No. 135, 136).

3. CORALS AND OTHER COELENTERATES

Although Verrill gave some attention to practically all groups of invertebrates, his first publication in this field, as well as his last, was devoted to the Coelenterates. His revision of the Polypi of the eastern coast of the United States (No. 140), published the year after his graduation from Harvard, exhibited his keenness in distinguishing the natural relationships of animal groups and this became the basis of future classification.

During the sixty-three years which intervened between his first paper on the corals and the last one which he completed on the Coelenterates some sixty papers and monographs were published by him (No. 138-198a).

Some of his earlier papers on this group discuss also the Echinoderms, for Verrill followed the lead of his illustrious master, Louis Agassiz, in combining the animals which comprise the two modern phyla into a single division, the Radiates. After a few years, however, Verrill himself was one of the first to recognize that the two groups are not closely related

phylogenetically and to place them in widely separated positions in the scheme of classification.

The naked polyps (Actinaria), the corals, the sea-fans and sea-plumes (Alcyonaria), and other groups in this phylum from both the east and west coasts of America and the West Indies were studied by him, and a large number of genera and species described as new to science. His last and most extensive monograph, on the Alcyonaria of the Blake expedition (No. 298), covering upwards of a thousand pages of manuscript and 150 plates, was in the hands of the publishers at the time of his death.

In his expeditions to Bermuda Verrill devoted particular attention to reef-building corals and not only described and figured the numerous species obtained, but made extended investigations concerning their manner of life and their associations.

Among the outstanding morphological features discovered by Verrill may be mentioned the dimorphic zooids in the Alcyonaria, the bilateral development of the zooids in the Zoanthidae, and the demonstration that the Tabulata, as previously understood, was a heterogeneous group, containing an assemblage of forms without close natural affinities (No. 150, 159, 174).

To Verrill we are thus indebted for much of the information which is now available regarding the taxonomy and natural history of this group of animals, and in many respects this constitutes his most successful work. Its importance is due not alone to the numerous new species which he made known to science, nor to the sound system of classification which he devised, but also to the careful observations which he has recorded regarding the mode of life of the many species which he studied.

Perhaps the following papers, selected from his long list of publications on this group should receive particular mention. No. 140, Revision of the species found on the east coast of the United States; No. 142, 143, 148, 158, 163, 173, Synopsis of the polyps and corals of the North Pacific exploring expedition; No. 152, 153, 154, 160, 165, 167, 169, 170, 171, papers

on the Radiata sent to the Museum of Yale College from various parts of the world, and particularly from Brazil and the west coast of America, during successive years; No. 193, Additions to the Anthozoa and Hydrozoa of the Bermudas; No. 194, Variations and nomenclature of Bermudian, West Indian and Brazilian reef corals; No. 195, Comparisons of coral faunae; No. 195a, Corals of the genus Acropora; No. 197, 198, Actinaria and Alcyonaria of the Canadian Arctic Expedition. These, together with his extensive monographs on the Alcyonaria of the Blake expedition and on the Gorgonians of the Brazilian coast (No. 196), place on a secure basis the taxonomy and systematic relationships of the groups concerned. A posthumous paper (No. 198a), describing the new species of Anthozoa which he collected on the reefs at the islands of Kauai and Oahu during the last two years of his life, brings his work to a conclusion.

4. SEA-STARS AND OTHER ECHINODERMS

Next to that on the Coelenterates, Verrill's most extensive work was on the Echinoderms, and more particularly the sea-stars. Many important articles were published by him on this group, the most extensive of these being the two volumes on the sea-stars of the Harriman Alaska Expedition (No. 220), with over a hundred plates. The classification was revised and numerous species described as new to science. Other extensive papers treat of the sea-stars of the east coast of North America (No. 44, 52, 146, 211, 212, 213), the West Indies (No. 223, 224), and both coasts of South America (No. 153, 199, 203, 204), as well as of the west coast of North America (No. 205, 206, 207, 217).

Perhaps in no other group of animals are the taxonomic characters more difficult to determine, so that not only is there a lack of agreement among students of the group concerning the natural affinities of the numerous species, but also there is such great variability that it is frequently impossible to define satisfactorily the characteristics which are thought to distinguish a species. This is equivalent to saying that there is either hybridization between some of the so-called species or

that the phylogeny of the starfishes is even at present but little understood (No. 218). Verrill's work will greatly aid in the final solution of these problems.

In the other groups of Echinoderms the situation is less difficult and the new species added by Verrill are in harmony with those previously described by others. The ophiurans of southern New England (No. 34, 211) and those of the West Indies (No. 85, 214, 215, 216) were fully treated, with many interesting accounts of the habits of the various species, in addition to their geographical distribution.

5. SEGMENTED WORMS. LEECHES AND OTHER ANNELIDS

Verrill was one of the first zoologists to study the North American fresh-water leeches (No. 227, 229, 230, 231, 232), describing a number of species new to science.

He later turned his attention to the marine annelids, of which many new species were secured during the dredging expeditions of the U. S. Fish Commission from 1872 to 1887 (No. 41, 52, 71, 76, 229, 234, 235). His contemplated monograph of all the species found on and off the east coasts of the United States had not been completed at the time of his death, although some of the plates had been printed many years previously.

His study of the annelids of the Bermudas was likewise left uncompleted, although he described a large number of new species from the extensive collections which he made during his three trips to the islands (No. 83, 85).

6. CRUSTACEANS AND PYCNOGONIDA

Most of the crustaceans of the U. S. Fish Commission collections were studied by Professor Sidney I. Smith of Yale University and his associates, but after the incapacity of Professor Smith through blindness Professor Verrill added this group to the many others which he investigated.

Three monographs of the crustaceans of the Bermudas were published by him, on the Macrura (No. 244a), the Brachyura and Anomura (No. 244), the Schizopoda, Cumacea, Stomatopoda and Phyllocarida (No. 245). All of these are fully illus-

trated and are remarkable not only for their clear exposition of taxonomic principles but also because they were all published after Verrill had reached his seventieth year and two of them after he had passed his eighty-third birthday. In all of them the distribution, variations and habits of the numerous species, including many new ones, are given particular attention.

Shortly before his death he completed a monograph on the higher crustacea of southern New England, a manuscript of some 700 pages and about 100 plates. Another monograph, on the Decapod Crustacea of Dominica Island, was nearly ready for the printer.

7. MOLLUSKS

Every subdivision of the Mollusca was studied by Verrill, from the tiny marine snails smaller than the head of a pin to the giant squids which reach a length of more than forty feet and are the largest invertebrate animals that have ever existed.

Of this latter group, the Cephalopods, Verrill discovered a number of curious forms in connection with the surveys of the U. S. Fish Commission, and made a very thorough study of their structure (No. 250, 259, 261, 266, 274, 280). He was also fortunate in securing portions of the bodies of some of the largest of the giant squids. These were fully described (No. 252, 253, 254, 255, 256, 257, 258, 260, 265, 267, 270, 271, 273) and illustrated by numerous plates. With the assistance of J. H. Emerton a life-sized model of an animal about 42 feet in length was constructed for the Yale Museum. Copies of this model may be found in the larger museums of the United States and of Europe. A similar model of a giant octopus was also constructed.

In his work on naked mollusks (No. 85, 247, 287), bivalve mollusks (No. 53, 262, 276, 277, 278, 284, 285), and univalve mollusks (No. 262, 276, 278) he was ably assisted by Dr. Katharine J. Bush, for many years assistant in zoology in the Peabody Museum at Yale. Large numbers of new species were described in these groups, especially from the coast of New England and from the deeper off-shore areas.

8. FLAT-WORMS. PLATYHELMINTHS

Of the monographs on the marine invertebrates of New England and adjacent waters which Professor Verrill intended to publish as a summary of his many years of research, only two were fully completed at the time of his death. These were on the marine Planarians and the Nemerteans.

The Planarians are fully described and their morphological details fully illustrated (No. 290).

All the species of Nemerteans known up to that time are likewise fully described externally, with colored figures of their appearance in life (No. 289, 290a).

In this connection may be mentioned his report on the external and internal parasites of man and domestic animals, which had a wide circulation at the time and was of great service in spreading information about the danger of tape worms and other parasites (No. 27, 33).

9. BRYOZOA AND OTHER MOLLUSCOIDEA

The Molluscoidea are a very ancient group and many of them are of such small size that the group has always been considered difficult of investigation. But Verrill unhesitatingly included this group with the others, describing many new species and untangling a confused synonymy (No. 36, 52, 185, 291, 292, 293).

10. TUNICATES

In his earlier papers Verrill placed the ascidians and other Tunicata among the Mollusca, as was the custom at the time, but later recognized the lack of affinities between the two phyla. Numerous new species are described from his collections along the coast of New England and from the off-shore dredgings of the U. S. Fish Commission. Not all of his supposed species are tenable, as has been more recently shown, but Verrill's descriptions were almost always accurate and his accounts of the natural history of the various species were always reliable.

Perhaps the work which has brought Professor Verrill the widest recognition is the Report on the Invertebrate Animals

of Vineyard Sound and Adjacent Waters (No. 36), published in the Report of the Commissioner of Fish and Fisheries, for 1871-2 (452 pp., 38 pls.). This stands as a monumental work in that it was the first extensive ecological study of the marine invertebrates of the inlets, tide pools, mudflats, estuaries and other physical features of the southern New England coast. It includes the natural history of the sponges, hydroids, echinoderms, worms, crustacea, mollusks and other invertebrates found in each of these habitats, in so far as they could be learned at the time. In these studies he was ably assisted by his brother-in-law, Professor Sidney I. Smith, for many years professor of Comparative Anatomy at Yale University. For more than thirty years this Vineyard Sound Report was the standard book of reference for all students of the seashore life of the region, and even today it is still much used. For the Vineyard Sound region the ecological work started by Verrill and Smith has now been carried to a much higher degree of perfection with the coöperation of a score or more of specialists. It is but natural that the results obtained by this modern practice are vastly more detailed than could be hoped for by the pioneer methods of earlier days.

No small part of the excellence of Verrill's publications is due to the accuracy and artistic merit of the drawings used for the illustrations. Most of the drawings of his earlier papers were made with his own hand, and these display a remarkable dexterity with the pen and faithfulness in depicting intricate details.

During his long connection with the U. S. Fish Commission he was assisted by Mr. J. H. Emerton, an artist who has had few equals in the execution of pen and ink outlines of invertebrate animals. Verrill's later publications were nearly all illustrated by drawings and photographs made by his second son, Alpheus Hyatt Verrill, who undoubtedly inherited his father's artistic ability.

Verrill was also fortunate in having associated with him from time to time young men of ability who later became leaders in their fields. To mention the names of some of these, as Edmund B. Wilson, C. Hart Merriam, E. A. Andrews, Edwin

Linton, Richard Rathbun, Sidney I. Smith, is to indicate that Verrill must have exerted a powerful indirect influence on the progress of zoology in America.

