so well suited to studies of this kind as are the pigeons. The elaborate courtship, the fidelity of the individuals to each other, the mating and nesting habits, the part taken by the female and the male in incubation, the feeding instinct of old and young, the weaning and the rythmic sequence of broods offer a fascinating opportunity to the student of animal behavior. Whitman obviously had in view a large program toward the accomplishment of which he had progressed much further that these notes indicate. Some of the lines of work opened up by him have been pursued successfully by his students Professor Craig and Dr. Riddle, but according to their statement his knowledge far outstripped that of any other observer in this field. The many observations here recorded are clearly only the material out of which, in time, he had expected to link up the evolution of instincts with the study of the evolution of structure and color. "If Professor Whitman had completed his work, he would have produced an extensive treatise on the phylogney of the pigeon group. . . . The voices and the behavior of the various species would have been used, like the color patterns, to throw light on the relationships, derivation and method of origin of pigeon species" (Craig and Riddle). According to Carr, Whitman developed "what one may term an orthogenetic conception of instinctive development. Instincts are not novel and unique constructions which spring, without ancestry, into being; rather each new instinct is but a slight modification or organization of tendencies already in existence." When one sees how vital the instincts are for the existence of the species it is probable that however the changes originated the advances would most probably be those involving only slight modifications of intincts already in action.

The Carnegie Institution and equally Dr. Riddle are to be sincerely congratulated on having preserved for American zoologists the last great work of Whitman. The wonderful colored pictures, almost entirely the work of the Japanese artist Hyashi, are marvels of beauty and accuracy, and stand for the minute attention that Whitman demanded at every stage of his work. The same attention to detail is shown in Whitman's early work on cell-lineage, on the leeches of Japan, and on the embryology of fishes, and explains in part his far reaching influence on American zoologists. It is rare to find combined such delicacy in treatment of detail with the sweep of philosophical interpretation of which Whitman was equally master.

Whitman stood at the parting of the ways. We may regret that he did not enter into the new era that even at that time was opening up its far reaching vistas, but this need not blind us to the fine example he set—an example of unworldly devotion and absorption in his work, of self-criticism made possible by simplicity and honesty of character, of fairness that led him to appreciate and to state accurately and kindly the opinions of others with whom he disagreed heartily.

T. H. Morgan

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A PALEONTOLOGIC REVIVAL AT YALE UNIVERSITY

Othniel Charles Marsh was appointed professor of paleontology at Yale in 1866, this being the first time such a chair was established at any university He was unquestionably one of America's leading men of science, and in vertebrate paleontology "he stood without a peer." He had collected fossils long before his graduation from Yale in 1860, and after taking the doctorate at Heidelberg, he became deeply interested in the wonderful array of extinct vertebrates that the U. S. Geological and Geographical Survey of the Territories was finding in the "bad lands" of Nebraska. In the meantime, his uncle, George Peabody, had founded at Yale the Peabody Museum of Natural History, though the building was not erected until 1875. Marsh saw the great western wilderness for the first time in 1868, going over the Union Pacific into Nebraska and Wyoming. In 1870 he fitted out the first Yale College Scientific Expedition, and took west with him twelve enthusiastic students. From this time the flood of boxes shipped to the university grew annually greater and greater. In 1899 Pro-

fessor Beecher said of these collections: Professor Marsh "brought forth in such rapid succession so many astonishing things that the unexpected became the rule. The science of vertebrate paleontology could not assimilate new material so fast. . . . The constant stream of vertebrate riches which, from 1868 to 1899, flowed into the Peabody Museum from the Rocky Mountain region had a similar bewildering effect upon Marsh, for it was impossible for him to do more than seize upon what appealed to him as the most salient. As a collector Marsh was seen at his best, and the collections he amassed during his forty-five years and more of activity in this direction form a lasting monument to his perseverance and foresight."

In Marsh's day, Peabody Museum was a very busy place, with a large staff unearthing and preparing the collections so that the master mind might make the treasures known to science. At least 400 new species and 185 new genera were described in abbreviated form previous to 1896, mainly in the *American Journal of Science*. In 1892 came the first check to his activity, and Marsh had to let go a considerable portion of his staff. He was then sixty-one years of age, but he struggled on, thinking that somehow he could describe the great mass of still unknown animals assembled in the museum, and make them fully known in large monographs Seven years later the Great Reaper took him, with his work still undone.

Professor Charles E. Beecher took up the work after Marsh's death, but he had no one to assist him in unearthing the collections except two preparators. Even under these conditions, however, the public were shown for the first time the skeletons of some of the wonderful animals of the past mounted as they appeared in life. The exhibition collections grew apace, and long before Professor Schuchert succeeded Beecher in 1904, they had outgrown the building. Two years later Professor Lull was added to the staff. Now we have mounted or ready to mount so many of our treasures that we are yearning for the new Peabody Museum, to take the place of the original building which was destroyed in 1917 to make way for the Harkness dormitories.

Professor Marsh left $30,000 "to be expended by the trustees of said Peabody Museum in preparing for publication and publishing the results of my explorations in the West." The trustees have heretofore held that only the income of this fund should be used in this way. However, having only this income to devote to the Marsh Collections, it was but natural that progress should be slow. We have now come to realize this fully, and the recognition has brought use to a new turn in the administration of the collections.

As it was evidently Professor Marsh's wish that both the income and the principal of the "Marsh Publication Fund" should be used in work on his collections, the trustees of the museum have recently decided to spend as much of the fund as will be required to make known the collections. The study of the Marsh material is therefore progressing far more rapidly than it has at any time since the donor's death. We have now on the staff of the museum, working under the guidance of Professor Lull, besides the two preparators, the following research associates: Dr. George F. Eaton and Assistant Professor John P. Buwalda, who give us half their time, and Drs. Edward L. Troxell and Malcolm R. Thorpe, who devote all their time to the Marsh collections.

In unearthing the unknown in science, no one can predict what the results will be, or how quickly they will be forthcoming, but we trust that in this case they will be abundant and timely. In working out the new things, however, we have also to consider the old ones, which, viewed in the light of the knowledge of to-day, were inadequately described. How vast are the treasures that Professor Marsh has left us is not even at this time fully known to the curators, but if it should take from ten to twenty years more to complete the description of the fossil vertebrate material assembled by Professor Marsh, Yale will but be the richer scientifically.

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