# *Memoir of Charles Emerson Beecher*

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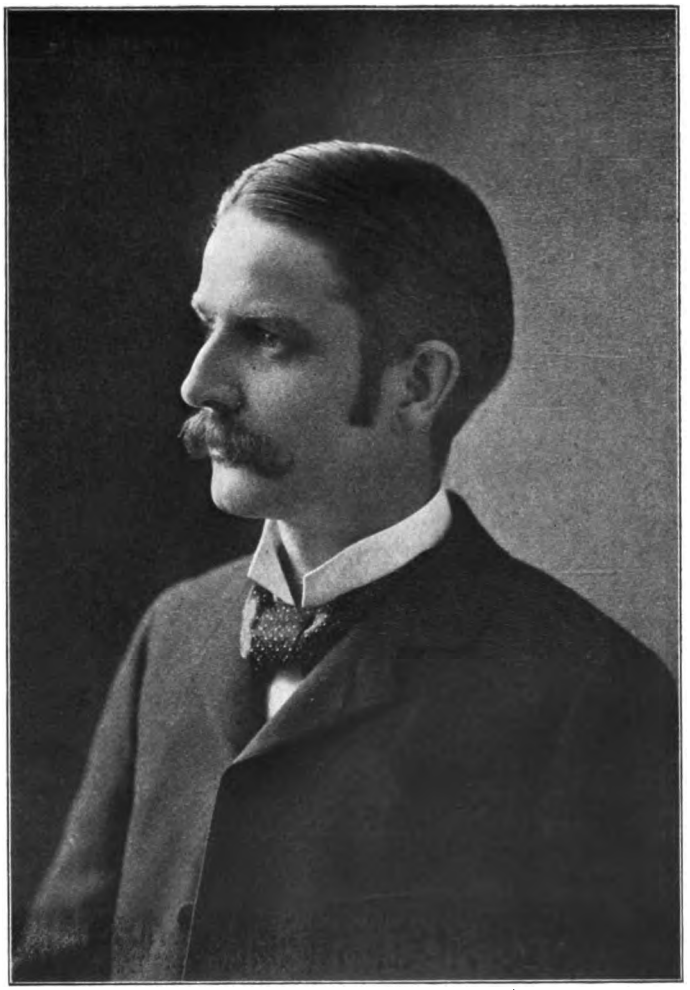

Charles E. Beecher

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# MEMOIR OF CHARLES EMERSON BEECHER*

BY CHARLES SCHUCHERT

One of America's leading paleontologists, and a Fellow of this Society since 1889, in the fullness of intellectual power, suddenly passed away on February 14, 1904. Few men were better prepared for great results and more promising of them for the next twenty years than Charles E. Beecher. Dall has said:

"There is no doubt that in the death of Professor Beecher not only has Yale sustained a serious loss and paleontology a severe blow, but the ranks of those capable of bringing to the study of fossils keen insight and a philosophical spirit of enquiry, guided by principles whose value can hardly be exaggerated, are diminished by one whom science could ill afford to lose."

Like most successful students of organic life, Beecher was a born naturalist. As a boy of twelve years he began to make a collection of recent shells and fossils, continuing to add to this for the next thirty years; so that, in 1899, he was able to present to Yale University, "uncondition-

*Sketches of Beecher have appeared as follows: Yale Alumni Weekly, March 2, 1904, by Bush, Chittenden, Schuchert, and "a graduate student;" Science, March 18, 1904, by Dall; Amer. Naturalist, June, 1904, by Jackson; Amer. Geologist, July, 1904, by Clarke; Museums Jour., London, April, 1904; Geol. Mag., London, June, 1904, by Woodward.

ally," upward of 100,000 fossils. To the Albany Museum he gave his entire collection of land and fresh-water shells, some 40,000 specimens. In the field few excelled Beecher as a collector. To him more than to any other we owe the present methods of washing clay for immature invertebrates as well as of etching silicious fossils from limestone. The Yale collections are rich in such delicate and well-preserved material. Clarke, who often collected with him, stated that "he was the most discriminating acquirer of the unusual, the exceptional, and the fine that it was my fortune to know."

As a paleontologist he was trained in stratigraphy and in the description of species and genera, but latterly he took almost no direct interest in this kind of work. Often he told me that he wished all our fossils were named. This is all the more remarkable because of his long association with Hall and Marsh. The explanation seems to lie in the fact that his philosophic bent did not come to full fruition until he had personally met the philosophic American paleontologist, Alpheus Hyatt. From that time his mind was absorbed in working out the ontogenetic stages in fossil species and in tracing their genetic sequence through the geological formations. To Beecher we owe the first natural classification of the Brachiopoda and the Trilobita, based on the law of recapitulation and on chronogenesis. He also gave a very philosophic account as to the origin and significance of spines in plants and animals. On these works his reputation in days to come will chiefly rest.