For more than thirty years he had the faithful assistance of Dr. Katharine J. Bush, co-author of several of his papers on mollusks and annelids, whose accuracy and ability are reflected in nearly all of Professor Verrill's publications during that period.

It may be of interest to recall that Verrill lived through practically the entire history of zoology in America; from the coming of Louis Agassiz in 1847, to the experimental period of the present century. But while the vogue of the science changed from taxonomy to comparative anatomy, then to adaptations and the evidences of evolution, and later to biometry, regeneration, cell lineage and embryology and, at the beginning of the century, to experimental fields and genetics, Verrill maintained to the end of his life the importance of taxonomy as a necessary preliminary to this more specialized biological work.

The successive states through which modern zoological discipline evolved had no effect whatever on his own chosen field of research. The natural history of animals, their evolution and their adaptations in nature, had a far greater appeal for him than did any of the methods used in laboratory studies. Partly for this reason and partly because of his retiring habits he was little known to the younger generation of zoologists, and the extent and importance of his work has not yet been fully appreciated.

At the time of his retirement in 1907 President Hadley said of him: "In his investigation of certain large fields of zoology, especially those dealing with marine life, he had no equal in America either for knowledge or for originality, and very few in the world as a whole."

With the exception of the protozoa, the taxonomy of every one of the invertebrate phyla shows the effects of Verrill's labors. In some, the general scheme of classification was modified; in others new genera and species were added. In all, he exhibited what seems to have been a natural intuition as to

the significance of morphological characters which amounted almost to genius. It is but natural that in the hundreds of species which he described as supposedly new to science, a few are now known to have been previously described from other parts of the world and a few others are now classed as mere varieties, but the marvel is that he could have accomplished such an enormous task with so few errors of judgment and with still fewer errors of observation.

There seems little doubt that future generations will accord him recognition as one of America's greatest systematic zoologists and one of the most productive of our zoological pioneers.

PART 3. BIBLIOGRAPHY

The following comprise the principal articles published by Professor Verrill on strictly scientific subjects and which contain material new to science. The numerous book reviews which appeared during the many years when he was an associate editor of the American Journal of Science (1869-1920) frequently contained critical comments in the nature of revisions in synonymy, but as most of these were later incorporated in other publications, such reviews are not included here. Nor have there been included the numerous popular articles which he contributed to the newspapers from time to time.

A complete list of Verrill's scientific papers prior to 1893 may be found in Fisher's "Bibliographies of the present (1893) officers of Yale University."

Since Professor Verrill's writings cover so wide a range of subjects, the titles in the bibliography have been grouped under thirteen headings, twelve of which indicate the principal classes of animals which he investigated. The first group of papers includes all the publications which treat of biological matters in general as well as those of his early years which are on botanical and geological subjects. This group also contains papers dealing with two or more groups of animals.

In many cases, however, Professor Verrill allowed his subject to range beyond the limits indicated by the title, for he often followed the example of the earlier naturalists and pub-

lished diagnoses of new species in articles dealing chiefly with other matters. Furthermore, several of the papers discuss the zoology of particular geographical regions and these, of course, treat of several different groups of animals. Thus it will inevitably happen that in some cases a paper placed under one heading will have in it matter which pertains to one or more of the other headings, the paper being listed in the group to which it particularly pertains. In a number of instances it has seemed necessary to list a single paper under two or more headings.

In each list the papers have been arranged in chronological order, and they have been numbered so as to afford ready reference in the text. In those cases where a paper is listed under two or more headings, it retains in subsequent lists the number given to it in the list in which it first appears.

I. MISCELLANEOUS PAPERS, INCLUDING THOSE OF A GENERAL CHARACTER, THOSE COVERING SEVERAL GROUPS OF ANIMALS, AS WELL AS THOSE PERTAINING TO BOTANICAL AND GEOLOGICAL TOPICS

1. Notice of the discovery of tin-ore, chrysoberyl, and other minerals in Maine. Proc. Boston Soc. Nat. Hist., vol. 7, p. 423, 1861.
2. Notes on the natural history of Anticosti. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 132-135, 1862.
3. List of the plants collected at Anticosti and the Mingan Islands during the summer of 1861. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 146-152, 1862.
4. Minerals found at Mt. Mica, Maine. 7th Ann. Rept. Sec. Maine Board Agric., pp. 408-412, 1862.
5. Remarks on the geographical distribution of animals. Proc. Boston Soc. Nat. Hist., vol. 9, p. 232, 1863.
6. Notice of several rare minerals discovered in Maine. Proc. Boston Soc. Nat. Hist., vol. 9, p. 201, 1863.
7. Notice of the discovery of two plants in Maine not before recorded from the United States. Proc. Boston Soc. Nat. Hist., vol. 9, p. 327, 1864.
8. Preservation of starfishes in their natural colors. Amer. Jour. Sci., vol. 39, p. 228. Reprint: Annals and Mag. Nat. Hist., vol. 15, p. 436, 1865.
9. A new American silkworm. Amer. Jour. Sci., vol. 39, p. 228, 1865.
10. A new developing solution. Amer. Jour. Sci., vol. 39, p. 221, 1865.
11. The wooly apple tree blight (Eriosoma lanigera Harris). Practical Entomol., vol. 1, p. 21, 1865.

12. Pasceolus halli Billings, regarded as a Cystidean. Proc. Boston Soc. Nat. Hist., vol. 10, p. 19, 1865.
13. New fluid for preserving natural history specimens. Amer. Jour. Sci., vol. 41, pp. 268-269. Reprint: Annals and Mag. Nat. Hist., vol. 17, pp. 385-386, 1866.
14. Yale College Cabinet. Yale Literary Mag., 1866.
15. Mounting microscopic preparations of entire insects. Proc. Boston Soc. Nat. Hist., vol. 10, p. 259, 1866.
16. Metamorphic rocks of northern New Hampshire containing gold and other metallic ores. Proc. Boston Soc. Nat. Hist., vol. 10, p. 386, 1866.
17. New preservative solution for natural history specimens. Proc. Boston Soc. Nat. Hist., vol. 10, pp. 257-259, 1866.
18. Occurrence of dipterous larvae and Artemia in Mono Lake, California. Proc. Boston Soc. Nat. Hist., vol. 11, p. 111, 1867.
19. Tenacity of life in insects. Proc. Boston Soc. Nat. Hist., vol. 11, p. 160, 1867.
20. Occurrence of Thecla auburniana near New Haven, Conn. Proc. Boston Soc. Nat. Hist., vol. 11, p. 160, 1867.
21. Chemical nature of the odors of hemipterous Insects. Proc. Boston Soc. Nat. Hist., vol. 11, p. 160, 1867.
22. Glycerine for preserving natural colors of marine animals. Amer. Nat., vol. 3, p. 156, 1869.
23. Rules of zoölogical nomenclature. Amer. Jour. Sci., vol. 48, no. 142, pp. 92-112, 1869.
24. Laws of reproduction in cattle. An abstract of two lectures before the State Board of Agriculture. Rept. Conn. Board Agric., pp. 9-32, 1869.
25. Recent explorations of the deep-sea faunae. Amer. Jour. Sci., vol. 49, pp. 129-134, 1870.
26. Descriptions of Sclerostoma pinguicola, a new species of Entozoa from the Hog. Amer. Jour. Sci., vol. 50, pp. 223-224, 1870.
27. The external and internal parasites of domestic animals, their effects and remedies. Rept. Conn. Board Agric., 140 pp., 1870.
28. Obituary of Capt. James Pedersen. Amer. Jour. Sci., vol. 50, p. 470, 1870.
29. Distribution of marine animals on the southern coast of New England. Amer. Jour. Sci., vol. 2, pp. 357-362, 1871. Reprint: Annals and Mag. Nat. Hist., vol. 9, pp. 92-97, 1872.
30. Marine fauna of Eastport, Me. Bull. Essex Inst., vol. 3, pp. 2-6, 1871.
31. Food and habits of some of our marine fishes. Amer. Nat., vol. 5, pp. 397-400. Reprint: Canadian Naturalist, vol. 6, pp. 107-111, 1871.
32. Additional note on the rules of nomenclature. Amer. Jour. Sci., vol. 3, pp. 387-388, 1872.

33. Additional observations on the parasites of man and domestic animals. 5th Ann. Rept. Conn. Board Agric., pp. 321-342, 1872.
34. Results of recent dredging expeditions on the coast of New England. Amer. Jour. Sci., vol. 5, pp. 1-16; 98-106; vol. 6, pp. 435-441, 1873.
35. Notice of: "On some remarkable forms of animal life from the great deeps off the Norwegian coast, partly from posthumous manuscripts of the late Professor Dr. Michael Sars," by George Ossian Sars. Amer. Jour. Sci., vol. 6, p. 470, 1873. (New matter relating to American Sponges.)
36. Report upon the invertebrate animals of Vineyard Sound and the adjacent waters, with an account of the physical characters of the region. 1st Ann. Rept. U. S. Com. Fish and Fisheries, pp. 295-747, 38 pls., 1873. The same, author's edition, with altered title and repaged, 1874. Crustacea of systematic list contributed by S. I. Smith and Oscar Harger; Embryology of Lobster and other Crustacea by S. I. Smith.
37. Colony of southern species on the coast of Maine. Amer. Jour. Sci., vol. 7, p. 134, 1873.
38. Results of recent dredging expeditions on the coast of New England. Amer. Jour. Sci., vol. 7, pp. 38-46; 131-138; 405-414, 2 pls., pp. 498-505, 3 pls., 1874.
39. Notice of some dredgings made near Salem by Dr. A. S. Packard, Jr., and C. Cooke, in 1873. 6th Ann. Rept. Peabody Acad. Sci., Salem, pp. 58-60, 1874.
40. Explorations of Casco Bay by the U. S. Fish Commission in 1873. Proc. Amer. Assoc. Adv. of Sci., Portland meeting, August, 1873, vol. 22 B., pp. 340-395, 6 pls. Printed June, 1874.
41. Results of dredging expeditions off the New England coast in 1874. Amer. Jour. Sci., vol. 9, pp. 411-415; vol. 10, pp. 36-43, 196-202, 3 pls., 1875.
42. Post-pliocene fossils of Sankoty Head, Nantucket Island. Amer. Jour. Sci., vol. 10, pp. 364-375, 1875.
43. Deep-sea dredging. Johnson's New Universal Cycl., vol. 1, pp. 1296-1298, 1875.
44. Notice of recent additions to the marine fauna of the eastern coast of North America. Amer. Jour. Sci., vol. 16, pp. 207-215; 371-378, 1878. (New species of mollusca, echinoderms and anthozoa.)
45. Occurrence of fossiliferous Tertiary rocks on the Grand Bank and George's Bank. Amer. Jour. Sci., vol. 16, pp. 323-324, 1878.
46. Note on borings of a sponge in Italian marble. Amer. Jour. Sci., vol. 16, p. 406, 1878.
47. Notice of recent additions to the marine fauna of the eastern Coast of North America. Amer. Jour. Sci., vol. 17, pp. 239-243; 309-315; 472-474; vol. 18, pp. 52-54; 468-470, 1879.

48. Preliminary check-list of the marine Invertebrata of the Atlantic Coast, from Cape Cod to the Gulf of St. Lawrence. 32 pp. Crustacea contributed by S. I. Smith. New Haven, June. Special edition only. First supplement, 2 pp., 1881; second supplement, 2 pp., 1882, 1879.
49. Notice of recent additions to the marine fauna of the eastern coast of North America. Amer. Jour. Sci., vol. 19, pp. 137-140, 1880.
50. Description of some of the apparatus used by the United States Commission of Fish and Fisheries in dredging off the New England coast, 6 pp., 4°, with cuts. (In: "Deep-sea Sounding and Dredging," by Lieut.-Com. Charles D. Sigsbee, U. S. Coast Survey), pp. 163-168, 1880.
51. List of marine Invertebrata from the New England coast. Proc. U. S. Nat. Mus., vol. 2, (1879), pp. 227-232, 1880.
52. Notice of the recent additions to the marine Invertebrata of the northeastern coast of America, with descriptions of new genera and species, and critical remarks on others. Pt. I; Annelida, Gephyraèa, Nemertina, Nematoda, Polyzoa, Tunicata, Mollusca, Anthozoa, Echinodermata, Porifera. Proc. U. S. Nat. Mus.. vol. 2, pp. 165-205, (1879), 1880.
53. Notice of the recent additions to the marine Invertebrata of the northeastern coast of America, with descriptions of new genera and species, and critical remarks on others. Pt. II: Mollusca, with notes on Annelida, Echinodermata, etc., collected by the U. S. Fish Com. Proc. U. S. Nat. Mus., vol. 3, pp. 356-404, 1880.
54. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. Amer. Jour. Sci., vol. 20, pp. 390-403, 1880. (Mollusks and echinoderms.)
55. Recent papers on the marine Invertebrata of the Atlantic coast of North America. Amer. Jour. Sci., vol. 21, p. 411, 1881.
56. Nature and origin of the sediments, etc. Amer. Jour. Sci., vol. 24, pp. 447-452, 1882.
57. List of collections made by the fishing vessels of Gloucester and other New England seaports for the United States Fish Commission, from 1877-1880. Ann. Rept. U. S. Com. Fish and Fisheries, for 1879, part 7, pp. 787-835, 1882.
58. Notice of the remarkable marine fauna occuping the outer banks off the southern coast of New England. No. 2. Amer. Jour. Sci., vol. 22, pp. 292-303, 1881. (Fishes and mollusks.)
59. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 3. Amer. Jour. Sci., vol. 23, pp. 135-142, 1882. (Echinoderms.)
60. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 4. Amer. Jour. Sci., vol. 23, pp. 216-225, 1882. (Echinoderms and Anthozoa.)

61. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 5. Amer. Jour. Sci., vol. 23, pp. 309-316, 1882. (New species of Anthozoa.)
62. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 6. Parasmilia lymani Pourtales—remarkable modes of growth and repair; restoration of the disk in ophiurans. Amer. Jour. Sci., vol. 23, pp. 406-408, 1882.
63. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 7. Work of the Steamer "Fish Hawk" in 1882; additions to the fauna; surface dredgings. Amer. Jour. Sci., vol. 24, pp. 360-371, 1882. (Describes in footnotes new species of cephalopods and other mollusks, annelids and planarians.)
64. Abstract: Annals and Mag. Nat. Hist., vol. 10, p. 479, 1882.
65. Description of some of the apparatus used by the United States Commission of Fish and Fisheries in dredging off the New England coast. Ann. Rept. U. S. Com. Fish and Fisheries, for 1880, vol. 8, pp. 65-74, 4 pls., 1883.
66. The use of steel sounding wire by Lieut. J. C. Walsh, U. S. N., on the "Taney" in 1849-1850. Science, vol. 1, no. 20, pp. 568-570, 1883.
67. Recent explorations in the region of the Gulf Stream off the eastern coast of the United States by the U. S. Fish Commission. No. 1: Introduction, pp. 443-446. No. 2: Physical features of the region, pp. 446-447. No. 3: Influence of the Gulf Stream. pp. 531-534. Science, vol. 1, 1883. No. 4: Nature of the deposits, pp. 153-154. No. 5: Fossiliferous magnesian limestone nodules, pp. 154-155, Science, vol. 2, 1883.
68. Parental instinct as a factor in the evolution of species. Science, vol. 1, pp. 303-304, 1883.
69. Physical characters of the portion of the continental border, beneath the Gulf Stream, explored by the "Fish Hawk," 1880 to 1882. Ann. Rept. U. S. Com. Fish and Fisheries, for 1882, vol. 10, pp. 1045-1054, 5 pls., 1884.
70. Evidences of light at great depths. Ann. Rept. U. S. Com. Fish and Fisheries, for 1882, vol. 10, pp. 1054-1056, 1884.
71. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England, and of some additions to the fauna of Vineyard Sound. Ann. Rept. U. S. Com. Fish and Fisheries, for 1882, vol. 10, pp. 641-669, 1884. (Distribution of fishes, mollusks, annelids, echinoderms; new species of planarian.)
72. Some results of the exploration of the deep-sea beneath the Gulf Stream by the U. S. Fish Commission on steamer "Albatross" during the past summer (1884). Communicated to the National

Academy of Sciences. Sci. Amer. Suppl., no. 461, pp. 7364-7365, 1884. (Includes details of the deep-sea deposits and additions to the fauna.)

73. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 9. Work of the steamer "Albatross" in 1883. Amer. Jour. Sci., vol. 28, pp. 213-220, 1884. (Describes in footnotes new species of echinoderms and Anthozoa.)
74. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 10. Work of the steamer "Albatross" in 1884 and character of the deep-sea deposits. Amer. Jour. Sci., vol. 28, pp. 378-384, 1884. (Describes in footnotes new species of echinoderms.)
75. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 11. Work of the steamer "Albatross" in 1884. Amer. Jour. Sci., vol. 29, pp. 149-157, 1885. (Describes in footnotes new genus and several new species of Anthozoa and echinoderms.)
76. Results of the explorations made by the steamer "Albatross" off the northern coast of the United States in 1883. In the Ann. Rept. of the Commissioner of Fish and Fisheries for 1883, pp. 1-107 (503-609), 44 pls., 1885. (Geographical and bathymetrical distribution.)
77. Notice of the recent additions to the marine Invertebrata of the northeastern coast of America, with descriptions of new genera and species and critical remarks on others. Part V, Annelida, Echinodermata, Hydroidea, Tunicata. Proc. U. S. Nat. Mus., vol. 8, pp. 424-448, 1885.
78. All zoölogical and a large part of the palaeontological matter contributed to Webster's Internat. Dictionary, Springfield, Mass., 1890.
79. Nocturnal protective coloration in Mammals, Birds, Fishes, Insects, as developed by Natural Selection. Amer. Jour. Sci., vol. 3, p. 132, 1897.
80. Nocturnal and diurnal changes in the colors of certain fishes and of the squid (Loligo), with notes on their sleeping habits. Amer. Jour. Sci., vol. 3, p. 135, 1897.
81. The Florida sea monster. Amer. Nat., vol. 31, pp. 304-307, 2 pls., 1897.
82. Notes on the Geology of the Bermudas. Amer. Jour. Sci. (4), vol. 9, pp. 313-340, 1 pl. and cuts, 1900.
83. Additions to the Turbellaria, Nemertina, and Annelids of the Bermudas, with Revisions of some New England genera and species. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 595-672, pl. 70, 1900.
84. Recent papers relating to the Fauna of the Bermudas, with corrections. Amer. Jour. Sci., vol. 11, pp. 326-330, 1901.

85. Additions to the Fauna of the Bermudas from the Yale Expedition of 1901, with notes on other species. Trans. Conn. Acad. Arts and Sci., vol. 11. pp. 15-62, pl. 1-9, 1901. New records of crustacea, mollusca, echinoderms, annelids, turbellaria, actinaria and other groups, with descriptions of new species.
86. Peculiar characters of the eruption of Mt. Pelee. Amer. Jour. Sci., vol. 14, p. 72, 1902.
87. Fauna of the Bermudas. Amer. Jour. Sci., vol. 13, p. 327, 1902.
88. Causes of the sudden destruction of life in the Martinique volcanic eruptions. Science, vol. 15, p. 824, 1902. Copied in Popular Science News, 1902, and widely discussed in the daily press.
89. The Bermuda Islands: Their scenery, climate, productions, physiography, natural history and geology, with sketches of their early history and the changes due to man. Trans. Conn. Acad. Arts and Sci.; vol. 11, pp. 413-911, pl. 65-104, 245 text figs. (Part 1 gives a general description of the scenery, climate, harbors, waters, vegetation, birds, roads, historical localities, and ruined forts. Part 2 discusses the physiography and meterology of the islands. Part 3 calls attention to the changes in the fauna and flora due to man, with a sketch of the discovery of the islands and their early history. Also issued by the author (1903) with separate pagination x + 548.) 1902.
90. The Mud Shower. Science, vol. 15, p. 872, 1902.
91. The Bermuda Islands. Amer. Jour. Sci., vol. 15, pp. 332-333, 1903.
92. Zoology of the Bermudas. Vol. 1. Fifteen articles, mainly by Professor Verrill and listed in this bibliography under the appropriate group headings, were issued by the author as a bound volume of 427 pages, with 45 plates. 1903. (Some copies contain three additional articles.)
93. Bibliography of the Bermudas. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 849-864, 1903.
94. The Bermuda Islands. Part IV, Geology and paleontology. Trans. Conn. Acad. Arts and Sci., vol. 12, pp. 45-204, with 12 plates and 60 text figures, 1905-1907. No. 94 and 95 also issued privately with separate pagination (1-304), 1907.
95. The Bermuda Islands. Part V. Characteristic Life of the Bermuda Coral Reefs. Trans. Conn. Acad. Arts and Sci., vol. 12, pp. 204-348, 29 pls., 1 map, 120 text cuts, 1906.
96. The Bermuda Islands. Supplement. Relations between Bermuda and the American colonies during the Revolutionary War. Trans. Conn. Acad. Arts and Sci., vol. 12, pp. 47-64, 1907.
97. The Bermuda Islands. (Author's second edition.) Vol. 1 contains in addition to the material in the 1903 edition a supplement containing the paper listed here as No. 96, as well as four pages discussing more recent work on the botany and zoology of the islands; illustrated by 7 additional plates and a map. 1907.