Beecher was not only a born naturalist, but also had much mechanical ability. Nothing pleased him more than to free fossils from the surrounding matrix, and his unexcelled talent in this direction is shown in the preparations of *Triarthrus* and *Trinucleus* in the Yale University museum. More than 500 specimens have been prepared by him, and this work has required peculiar skill, patience, ingenuity, and a great deal of time. It is very unfortunate that he did not live to finish his studies on the trilobites, but he left all the better specimens completely worked out, and of most of them he had made photographs and drawings.

Charles Emerson Beecher, son of Moses and Emily D. Beecher, was born in Dunkirk, New York, October 9, 1856. Not long after this date his parents removed to Warren, Pennsylvania, where he prepared for college at the high school, and was graduated from the University of Michigan, receiving the degree of B. S. in 1878. The ten succeeding years he served as an assistant to Professor James Hall. In 1888 he was invited by Professor Marsh to remove to New Haven and to take charge of the collections of invertebrate fossils in the Peabody Museum. His career as a teacher of geology began in 1891, when for two years he took charge

of Dana's classes at Yale, and in 1892 he was made Assistant Professor of Historical Geology in the Sheffield Scientific School, serving in this capacity until 1897, when he became Professor of Historical Geology and a member of the governing board in the Sheffield Scientific School. In 1899 he succeeded the late Professor Marsh as curator of the geological collections, and was made a member of and secretary to the board of trustees of the museum. In 1902 his title was changed to that of University Professor of Paleontology. He was eminently successful as a teacher, both with undergraduates and with advanced students, his enthusiasm and kindliness of character at once arousing their interest and devotion.

Beecher received the degree of Ph. D. from Yale in 1889, his thesis being a memoir on the Ordovician Brachiospongidæ. In 1899 he was elected a member of the National Academy of Sciences and a foreign correspondent of the Geological Society of London. In 1900 he was elected President of the Connecticut Academy of Arts and Sciences, and filled this office for two years. He was also a member of the American Association of Conchologists, Geological Society of Washington, Boston Society of Natural History, and Malacological Society of London.

Some time before Beecher was graduated from the University of Michigan, the desire of his youth to follow as his life's work the study of fossils became a conviction. The year before his graduation he is seen worshipping at the shrine at Albany, where many another paleontologist had preceded him on the same errand. Clarke describes Beecher's introduction at Albany in the following interesting way :

"On a hot summer day in 1877, pale with weariness, he staggered with pack on back into the laboratory of Professor James Hall at Albany. He had sought what to him had seemed the fountainhead of knowledge of his fossils. It had been the goal of many a youthful dream to show to the author of the *Paleontology of New York* the treasures he had found. The great and keen-eyed Hall ever had an appreciative reception for such endeavor. With the most friendly concern he refreshed and nursed this acolyte, and, when strength had returned, expressed a lively interest in his efforts and his ambitions. On going away Beecher had promised to come back to Albany when his college course was done and join Hall's corps of workers on paleontology. So, in the summer of 1878, the year of his graduation, he became assistant to Professor Hall, entered upon his work, and was received with genuine enthusiasm."

Beginning with the summer of 1880 and continuing into 1883, he read, according to a list still extant, more than 18,000 pages of standard literature. During the 10 years with Hall he assisted very largely in the preparation of the Paleontology of New York, treating of the Lamellibranchiata, Gasteropoda, Cephalopoda, and Bryozoa; and to a less extent on the volumes pertaining to the Pteropoda and corals. These were great days of preparation and they bore most valuable fruit later on.

As to his methods of investigation, Clarke says:

"A part of Mr Beecher's fine natural equipment for scientific research was his indomitable patience necessary to establish broad premises. His conclusions were never hasty nor ever stated on merely one aspect of the evidence. All the more far-reaching and striking of his deductions in his later work, when his mind had turned chiefly to problems of biogenesis, are known to his friends to be the result of tireless acquisitions of material and the focussing of light from every source. In some quarters, his methods unknown, their results were not accepted; they were regarded as startling, as iconoclastic, and even unreliable."

During his bachelor days at New Haven he lived in "the attic," a series of rooms fitted up in Bohemian style in old Sheffield Hall, with Penfield, Pirsson, and Wells, all of whom are now full professors. After the day's work the "attic philosophers" met here in delightful intercourse, social and scientific, and it was here that during the late '80's and early '90's many pleasant acquaintances and recollections were acquired with the young scientific men of this and other countries.

Beecher's first paleontologic paper was published by the Geological Survey of Pennsylvania in 1884, when he was 28 years old. It treated of new genera and species of Phyllocarida from the Devonian, a group of rare Crustacea, most of which he found about his home. He was always on the lookout for these rare fossils, and after securing many hundred additional specimens he again returned to the subject, and in 1902, in a paper published by the Geological Society of London, embodied all that is known of the Upper Devonian Phyllocarida of Pennsylvania.