98. Geographical Distribution; Origin of the Bermudian Decapod Fauna. Amer. Nat., vol. 42, pp. 289-296, 1908.
99. Alexander Agassiz. Amer. Jour. Sci., vol. 29, pp. 561-565, 1910.
100. Priority overworked. Science, vol. 39, pp. 607-609, 1914.
101. A recent case of Mushroom intoxication. Science, vol. 40, pp. 408-410, 1914.
102. Sanderson Smith, Malacologist. Amer. Jour. Sci., vol. 39, pp. 685-686, 1915.
103. How the works of Professor Willard Gibbs were published. Science, vol. 61, pp. 41-42, 1925.
104. Sidney Irving Smith. Science, vol. 54, pp. 57, 58, 1926.

2. PAPERS RELATING TO BIRDS, MAMMALS AND OTHER VERTEBRATES

105. Catalogue of the Birds found in the vicinity of Calais, Maine, and about the islands at the mouth of the Bay of Fundy; by George A. Boardman. (Edited.) Proc. Boston Soc. Nat. Hist., vol. 9, pp. 122-132, 1862.
106. The Classification of Birds. Proc. Essex Inst., vol. 3, pp. 208-211, 1862.
107. Mammals observed at Anticosti during the summer of 1861. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 135-136, 1862.
108. Catalogue of the Birds observed at Anticosti and vicinity. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 137-143, 1862.
109. Description of species of Passerella, supposed to be new, from Anticosti. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 143-146, 1862.
110. Notice of a species of Neosorex from Massachusetts, and of Sorex Thompsoni from Maine. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 164-172, 1863.
111. List of the species of the family Soricidae, known to inhabit New England. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 172-173, 1863.
112. Notes on an Arctic and Alpine Frog, and on the supposed Eastern Migration of the Cliff Swallow. Proc. Boston Soc. Nat. Hist., vol. 9, p. 232, 1863.
113. Catalogue of the Reptiles and Batrachians found in the vicinity of Norway, Oxford Co., Maine. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 195-199, 1863.
114. Supplementary notice of Neosorex palustris. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 225-226, 1863.
115. Occurrence of Caribou in Maine. Proc. Boston Soc. Nat. Hist., vol. 9, p. 226, 1863.
116. Additions to the catalogue of the Birds found in the vicinity of Calais, Maine, and about the Bay of Fundy. Proc. Boston Soc. Nat. Hist., vol. 9, pp. 233-234, 1863.
117. Catalogue of the Birds found at Norway, Oxford Co., Maine. With a list of birds found in Maine not observed in Norway. Proc. Essex Inst., vol. 3, pp. 136-160, 1863.

118. Notice of the eggs and young of a Salamander (Desmognathus fusca Baird) from Maine. Proc. Boston Soc. Nat. Hist., vol. 9, p. 253, 1863.

119. Observations on the supposed eastward migration of the Cliff Swallow (Hirundo lunifrons Say). Proc. Boston Soc. Nat. Hist., vol. 9, pp. 276-278, 1864.

120. Note on the distribution of North American Birds. Amer. Jour. Sci., vol. 41, pp. 249-250, 1866.

121. Investigations upon the Geographical Distribution of North American Birds, made with reference to the physical causes that determine their limits in latitude. Proc. Boston Soc. Nat. Hist., vol. 10, pp. 259-262, 1866.

122. External characters of the young of the Central American Tapir (Elasmognathus Bairdii Gill). Amer. Jour. Sci., vol. 44, p. 127. Reprint: Annals and Mag. Nat. Hist., vol. 20, p. 232, 1867.

123. Breeding Habits of Salamanders and Frogs. Amer. Nat., vol. 3, p. 157, 1869.

124. The Biter bitten (Black Snake and Copperhead). Amer. Nat., vol. 3, pp. 158-159, 1869.

125. The Coral Snake. Amer. Nat., vol. 3, p. 278, 1869.

126. Note on the occurrence of the Sea Lion (Otaria Jubata) at Zorritos, Peru. Amer. Jour. Sci., vol. 50, p. 431, 1870.

127. Occurrence of Kirtland's Owl in Maine. Amer. Nat., vol 5, p. 119, 1871.

128. Artificial propagation of the Spanish Mackeral, Cybium Maculatum. Amer. Jour. Sci., vol. 20, p. 251, 1880.

58. Notice of the remarkable Marine Fauna occupying the outer banks off the Southern Coast of New England. No. 2: (Fishes and Mollusca). Amer. Jour. Sci., vol. 22, pp. 292-303, 1881.

129. On the causes of the great mortality of the Tile-fish in 1882, in "History of the Tile-fish," by J. W. Collins. Ann. Rept. U. S. Com. Fish and Fisheries, for 1882, vol. 10, pp. 276-280. Reprint of an article in the New York Herald. 1884.

130. Nocturnal and diurnal changes in the color of certain fishes, with notes on their sleeping habits. Science, vol. 5, p. 427, 1897.

131. Nocturnal Protective Coloration of Mammals, Birds, Fishes, and Insects. Science, vol. 5, pp. 425-6, 1897.

132. Same title. Amer. Nat., vol. 31, pp. 99-103, 1897.

133. Note on the nomenclature of Bermuda birds. Amer. Jour. Sci., vol. 12, p. 470, 1901.

134. A remarkable Instance of the death of Fishes at Bermuda, in 1901. Amer. Jour. Sci., vol. 12, p. 88, 1901.

135. The story of the Cahow, the mysterious extinct bird of the Bermudas. Popular Science Monthly, vol. 60, pp. 22-30, 1901.

136. The "Cahow" of the Bermudas, an extinct bird. Annals and Mag. Nat. Hist. (7), vol. 9, pp. 26-31, 1902.

137. The Solenodon of San Domingo: its external characters and habits. Science, vol. 25, p. 1004, 1907.

3. PAPERS RELATING WHOLLY OR IN PART TO CORALS AND OTHER COELENTERATES

138. Notice of a Primnoa from George's Bank. Proc. Essex Inst., vol. 3, pp. 127-128, 1862.

139. Corals and Polyps, with a brief history of our knowledge of them. Proc. Essex Inst., vol. 3, p. 32, 1862.

140. Revision of the Polypi of the eastern coast of the United States. Mem. Boston Soc. Nat. Hist., vol. 1, pp. 1-45, 1 pl., 1863.

141. List of the Polyps and Corals sent by the Museum of Comparative Zoology to other institutions in exchange, with annotations. Bull. Mus. Comp. Zool., vol. 1, pp. 29-60, 1864.

142. Classification of Polyps: (Extract condensed from a synopsis of the Polypi of the North Pacific Exploring Expedition under Captains Ringgold and Rodgers, U. S. N.) Part I. Proc. Essex Inst., vol. 4, pp. 145-152. Reprint: Annals and Mag. Nat. Hist., vol. 16, pp. 191-197. Abstract: Amer. Jour. Sci., vol. 40, pp. 127-129, 1865.

143. Synopsis of the Polyps and Corals of the North Pacific Exploring Expedition, under Commodore C. Ringgold and Captain John Rodgers, U. S. N., from 1853 to 1856, collected by Dr. Wm. Stimpson, naturalist to the Expedition, with descriptions of some additional species from the West Coast of North America. Part II. Alcyonaria, 2 pls. Proc. Essex Inst., vol. 4, pp. 181-196. Some copies of the author's edition were issued with colored plates, 1865.

144. A new Genus (Lissogorgia) of Gorgonians. Proc. Boston Soc. Nat. Hist., vol. 10, p. 22, 1865.

145. Polyps and Corals of Panama with descriptions of new species. Proc. Boston Soc. Nat. Hist., vol. 10, pp. 323-333, 1866.

146. Polyps and Echinoderms of New England with descriptions of new species. Proc. Boston Soc. Nat. Hist., vol. 10, pp. 333-357, 1866.

147. Living Corals (Montipora) transplanted to distant islands by the natives of certain Pacific Islands. Proc. Boston Soc. Nat. Hist., vol. 10, p. 364, 1866.

148. Synopsis of the Polyps and Corals of the North Pacific Exploring Expedition, under Commodore C. Ringgold and Capt. John Rodgers, U. S. N., from 1853 to 1856, collected by Dr. Wm. Stimpson, naturalist to the Expedition, with descriptions of some additional species from the West Coast of North America. Part III. Madreporaria, 2 pls. Commun. Essex Inst., vol. 5, pp. 17-50, 1866.

149. Descriptions of a remarkable new Jellyfish and two Actinians from the Coast of Maine. Amer. Jour. Sci., vol. 42, pp. 116-118. Reprint: Annals and Mag. Nat. Hist., vol. 4, pp. 160-163, 1866.
150. Zoological Affinities of the Tabulate Corals. Proc. Amer. Assn. for Adv. Sci., vol. 16, p. 148, 1867.
152. Notes on the Radiata in the Museum of Yale College, with descriptions of new Genera and Species. Trans. Conn. Acad., vol. 1, pt. 2, 1868. (See No. 153, 170, 171.)
153. Notice of the Corals and Echinoderms collected by Prof. C. F. Hartt, at the Abrolhos Reefs, Province of Bahia, Brazil, 1867. Trans. Conn. Acad., vol. 1, pt. 2, pp. 351-371, 1 pl. Reprint: 1869. 1868.
154. Review of the Corals and Polyps of the west coast of America. Trans. Conn. Acad., vol. 1, pt. 2, pp. 377-423, 1868; pp. 423-502 published in 1869, 6 pls. Abstract: Amer. Jour. Sci., vol. 47, p. 286, 1868; reprint with changes, 1869.
155. Our Sea-Anemones. Amer. Nat., vol. 2, pp. 251-262, 1868.
156. Critical remarks on the Halcyonoid Polyps in the Museum of Yale College with descriptions of new genera. No. 1, Amer. Jour. Sci., vol. 45, pp. 411-415, 1868.
157. A second critical notice of Alcyonaria in the Museum of Yale College. Amer. Jour. Sci., vol. 46, p. 143, 1868.
158. Synopsis of the Polyps and Corals of the North Pacific Exploring Expedition, under Commodore C. Ringgold and Capt. John Rodgers, U. S. N., from 1853 to 1856, collected by Dr. Wm. Stimpson, naturalist to the expedition, with descriptions of some additional species of the West Coast of North America. Part IV. Actinaria, 2 pls. Commun. Essex Inst., vol. 5, pp. 315-330. (Some copies of the author's edition were issued with colored plates), 1869.
159. Zoological Affinities of the Tabulate Corals. Proc. Essex Inst., vol. 6, p. 90, 1869.
160. New and imperfectly known Echinoderms and Corals. Proc. Boston Soc. Nat. Hist., vol. 12, pp. 381-396, 1869.
161. Critical remarks on Halcyonoid Polyps. No. 3. Amer. Jour. Sci., vol. 47, pp. 282-285, 1869.
162. A remarkable new Jellyfish (Callinema ornata) from Eastport, Me. Amer. Nat., vol. 3, p. 332, 1869.
163. Synopsis of the Polyps and Corals of the North Pacific Exploring Expedition, under Commodore C. Ringgold and Capt. John Rodgers, U. S. N., from 1853 to 1856, collected by Dr. Wm. Stimpson, naturalist to the Expedition, with descriptions of some additional species from the West Coast of North America. Pt. IV. Actinaria, continued, 2 pls. Commun. Essex Inst., vol. 6, pp. 51-74, August. The same. Additions and corrections. Commun. Essex Inst., vol. 6, pp. 75-104, August. (Some copies

of the author's edition were issued with plates colored according to Stimpson's drawings from life), 1869.

164. Critical remarks on the Halcyonoid Polyps with descriptions of species in the Museum of Yale College. No. 4. Amer. Jour. Sci., vol. 48, pp. 419-429, 1869.

165. Review of the Corals and Polyps of the West Coast of America. Abstract: Amer. Jour. Sci., vol. 48, pp. 432-433, 1869.

166. Comparison of the Coral Faunae of the Atlantic and Pacific Coasts of the Isthmus of Darien, as bearing on the supposed former connection between the two oceans. Amer. Nat., vol. 3, pp. 499-500, 1869.

167. Descriptions of Echinoderms and Corals from the Gulf of California. Amer. Jour. Sci., vol. 49, pp. 93-100, 1870.

168. Descriptions of new corals. Amer. Jour. Sci., vol. 49, pp. 370-375, 1870.

169. Notes on the Radiata in the Museum of Yale College, with descriptions of new Genera and Species. Trans. Conn. Acad., vol. 1, pt. 2, 1870. (See No. 170.)

170. Review of the Corals and Polyps of the West Coast of America. Continuation with Addenda. Trans. Conn. Acad., vol. 1, pt. 2, pp. 503-558, 6 pls., 1870.

171. On the geographical distribution of the Popyps of the West Coast of America. Trans. Conn. Acad., vol. 1, pt. 2, pp. 559-568, 1870.

173. Revised list of Corals of the U. S. Exploring Expedition, and other matter, contributed to "Corals and Coral Islands"; by J. D. Dana. pp. 111-114, 125, 379-388, 1872. (New York, Dodd and Mead.)

174. Affinities of Paleozoic Tabulate Corals with existing species. Amer. Jour. Sci. (3), vol. 3, pp. 187-194. Reprint: Annals and Mag. Nat. Hist., vol. 9, pp. 355-364, 1872.

175. Radiata from the Coast of North Carolina. Amer. Jour. Sci., vol. 3, pp. 432-438, 1872.

176. Tunicates, Anthozoa, etc., contributed to: Report of a second deep-sea Dredging Expedition to the Gulf of St. Lawrence (in 1872); by J. F. Whiteaves. Ann. Rept. Dept. Marine and Fisheries. Montreal, 1872.

177. Review of: Illustrated Catalogue of the Museum of Comparative Zoology, No. 4: Deep-sea Corals; by L. F. de Pourtalès, 1871. Amer. Jour. Sci., vol. 3, pp. 65-67, 1872.

178. Reply to the criticism of P. Martin Duncan on "Corals and Coral Islands"; by J. D. Dana. Nature, Apr. 3, p. 423. Reprint: Amer. Jour. Sci., vol. 6, pp. 68-72, 1873.

179. Tunicates, Anthozoa, etc., contributed to: Recent deep-sea dredging operations in the Gulf of St. Lawrence; by J. F. Whiteaves. Amer. Jour. Sci., vol. 7, p. 210, 1874.

180. Tunicata, Anthozoa, etc., contributed to: Report of Deep-sea dredging operations in the Gulf of St. Lawrence in 1873; by J. F.

Whiteaves. Ann. Rep't. Dept. Marine and Fisheries, for 1873. Ottawa, 1874.

181. Descriptions of Annelids, Echinoderms and Anthozoa in: Natural History of Kerguelen Island; by J. H. Kidder. Bull. Nat. Mus., no. 1, pp. 64-77. The same: Notice with addition of new matter. Amer. Jour. Sci., vol. 12, pp. 239-240, 1876.

182. Hydroidea. Johnson's New Universal Cycl., vol. 2, pp. 1059-1061, 1876.

183. Polyps or Polypi. Johnson's New Universal Cycl., vol. 3, pp. 1324-1327, 1877.

184. Anthozoa, including a description of Paragorgia pacifica, nov. sp., contributed to: "Marine Invertebrata from the West Coast of North America"; by J. F. Whiteaves. Canadian Naturalist, vol. 8, 1878.

185. Notice of recent additions to the marine fauna of the eastern coast of North America, No. 6. Polyzoa, Echinodermata, Anthozoa. Amer. Jour. Sci., vol. 18, pp. 52-54, 1879. Descriptions of new genera and species.

186. Fauna Littoralis Norvegiae, edited by J. Koren and Dr. D. C. Danielssen, pt. III. (Review with new matter concerning Anthozoa, Hydroida, and Bryozoa.) Amer. Jour. Sci., vol. 17, pp. 258-259, 1879.

187. Report on Radiates. Bull. Nat. Mus., No. 15, pp. 151-153, 1879.

188. Anthozoa and Echinoderms, including three new species of Starfishes, contributed to "Marine Invertebrata from Queen Charlotte Island," by J. F. Whiteaves. Rep't. Progress Geol. Surv. Canada, 1878, 1879.

52. Notice of the recent additions to the Marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. I. Annelida, Gephyraea, Nemertina, Nematoda, Polyzoa, Tunicata, Mollusca, Anthozoa, Echinodermata, Porifera. Proc. U. S. Nat. Mus., vol. 2, pp. 165-205 (1879), 1880.

189. On the zoological affinities of Halysites. Amer. Jour. Sci., vol. 22, pp. 508-509. Reprint: Annals and Mag. Nat. Hist., vol. 8, p. 72, 1881.

60. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England (No. 6). Parasmilia and Anthozoa. No. 5. Anthozoa. Amer. Jour. Sci., vol. 23, pp. 216-225, 1882.

61. New Anthozoa. Amer. Jour. Sci., vol. 23, pp. 309-316, 1882.

62. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England (No. 6). Parasmilia lymani Pourtales. Remarkable notes of growth and repair. Amer. Jour. Sci., vol. 23, pp. 406-408, 1882.

190. Reports on the results of dredging, under the supervision of Alexander Agassiz, on the East Coast of the United States, during the summer of 1880, by the U. S. Coast Survey steamer "Blake," Commander J. R. Bartlett, U. S. N., commanding. Report on the Anthozoa and on some additional species dredged by the "Blake" in 1877-1879, and by the U. S. Fish Commission Steamer "Fish Hawk" in 1880-1882. Bull. Mus. Comp. Zool., vol. 11, pp. 1-72, 8 pls., 1883.

73. New Echinoderms and Anthozoa. Amer. Jour. Sci., vol. 28, pp. 213-220, 1884.

75. New Anthozoa and Echinoderms. Amer. Jour. Sci., vol. 29, pp. 149-157, 1885.

77. Notice of the recent additions to the marine Invertebrata of the Northeastern Coast of America with descriptions of new Genera and Species, and critical remarks on others. Pt. V. Annelida, Echinodermata, Hydroidea, Tunicata. Proc. U. S. Nat. Mus., vol. 8, pp. 424-448, 1885.

191. Descriptions of new American Actinians, with critical notes on other species. I. Amer. Jour. Sci., vol. 6, pp. 493-498, 1898.

192. Descriptions of imperfectly known and new Atinians, with critical notes on other species. Amer. Jour. Sci., vol. 7, pp. 41-50; 143-146; 205-218; 375-380; 1899. New species from various localities described and figured.

193. Additions to the Anthozoa and Hydrozoa of the Bermudas. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 551-572, pls. 67-69, 1900.

194. Variations and Nomenclature of Bermudian, West Indian, and Brazilian Reef Corals, with Notes on various Indo-Pacific Corals. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 63-168, pl. 10-35, 1901.

195. Comparison of Bermudian, West Indian, and Brazilian Coral Faunae. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 169-206, 1901.

195a. Corals of the genus Acropora. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 207-260, with 7 pls., 1902.

95. The Bermuda Islands. Part V. Characteristic life of the Bermuda coral reefs. Trans. Conn. Acad. Arts and Sci., vol. 12, pp. 204-348, with 29 plates and 121 text figures, 1905-1907. Also issued privately with separate pagination 160-316, 1907.

196. The Gorgonians of the Brazilian Coast. Jour. Acad. Nat. Sci. (2), vol. 15, pp. 373-404, pls. 29-35, 1912. (Revision of synonymy, descriptions of new species, and revised diagnoses of species previously described. Quarto, beautifully illustrated.)

197. The Actinaria of the Canadian Arctic Expeditions, with notes on interesting species from Hudson Bay and other Canadian localities. Rept. Canadian Arctic Expedition, pp. 89-164, 13 pls., 9 text figs., 1922.

198. The Alcyonaria of the Canadian Arctic Expeditions, 1913-1918, with a revision of some other Canadian genera and species. Rept. Canadian Arctic Exped., pp. 1-87, 19 pls., 9 text figs., 1922.

198a. Hawaiian shallow water Anthozoa. Bernice P. Bishop Museum Bull. 49, pp. 1-70; pls. 1-5, 1928. (Prepared for publication by Charles Howard Edmondson. Includes descriptions of new species.)

See also No. 36, 44, 85, 200, 210, 298.

4. PAPERS RELATING WHOLLY OR IN PART TO SEA-STARS AND OTHER ECHINODERMS

In his earlier papers Professor Verrill classified both the Coelenterates and Echinoderms in the group Radiata; hence some of the papers in list No. 3 treat also of Echinoderms. See also list No. 1.

146. On the Polyps and Echinoderms of New England, with descriptions of new Species. Proc. Boston Soc. Nat. Hist., vol. 10, (1864-1866), pp. 333-357, 1866.

153. Notice of the Corals and Echinoderms collected by Professor C. F. Hartt, at the Abrolhos Reefs, Province of Bahia, Brazil, in 1867. Trans. Conn. Acad. Sci., vol. 1, pt. 2, pp. 351-371, pl. 4, 1868.

199. Supplementary note on Echinoderms of the West Coast of America. Trans. Conn. Acad., vol. 1, p. 376, 1868.

200. Descriptions of new species of Starfishes and Corals contributed to "A Naturalist in Brazil," by C. Fred. Hartt. Amer. Nat., vol. 2, pp. 10-12, 1868.