Beecher's first turn from stratigraphic paleontology to pure paleobiology and correlation had its origin in the brachiopods. Hall had assembled some tons of the Silurian fossils occurring at Waldron, Indiana. This collection contained many slabs, and as much loose clay adhered to them, Beecher and Clarke night after night for an entire winter washed this material; eventually they together obtained about 50,000 specimens of young brachiopods, among which were included every stage of development of these shells. Their results were published in 1889 in a well-illustrated paper entitled "Development of some Silurian Brachiopods."

From a study of the nature of the pedicle opening, these authors concluded that the "phylogenetic development tended in two main channels," and this arrangement foreshadowed two orders of brachiopods for which Beecher later proposed the names Neotremata and Telotremata.

My acquaintance with Beecher began in 1889, and at that time it was evident that the paper just referred to was being considered with a better understanding of what Hyatt's principles meant when applied to Brachiopoda. The very fact that nearly all the Waldron, Indiana, brachiopods began with smooth shells having a subcircular outline led him to look

for this early stage in other genera, but as no other young shells were at hand, he resorted to a study of the beaks in well-preserved examples of mature shells. In the spring of 1891 he announced that he had seen the initial shell in 15 families representing 40 genera.

A study of the stages of growth in many brachiopods, from the Cambrian to the living forms, enabled Beecher to show that the old classifications were not expressive of genetic relationship. He demonstrated that on the basis of types of pedicle openings all brachiopods are naturally grouped into four orders, of which two are without, and two possess hinge teeth. The most primitive order (*Lingula*, etcetera) he named Atremata, and this gave rise directly to the Telotremata (*Rhynchonella*, *Terebratula*, etcetera). The Neotremata (*Crania*, *Discina*, etcetera) also originated in the Atremata, and from the former descended the Protremata (*Strophomena*, *Productus*, etcetera).

In 1893 there was discovered in the Utica formation near Rome, New York, a thin band in which nearly all the trilobites occur as pseudomorphs in iron pyrite and retain antennæ and legs. Trilobites with legs had been known before in two specimens and in four genera. Walcott determined the presence of legs by slicing enrolled individuals. Antennæ, however, had not been clearly made out until 1893, when their presence was announced by Matthew in the August number of the American Journal of Science. This discovery was of great value and promised much toward a better understanding of the ventral anatomy of trilobites and their systematic position among the Crustacea. Beecher was thus led to visit the locality in 1893, when he took out several tons of shale; since then he has published fifteen papers on trilobites. Of these, three are devoted to the larval stages, seven to the ventral anatomy, and five to the classification and systematic position of these forms.

Beecher showed that in *Triarthrus* the entire series of thoracic legs are biramous, one being setæ-bearing and used for swimming and the other without setæ and used for crawling. The limbs of the pygidium overlap each other, are much crowded, and are adapted for swimming or guiding the animal, although they may also have served as egg-carriers. The head has five pairs of appendages, four pairs of which are biramous and closely resemble the thoracic legs.

He also observed that in the first or unsegmented stage of the most primitive trilobites there are neither dorsal free cheeks nor eyes, but that in some of the later forms both the eyes and free cheeks have migrated to the anterior margin or may even have progressed a little posteriorly down the dorsal side of the first or unsegmented stage. This led him to undertake a study of all trilobite genera, more than two hundred in number, and it was seen that these could be arranged in three groups or

orders on the basis of the nature and position of the free cheeks. These orders he named Hypoparia, Opisthoparia, and Proparia.

In 1892 he became greatly interested in the significance of spines, accumulating data until 1898, when he presented his studies in a paper entitled "The origin and significance of spines." This paper he regarded as his best and most philosophic work. He found that all kinds of spines in plants and animals can be arranged into eleven distinct categories. Further, that two generalizations result, as follows:

> "That spinosity represents the limit of morphological variation, and, second, that it indicates the decline or paracme of vitality." . . . "Finally it is evident that, after attaining the limit of spine differentiation, spinose organisms leave no descendants, and also that out of spinose types no new types are developed."

Beecher's standing among biologists and paleontologists was high; he was a leader among students of Brachiopoda and Trilobita, and Jackson has said that he "became the leader of the Hyatt school." He had the artist's gift, nearly all the drawings illustrating his various papers being made by himself and exhibiting a high order of merit. He was a slow and very careful worker. Those who knew him well saw in him an enthusiast, but his exuberance was always held in check by his judicial qualities, which also made him an excellent counselor. He was orderly in his work, and, as he had the "museum instinct" well developed, he made one of the best of curators.

In 1894 Beecher married Mary Salome Galligan, of Warren, Pennsylvania, who, with two daughters, survives him. He died very suddenly, of *angina pectoris*, at his home, shortly after 1 o'clock on Sunday afternoon, February 14, 1904. Up to about 11 o'clock of the same day, he was in his usual health. He lies in Grove Street cemetery, in the shadow of the Sheffield Scientific School.

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