160. New and imperfectly known Echinoderms and Corals. Proc. Boston Soc. Nat. Hist., vol. 12, pp. 381-396, 1869.

201. Note on the generic relations and synonymy of the common Sea-urchin of New England (Euryechinus Dröbachiensis). Amer. Jour. Sci., vol. 49, pp. 101-103, 1870.

202. Notes on Radiata. Trans. Conn. Acad. Arts and Sci., vol. I, part 2, pp. 247-613, pls. 4-10, 1867-1871. (No. 202a-207 relate to Echinoderms.)

202a. No. 1. Descriptions of new Starfishes from New Zealand. Trans. Conn. Acad. Arts and Sci., vol. 1, pp. 247-251, 1867.

203. No. 2. The Echinoderms of Panama and the West Coast of America, with descriptions of new Genera and Species. Trans. Conn. Acad. Arts and Sci., vol. 1, pp. 251-322, pl. 10, 1867.

204. No. 3. On the Geographical Distribution of the Echinoderms of the West Coast of America (and Comparison of the Tropical Echinoderm Faunae of the East and West Coasts of America). Trans. Conn. Acad. Arts and Sci., vol. 1, pp. 323-339, 1867. Reprint of Nos. 1-3, with additional footnotes, 1870.

205. No. 5. Notice of a Collection of Echinoderms from La Paz, Lower California. Trans. Conn. Acad. Arts and Sci., vol. 1, pp. 371-376, 1868.

206. No. 8. Additional Observations on Echinoderms, chiefly from the Pacific Coast of America. Trans. Conn. Acad. Arts and Sci., vol. 1, pp. 568-593, pl. 10, 1871.

207. No. 9. The Echinoderm-Fauna of the Gulf of California and Cape St. Lucas. Trans. Conn. Acad. Arts and Sci., vol. 1, pp. 593-596, 1871.

167. Descriptions of Echinoderms and Corals from the Gulf of California. Amer. Jour. Sci., vol. 49, pp. 93-100, 1870.

208. Descriptions of Starfishes and Ophiurans from the Atlantic coasts of America and Africa. Amer. Jour. Sci., vol. 2, pp. 130-133, 1871.

30. Marine Fauna of Eastport, Me. Bull. Essex Inst., vol. 3, pp. 2-6, 1871.

175. On Radiata from the Coast of North Carolina. Amer. Jour. Sci., vol. 3, pp. 432-438, 1872.

34. Results of Recent Dredging Expeditions on the Coast of New England. Amer. Jour. Sci., vol. 5, pp. 1-16, 98-106; vol. 6, pp. 435-441, 1873.

36. Report upon the Invertebrate Animals of Vineyard Sound, and Adjacent Waters. Washington, 1873. In Report of the Commissioner of Fish and Fisheries for 1871, pp. 295-747, pls. 1-38, 1873. Also author's edition, repaged, 1874.

181. Descriptions of Annelids, Echinoderms and Anthozoa in: Natural History of Kerguelen Island; by J. H. Kidder. Bull. Nat. Mus., no. 1, pp. 64-77. 1876. The same: Notice with addition of new matter. Amer. Jour. Sci., vol. 12, pp. 239-240, 1876.

209. Note on some of the Starfishes of the New England Coast. Amer. Jour. Sci., vol. 11, pp. 416-420, 1876. (Corrections of Errors made by M. E. Perrier, in respect to New England species of Asterias.)

44. Notice of recent additions to the Marine Fauna of the Eastern Coast of North America, nos. 1 and 2. Amer. Jour. Sci., vol. 16, pp. 207-215, 371-378, 1878.

210. Radiates. In Ludwig Kumlin, Contributions to the Natural History of Arctic America, made in connection with the Howgate Polar Expedition, 1877-78. Bull. U. S. Nat. Mus., no. 15, pp. 151-153, 1879.

48. Preliminary check-list of the Marine Invertebrata of the Atlantic Coast, from Cape Cod to the Gulf of St. Lawrence, 32 pp. (with two supplements of two pages each). Published by the author, 1879.

188. Anthozoa and Echinoderms, including three new species of Starfishes, contributed to "Marine Invertebrata from Queen Charlotte Island," by J. F. Whiteaves. Rep't Progress Geol. Surv. Canada, 1878, 1879.

52. Notice of the recent additions to the Marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. I, Annelida, Gephyraea, Nemertina, Nematoda, Polyzoa, Tunicata, Mollusca, Anthozoa, Echinodermata, Porifera. Proc. U. S. Nat. Mus., vol. 2, pp. 165-205, 1879.

210a. Notes on the distribution and synonymy of Northern Echinoderms, in Review of: A memoir on the Echinodermata of the Arctic Seas; by P. M. Duncan and W. P. Sladen. Annals and Mag. Nat. Hist., vol. 9, pp. 247-248, 1882.

210b. Restoration of disk in Ophiurans. Amer. Jour. Sci., vol. 23, p. 408, 1882. Reprint in Annals and Mag. Nat. Hist., vol. 9, p. 476, 1882.

211. Descriptions of New Species of Starfishes and Ophiurans, with a Revision of Certain Species formerly Described. Proc. U. S. Nat. Mus., vol. 17, pp. 245-297, 1894.

212. Distribution of the Echinoderms of Northeastern America. Amer. Jour. Sci., vol. 49, pp. 127-141, 199-212, 1895.

213. Revision of Certain Genera and Species of Starfishes, with Descriptions of New Forms. Trans. Conn. Acad. Arts and Sci., vol. 10, part 1, pp. 145-234, pls. 24-30, 1899.

214. North American Ophiuroidea. Part I. Revision of certain families and genera of West Indian Opheurans. Part II. A faunal catalogue of the known species of West Indian Ophiurans. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 301-386; pls. 42-43, 1899.

215. Report on the Ophiuroidea collected by the Bahama expedition in 1893. Bulletin from the Laboratories of Natural History of the State University of Iowa, vol. 5, pp. 1-86, pls. 1-8, 1899.

216. Additions to the Echinoderms of the Bermudas. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 583-587, 1900.

85. Additions to the Fauna of the Bermudas from the Yale Expedition of 1901, with notes on other species. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 15-62, pl. 1-9, 1901. (New records of crustacea, mollusca, echinoderms, annelids, turbellaria, actinaria, and other groups, with descriptions of new species.)

92. Zoology of the Bermudas, vol. 1, 427 pp., 45 pls., 1903. (Starfishes are discussed.)

95. The Bermuda Islands, part 5, section 1, Characteristic Life of the Bermuda Coral Reefs. Trans. Conn. Acad. Arts and Sci., vol. 12, pp. 204-348, 29 pls., 1 map, 120 text cuts, 1906. (Starfishes are discussed.)

217. Descriptions of New Genera and Species of Starfishes from the North Pacific Coast of America. Amer. Jour. Sci., vol. 28, pp. 59-70, figs. 1-10, 1909.

218. Remarkable Development of Starfishes on the Northwest American Coast; Hybridism; Multiplicity of Rays; Teratology; Prob-

lems in Evolution; Geographical Distribution. Amer. Nat., vol. 43, pp. 542-555, figs. 1-7, 1909.

219. Revision of the Genera of Starfishes of the subfamily Asterininae. Amer. Jour. Sci., ser. (4), vol. 35, pp. 477-485, 2 text cuts, 1913. Eight new genera established.

220. Monograph of the Shallow-water Starfishes of the North Pacific Coast, from the Arctic Ocean to California, with Revisions of various Extralimital Genera and Species. Harriman Alaska Expedition, vol. 14, part I, pp. 1-420; part II, pl. 1-110, 1914. Published by the Smithsonian Institution.

221. Review of No. 220 in Science, vol. 40, pp. 523-525; and in Amer. Jour. Sci., vol. 38, p. 107, with errata, 1914.

222. Nomenclature of Certain Starfishes. Amer. Jour. Sci., vol. 37, pp. 483-486, 1914.

223. Revision of some Genera and Species of Starfishes, with Descriptions of a few New Genera. Annals and Mag. Nat. Hist., vol. 14, pp. 13-22, pl. 1, 1914. (Seven new genera proposed.)

224. Report on the Starfishes of the West Indies, Florida, and Brazil, including those obtained by the Bahama Expedition from the University of Iowa in 1893. Bull. Laboratories Nat. Hist. State Univ. Iowa, vol. 7, pp. 1-232, pl. 1-29, 1915.

See also No. 53, 54, 59, 60, 62, 71, 73, 74, 75, 76, 77, 153.

5. PAPERS RELATING TO ANNELIDS, LEECHES, AND OTHER SEGMENTED WORMS

30. Marine Fauna of Eastport, Maine. Bull. Essex Inst., vol. 3, pp. 2-6, 1871.

225. Notice of the Invertebrates dredged in Lake Superior in 1871, by the U. S. Lake Survey, under the direction of Gen. C. B. Comstock, S. I. Smith, naturalist; by S. I. Smith and A. E. Verrill. (Annelids, Leeches, and Planarians by A. E. Verrill). Amer. Jour. Sci., vol. 2, pp. 448-455, 1871.

226. Annelids, Leeches, and Planarians described in: Preliminary report on the dredging in Lake Superior; by S. I. Smith. From Rep't Sec'y War, vol. 2. Rep't Chief of Engineers. Author's edition, pp. 4-6, 1871.

227. Descriptions of North American fresh water leeches. Amer. Jour. Sci. (3), vol. 3, pp. 126-139. 1872.

34. Results of recent Dredging Expeditions on the Coast of New England. Amer. Jour. Sci. (3), vol. 5, pp. 1-16, 98-106, vol. 6, pp. 435-441, 1873.

36. Report upon the Invertebrate Animals of Vineyard Sound and the Adjacent Waters, with an account of the Physical Characters of the region. Rept. U. S. Com. Fish and Fisheries, pt. I, pp. 295-747, 38 pls., 1873. Author's edition, 1874.

228. Descriptions of new and rare species of Annelids contributed to: Report on the Dredgings in the region of St. George's Banks, in 1872; by S. I. Smith and O. Harger. Trans. Conn. Acad. Sci., vol. 3, pp. 35-46. 1874.

229. Annelids, Leeches, etc., contributed to: Sketch of the Invertebrate Fauna of Lake Superior; by S. I. Smith. Rep't U. S. Com. Fish and Fisheries, pt. II, p. 690, 1874.

230. Synopsis of North American fresh water Leeches. Rep't. U. S. Com. Fish and Fisheries, pt. II, pp. 666-689, 1874.

231. List of the Leeches collected by Hayden's Expedition. Ann. Rep't. U. S. Geol. and Geogr. Surv. of the Territories embracing Colorado, 1873, p. 633, 1874.

40. Explorations of Casco Bay by the U. S. Fish Commission in 1873. Proc. Amer. Assoc. Adv. Sci., vol. 22 B., pp. 340-395, 1874.

39. Notice of some Dredgings made near Salem by Dr. A. S. Packard, Jr., and C. Cooke, in 1873, 6th Ann. Rep't Peabody Acad. Sci., 1874.

41. Results of Dredging Expeditions off the New England Coast in 1874. Amer. Jour. Sci. (3), vol. 9, pp. 411-415; vol. 10, pp. 36-43, 196-202, 3 pls., 1875.

232. Report upon the collections of fresh water Leeches made in portions of Nevada, Utah, Colorado, New Mexico, and Arizona, during the years 1872, 1873, and 1874. Report upon Geographical and Geological Explorations and Surveys west of the hundredth meridian, in charge of Lieut. Geo. M. Wheeler, vol. 5, chapt. 16, 1875.

181. Natural History of Kerguelen Island. Annelids and Echinoderms. Bull. U. S. Nat. Mus., no. 1, pp. 64-77, 1876.

233. In Kumlin, Contributions to Natural History of Arctic America, made in connection with the Howgate Polar Expedition, 1877-78, Annelida. Bull. U. S. Nat. Mus., no. 15, pp. 141-145, 1879.

48. Preliminary Check-list of the Marine Invertebrata of the Atlantic Coast from Cape Cod to the Gulf of St. Lawrence. Annelida, pp. 7-11, 32, 1879.

52. Notice of recent additions to the Marine Invertebrata of the Northeastern Coast of America, with Descriptions of new Genera and Species, and Critical Remarks on others. Part I, Annelida, Gephyraea, Nemertina, etc. Proc. U. S. Nat. Mus., vol. 2, p. 185, 1879.

234. New England Annelida. Trans. Conn. Acad., vol 4, pp. 285-324, pls. 3-13, 1881.

71. Notice of the remarkable Marine Fauna occupying the outer banks off the Southern Coast of New England. Rep't U. S. Com. Fish and Fisheries for 1882, vol. 10, pp. 641-669, 1884.

76. Results of the Explorations made by the Steamer "Albatross," off the Northern Coast of the United States in 1883. Rept. U. S. Com. Fish and Fisheries for 1883, pp. 503-609, 44 pls., 1885.
235. Dinophilidae of New England. Trans. Conn. Acad., vol. 8, pp. 457-458, 1892.
83. Additions to the Turbellaria, Nemertina, and Annelids of the Bermudas, with Revisions of some New England genera and species. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 595-672, pl. 70, 1900.
85. Additions to the Fauna of the Bermudas from the Yale Expedition of 1901, with notes on other species. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 15-62, pl. 1-9, 1901. (New records of Crustacea, Mollusca, Echinoderms, Annelids, Turbellaria, Actinaria and other groups, with descriptions of new species.)

See also No. 53, 63, 77.

6. PAPERS RELATING TO CRUSTACEA AND PYCNOGONIDA

237. Remarkable instances of Crustacean Parasitism. Amer. Jour. Sci., vol. 44, p. 126. Reprint: Annals and Mag. Nat. Hist., vol. 20, p. 230, 1867.
238. Parasitic Habits of Crustacea (Includes descriptions of several new species by S. I. Smith). Amer. Nat., vol. 3, p. 239, 1869.
239. Descriptions of some new American Phyllopod Crustacea. Amer. Jour. Sci., vol. 48, pp. 244-255. Reprint: Annals and Mag. Nat. Hist., vol. 4, pp. 331-341, 1869.
240. New localities of Artemia. Amer. Jour. Sci., vol. 48, p. 430, 1869.
241. Observations on Phyllopod Crustacea of the family Branchipidae, with descriptions of some new Genera and Species from America. Proc. Amer. Assn. Adv. Sci., vol. 18, pp. 230-247, 1870.
242. Additions to the Crustacea and Pycnogonida of the Bermudas. Trans. Conn. Acad. Sci., vol. 10, pp. 573-582, pls. 67-69, 1900.
85. Additions to the Fauna of the Bermudas from the Yale Expedition of 1901, with Notes on Other Species. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 15-62, pl. 1-9, 1901.
89. The Bermuda Islands, vol. 1, Crustacea on pp. 37, 53, 289, 293-296, figs. 22a, 56, 57, 250, pl. 94, 1903. A repaged reprint (with additions) from Trans. Conn. Acad. Arts and Sci., vol. 11, 1902. A second edition, with a supplement, seven additional plates, and a map, 1907. Published by the author, New Haven, Conn. (Observations on the early history and habits of Panulirus argus, Cenobita diogenes, Gecarcinus lateralis, etc.)
94. Geology and Paleontology, of Bermuda, Trans. Conn. Acad. Arts and Sci., vol. 12, pp. 158, 179, 196, 197, fig. 60, 1906. Discusses occurrence of Cenobita diogenes as a fossil.
98. Geographical Distribution; Origin of the Bermudian Decapod Fauna. Amer. Nat., vol. 42, pp. 289-296, and cuts, 1908.

243. Notable case of a species of Grapsoid Crustacean apparently in actual process of evolution. Amer. Jour. Sci., vol. 25, pp. 119-122, 1908.
244. Decapod Crustacea of Bermuda, Part 1, Anomura and Brachyura. Trans. Conn. Acad. Arts and Sci., vol. 13, pp. 299-474, with 21 pls., 1908.
244a. Decapod Crustacea of Bermuda, Part 2, Macrura. Trans. Conn. Acad. Arts and Sci., vol. 26, pp. 1-179, pl. 1-48, 1922.
245. Crustacea of Bermuda: Schizopoda, Cumacea, Stomatopoda and Phyllocarida. Trans. Conn. Acad. Arts and Sci., vol. 26, pp. 118-211, pls. 49-56. 1923.

See also No. 36, 297, 301.

7. PAPERS RELATING TO MOLLUSCA

246. Descriptions of shells from the Gulf of California. Amer. Jour. Sci., vol. 49, pp. 217-227, 1870.
247. Descriptions of some New England Nudibranchiata. Amer. Jour. Sci., vol. 50, pp. 405-408, 1870.
248. Recent additions to the molluscan Fauna of New England and the adjacent waters, with notes on other species. Amer. Jour. Sci., vol. 3, pp. 209-213; 281-290, 3 pls., 1872.
249. Remarks on certain errors in Mr. Jeffrey's article on "The Mollusca of Europe compared with those of Eastern North America." 5th Ann. Rept. Conn. Board Agric., p. 465, June. Reprint: Annals and Mag. Nat. Hist., vol. 11, pp. 206-213, 1873.
250. Discovery of an Octopus inhabiting the coast of New England. Amer. Nat., vol. 7, pp. 394-398, 2 cuts, 1873.
251. Oyster-shell beds in Portland harbor. Amer. Jour. Sci., vol. 7, p. 136, 1874.
252. Occurrence of gigantic Cuttlefishes on the Coast of Newfoundland. Amer. Jour. Sci., vol. 7, pp. 158-161, 1874.
253. The giant Cuttlefishes of Newfoundland and the common Squids of the New England Coast. Amer. Nat., vol. 8, pp. 167-174, 1874.
254. The colossal Cephalopods of the North Atlantic. Amer. Nat., vol. 9, no. 1, pp. 21-36, 11 cuts. The same, no. 2, 17 cuts. Ann. Rept., U. S. Geol. and Geogr. Surv. of the Territories embracing Colorado, 1873, pp. 78-86, Feb., 1875.
255. The gigantic Cephalopods of the North Atlantic. Amer. Jour. Sci., vol. 9, pp. 123-130, 4 pls.; pp. 177-185, 1875.
256. Notice of the occurrence of another gigantic Cephalopod (Architeuthis) on the Coast of Newfoundland in December, 1874. Amer. Jour. Sci., vol. 10, pp. 213-214. Reprint: Annals and Mag. Nat. Hist., vol. 16, p. 266, 1875.
257. Note on gigantic Cephalopods, a correction. Amer. Jour. Sci., vol. 12, p. 236, 1876.

258. Occurrence of another gigantic Cephalopod on the coast of Newfoundland. Amer. Jour. Sci., vol. 14, pp. 425-426, 1877.
259. Notice of recent additions to the marine fauna of the eastern coast of North America, No. 7. Amer. Jour. Sci., vol. 18, pp. 468-470, 1879. New species of Cephalopods.
260. The Cephalopods of the Northeastern Coast of America. Pt. I. The gigantic squids (Architeuthis) and their allies; with observations on similar large species from foreign localities. Trans. Conn. Acad., vol. 5, pp. 177-257, 14 pls., 1879.
52. Notice of the recent additions to the marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. I, Annelida, Gephyraea, Nemertina, Nematoda, Polyzoa, Tunicata, Mollusca, Anthozoa, Echinodermata, Porifera. Proc. U. S. Nat. Mus., vol. 2, pp. 165-205 (1879), 1880.
261. Synopsis of the Cephalopoda of the Northeastern Coast of America. Amer. Jour. Sci., vol. 19, pp. 284-295, 5 pls., 1880.
53. Notice of the recent additions to the marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. II. Mollusca, with notes on Annelida, Echinodermata, etc., collected by the U. S. Fish Commission. Proc. U. S. Nat. Mus., vol. 3, pp. 356-404, 1880.
54. Notice of the remarkable Marine Fauna occupying the outer banks off the Southern Coast of New England (Mollusca and Echinoderms). Amer. Jour. Sci., vol. 20, pp. 390-403, 1880.
262. Part III. Catalogue of Mollusca recently added to the Fauna of Southern New England Proc. U. S. Nat. Mus., vol. 3, pp. 405-409, 1880.
263. Occurrence at Newport, R. I., of two littoral European shells new to the American Coast. Amer. Jour. Sci., vol. 20, p. 250, 1880.
264. Rapid diffusion of Littorina littorea on the New England Coast. Amer. Jour. Sci., vol. 20, p. 251, 1880.
265. Reports on the results of dredging, under the supervision of Alexander Agassiz, on the East Coast of the United States, during the summer of 1880, by the U. S. Coast Survey Steamer, "Blake," Commander J. R. Bartlett, U. S. N., commanding. Report on the Cephalopods, and on some additional species dredged by the U. S. Fish Comm. Steamer "Fish Hawk" during the season of 1880. Bull. Mus. Compar. Zool., vol. 8, pp. 99-116, 8 pls., 1881.
266. The Cephalopods of the Northeastern Coast of America. Pt. II. The smaller Cephalopods, including the Squids and Octopi, with other allied forms, 1880-1881. Trans. Conn. Acad., vol. 5, pp. 259-446, 28 pls., 1881.
58. Notice of the remarkable marine Fauna occupying the outer banks off the Southern Coast of New England, No. 2: (Fishes and Mollusca). Amer. Jour. Sci., vol. 22, pp. 292-303, 1881.

267. Giant Squid (Architeuthis) abundant in 1875, at the Grand Banks. Amer. Jour. Sci., vol. 21, pp. 251-252, 1881.

268. Regeneration of lost parts in the Squid (Loligo Pealei). Amer. Jour. Sci., vol. 21, pp. 333-334, 1881.

269. Notice of the recent additions to the marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. IV. Additions to the deep-water Mollusca taken off Martha's Vineyard, in 1880 and 1881. Proc. U. S. Nat. Mus., vol. 5, pp. 315-343, 1882 .

270. Additional notes on giant Cephalopods in a Review of: Descriptions of some new and rare Cephalopoda, Pt. 2; by Richard Owen. Amer. Jour. Sci., vol. 23, pp. 72-75, 1882.

271. Occurrence of an additional specimen of Architeuthis at Newfoundland. Amer. Jour. Sci., vol. 23, pp. 71-72, 1882.

272. Catalogue of the Marine Mollusca added to the Fauna of New England during the past ten years. Pt. I. Trans. Conn. Acad., vol. 5, pt. II, pp. 447-587, with 5 pls., 1882.

273. Notes on two gigantic Cephalopods from New Zealand, in Review of: Descriptions of new Cephalopoda; by F. W. Kirk. Amer. Jour. Sci., vol. 24, p. 477, 1882.

274. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico and in the Caribbean Sea, 1878-1879, by the U. S. Coast Survey Steamer "Blake," Lieut-Commander C. D. Sigsbee, U. S. N., and Commander J. R. Bartlett, U. S. N., commanding. Supplementary report on the Blake Cephalopods. Bull. Mus. Comp. Zool., vol. 11, pp. 105-115, 3 pls., 1883.

275. Descriptions of two species of Octopus from California. Bull. Mus. Comp. Zool., vol. 11, pp. 117-124, 3 pls., 1883.

276. Second catalogue of Mollusca, recently added to the Fauna of the New England Coast and the adjacent parts of the Atlantic, consisting mostly of deep-sea species, with notes on others previously recorded. Trans. Conn. Acad., vol. 6, pt. I, pp. 139-294, 5 pls., 1884.

277. List of deep-water and surface Mollusca taken off the East Coast of the United States by the U. S. Fish Commission Steamers "Fish Hawk" and "Albatross," 1880-1883. Trans. Conn. Acad., vol. 6, pt. I, pp. 263-289, 1884.

278. Third catalogue of Mollusca, recently added to the Fauna of the New England Coast and the adjacent parts of the Atlantic, consisting mostly of deep-sea species, with notes on others previously recorded. Trans. Conn. Acad., vol. 6, pt. II, pp. 395-452, 3 pls., 1885

279. How long will oysters live out of water? Bull. U. S. Fish Commission, vol. 5, p. 161, 1885.

280. The Opisthoteuthidae. A remarkable new family of deep-sea

Cephalopoda, with remarks on some points in Molluscan Morphology. Amer. Jour. Sci. (4), vol. 2, pp. 74-80, 1896.

281. The Molluscan Archetype considered as a Veliger-like form, with discussions of certain points in molluscan morphology. Amer. Jour. Sci. (4), vol. 2, pp. 91-98, 1 pl., 1896.

282. A study of the Family Pectinidae, with a revision of the Genera and Subgenera. Trans. Conn. Acad., vol. 10, pp. 41-95, pls. 16-21, 1897.

283. Supposed giant Cephalopod on the Florida coast. Amer. Jour. Sci., vol. 3, pp. 79, 162, 355. 1897.

284. Revision of the Genera of Ledidae and Nuculidae of the Atlantic Coast of the United States. Amer. Jour. Sci., vol. 3, pp. 51-63, 1897. (With Katharine J. Bush.)

285. Revision of the deep-water Mollusca of the Atlantic Coast of North America, with descriptions of new Genera and Species. Pt. 1, Bivalvia. Proc. U. S. Nat. Mus., vol. 20, pp. 775-901, pls. 71-97, 1898. (With Katharine J. Bush.)

286. Additions to the marine mollusca of the Bermudas. Trans. Conn. Acad. Sci., vol. 10, pp. 513-544, pls. 63-65, 1900. (With Katharine J. Bush.)

287. The nudibranchs and naked Tectibranchs of the Bermudas. Trans. Conn. Acad. Sci., vol. 10, pp. 545-550, pl. 66. 1900.

85. Additions to the Fauna of the Bermudas from the Yale Expedition of 1901, with notes on other species. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 15-62, pl. 1-9. 1901. New records of Crustacea, Mollusca, Echinoderms, Annelids, Turbellaria, Actinaria and other groups, with descriptions of new species.

288. Land snails and slugs of the Bermudas. Trans. Conn. Acad. Arts and Sci., vol. 11, pp. 315-323, 43 cuts, 1903.

See also No. 36, 44, 63, 71, 80, 81.

8. PAPERS RELATING TO FLATWORMS AND RIBBON WORMS

233. Report on Annelids and Nemerteans of the Howgate Polar Expedition. Bull. U. S. Nat. Mus., no. 15, pp. 141-145, 1879.

289. The marine Nemerteans of New England and adjacent waters. Trans. Conn. Acad. Arts and Sci., vol. 8, pp. 381-456, with 7 plates, mostly colored, 1892.

290. The Marine Planarians of New England. Part 1, Dendrocoela; Part 2, Acoela. Trans. Conn. Acad. Arts and Sci., vol. 8, pp. 460-520, with 5 plates, 1893.

290a. Supplements to the Nemerteans and Planarians of New England. Trans. Conn. Acad. Arts and Sci., vol. 9, pp. 141-152, 1895.

83. Additions to the Turbellaria, Nemertina, and Annelids of the Bermudas, with revisions of some New England genera and species. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 595-672, pl. 70, 1900.

See also No. 36, 52, 63, 71, 85 (New species of planarians.)

9. PAPERS RELATING TO BRYOZOA (MOLLUSCOIDEA)

291. Report on Molluscoids. Bull. U. S. Nat. Mus., no. 15, pp. 147-150, 1879.

292. Notice of recent additions to the marine fauna of the eastern coast of North America, No. 5, Polyzoa Amer. Jour. Sci., vol. 17, pp. 472-474, 1879.

185. Notice of recent additions to the marine fauna of the eastern coast of North America, No. 6. Polyzoa, Echinodermata, Anthozoa. Amer. Jour. Sci., vol. 18, pp. 52-54; 1879. Descriptions of new genera and species.

293. Additions to the Tunicata and Molluscoidea of the Bermudas. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 588-594, 1900.

See also No. 36, 52, 84, 85, 186.

10. PAPERS RELATING TO PROCHORDATA

294. Descriptions of some imperfectly known and new Ascidians from New England. 4 cuts. Amer. Jour. Sci. (3), vol. 1, pp. 54-58; 93-100; 211-212; 288-294; 443-446; 1871.

29. Distribution of marine animals on the Southern Coast of New England. Amer. Jour. Sci., vol. 2, pp. 357-362, 1871. Reprint: Annals and Mag. Nat. Hist., vol. 9, pp. 92-97, 1872.

176. Tunicates, Anthozoa, etc., contributed to: Report of a second deep-sea Dredging Expedition to the Gulf of St. Lawrence (in 1872); by J. F. Whiteaves. Ann. Rept. Dept. Marine and Fisheries. Montreal, 1872.

179. Tunicates, Anthozoa, etc., contributed to: Recent deep-sea dredging operations in the Gulf of St. Lawrence; by J. F. Whiteaves. Amer. Jour. Sci., vol. 7, p. 210, 1874.

180. Tunicata, Anthozoa, etc., contributed to: Report of deep-sea dredging operations in the Gulf of St. Lawrence in 1873; by J. F. Whiteaves. Ann. Rept. Dept. Marine and Fisheries, for 1873. Ottawa, 1874.

295. Occurrence of Ciona ocellata at Newport, R. I. Amer. Jour. Sci., vol. 20, p. 251, 1880.

52. Notice of the recent additions to the marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. I, Annelida, Gephyraea, Nemertina, Nematoda, Polyzoa, Tunicata, etc. Proc. U. S. Nat. Mus., vol. 2, pp. 165-205, 1880.

77. Notice of the recent additions to the marine Invertebrata of the Northeastern Coast of America, with descriptions of new Genera and Species, and critical remarks on others. Pt. V. Annelida, Echinodermata, Hyroidea, Tunicata. Proc. U. S. Nat. Mus., vol. 8, pp. 424-448, 1885.

293. Additions to the Tunicata and Molluscoidea of the Bermudas. Trans. Conn. Acad. Arts and Sci., vol. 10, pp. 588-594, 1900.

See also No. 36.

11. PAPERS RELATING TO SPONGES

No. 35, 36, 46, 52; 95 (New species of silicious sponges.)

12. PAPERS RELATING TO ROUNDWORMS

No. 26, 27, 33, 36, 52.

13. PAPERS RELATING TO INSECTS

No. 9, 11, 15, 18, 19, 20, 21, 27, 33, 79, 89.

In addition to the publications which appeared during his lifetime, Professor Verrill left completed manuscripts of several works which, for one reason or another, had not been printed at the time when this biography was issued (1930). It seems desirable to list them here since it is presumable that they will later be published, probably with editorial revision and emendations. Such information as is now available concerning them is appended.

297. Report on the Higher Crustacea of Connecticut and Adjacent Waters. About 700 pp., 160 text-cuts and 99 plates.

"This includes descriptions and figures of all the genera and species, the morphology, classification, habits, anatomy, evolution, natural selection, development, lobster hatcheries, and the fisheries, etc."

(This was submitted to the Connecticut Geological and Natural History Survey in 1919, but will require considerable revision in order to conform with the other publications of the Survey.)

298. Deep-Sea Alcyonaria of the Blake Expeditions; 2 vols., quarto, with about 150 plates.

(This is Professor Verrill's most extensive monograph and the one which he considered in many respects the most important work of his life. It is now found to require such extensive revision because of the loss or misplacement of some of the type specimens that the text is to be entirely rewritten and new plates substituted. The monograph will then appear as a Memoir of the Museum of Comparative Zoology, Harvard College.)

299. True Nature Stories for Boy Scouts and other Boys.

"A popular work, relating mostly to the habits of mammals, birds, and other vertebrates, about 300 pages with many text-cuts."

300. Yellowstone Park in winter and spring, with numerous illustrations from new photographs.

301. The Decapod Crustacea of Dominica Island; about 200 pages, 30 plates.

302. Genealogy of the Verrill families descended from Samuel Verrill, 1st, of Ipswich and Gloucester, Mass., and of some related families.