VOL. V. No. 2.

THE JOURNAL

OF THE

CINCINNATI SOCIETY OF NATURAL HISTORY.

JULY, 1882.

CINCINNATI:
PRINTED BY JAMES BARCLAY, 269 VINE STREET.

*CHARLES ROBERT DARWIN.**

By Joseph F. James.

There has passed away, within the last few weeks, one of the most eminent, and one of the greatest men which our century has so far produced. A man who is perhaps better known, at least by name, than any other. A man whose influence in science and upon scientific thought has been most profound. And a man who should be admired as a teacher, an experimenter, and an investigator. We as cultivators and students in the wide domain of Natural History, should lay a tribute of respect upon the grave, and honor the name of Charles Robert Darwin.

He was born at Shrewsbury, England, on February 12, 1809, and was, therefore, at the time of his death, in his 74th year, having exceeded by a little the three score years and ten alloted to the life of man. He was the worthy grandson of the justly celebrated Erasmus Darwin, in whose writings, the "Botanic Garden" and "Zoonomia," were shadowed forth the theories which the eminent and talented descendant was destined to bring so prominently before the eyes of the scientific world.

Mr. Darwin began his investigations into natural science at an early age, and after completing his college course at Cambridge, volunteered his services as naturalist to H. M. Ship "Beagle," then about to sail on a voyage round the world. This was in 1831, and it was while upon this voyage that Mr. Darwin made observations which brought him prominently before the notice of the world. His observations upon the "Structure and Distribution of Coral Reefs,' was the first of a long series of works of permanent value. In this book he first propounded the theory that the Coral islands of the South seas were the result of the subsidence of the land, thus enabling the zoophytes to build up the reefs, as the land sank, to the surface of the water, and forming those beautiful "atolls," or coral-encircled lakes, which are one of the beauties of the Pacific ocean. His observations upon general natural history were embodied in that most charming of all works of travel, "A Naturalist's Voyage Round the World." This book has been read and enjoyed by thousands who know but little of his other writings, and is certainly one of the most fascinating narratives, and at the same time one of the most instructive ones which has ever been written. Its immense popularity has been shown by the

* Read May 2d, 1882.

many editions it has gone through, and by its having been adopted as a book for children, by putting the narrative into simple language.

In 1846 was published his "Geological Observations upon South America," a volume of 268 pages, which was one of the results of his voyage in the Beagle. His monograph of the sessile and pedunculate Cirripedia, with figures of all the species, was published in two parts in 1851 and 1854, and is replete with interesting and valuable notes upon their life history. Another monograph, on the Fossil Lepadidæ of Great Britain, was published by the Palæontological Society of England in 1851, and these works show Mr. Darwin to have been as great an authority in special branches as he has since been recognized to be in the wide field of Biology.

It was while upon his voyage round the world, that Mr. Darwin first had suggested to him the ideas afterward embodied in his "Origin of Species," and from the time of his return from his first and only long journey, in 1836, until his death, he was engaged in work which tended to confirm and establish his first ideas. It was the reading of the celebrated treatise of Malthus on "The Principles of Population," which originally directed his ideas toward the matter of the "Struggle for Existence," which forms so prominent a part of his great theory. When the "Vestiges of Creation" first appeared, in 1844, an epoch began which will be long remembered in the history of science. Although about 1830 the great Cuvier had ridiculed and vanquished his opponent Geoffroy St. Hiliare, before the Paris Academy of Sciences, the theories of Lamarck and of St. Hiliare had their influence upon thinking men. Though many of the ideas were crude and improbable, they contained germs of truths which were afterward fully elaborated.

For twenty years previous to the publication of Mr. Darwin's "Origin of Species," the work by which he is most widely known, he was engaged in collecting facts and making observations into the natural history of the animal kingdom. His friends, Sir Charles Lyell, and Sir Joseph Hooker, names which will descend to posterity with no small amount of fame attached to them, were cognizant of his labors in this field, and repeatedly urged him to make an abstract of his observations for the benefit of science. This he had as often refused to do, not being satisfied with the materials at his command. But in 1858, Mr. Alfred Wallace, then traveling in the Malay archipelago, sent home an article "On the Tendency of Varieties to depart indefinitely from the Original Type," with the request that if thought worthy it be read before the Linnean Society. Then Mr. Darwin was induced

to prepare a short paper giving a digest of his views on the subject. Both of these papers were read at a meeting of the Linnean Society, and appear in a volume of the Transactions. They created no stir except among scientists, for people at large did not know of their full significance. This paper was the prelude to the publication of the "Origin of Species," the first edition of which is dated Nov. 24, 1859.

It was a fire-brand thrown into a mass of inflammable material. It ran through an edition of thousands in a few months. A second (in March, 1860) and a third appeared, and the world was taken by storm. Advocates and opponents appeared on all sides. Invectives and praises were showered upon the author from all quarters. Nearly the entire body of the clergy rose against him, and from pulpit and sanctum, at home and abroad, he was ridiculed and abused. But his advocates took up the gauntlet, and the battle has raged ever since. One of his earliest and most ardent admirers was Prof. Huxley, who joined issue with the detractors, and threw his weight into the scale of Darwin. In a review of the book, Prof. Huxley, after referring to the hostility always shown by the clergy to every advance made in science, said: "Extinguished theologians lie about the cradle of every science, like strangled snakes beside that of Hercules; and history records that whenever science and orthodoxy have been fairly opposed, the latter has been forced to retire from the lists, bleeding and crushed if not annihilated, scotched if not slain." And the result has been the same in this conflict as in all the others; and now, when the theory of Mr. Darwin has been all but proved, many of those who were originally its opponents have become its staunch advocates.

It is needless to go into an account of the theory of the "Origin of Species." It is well enough known to science, though, perhaps, imperfectly so to its opponents generally. There can be but little doubt but that the publication of this book marks an epoch in the history of the human intellect. It came at a time when the world was ripe for it, and when the slightest impetus drove it onward and upward with a force which is gathering strength day by day. Now, but twenty-three years after the first public announcement of the theory, it receives the avowed sanction of nearly every scientific man in the world, and of thousands who know of science but by hearsay. It has been translated into the French, German, Dutch, Italian, Russian and Japanese languages. It is a triumph which has been achieved by no other book which has appeared in this century. It has effected such a change in thought, it has given such an impetus to scientific investigation, that

its effects must be felt for all time to come. Its influence in directing research toward the natural sciences, and its effect upon the whole world has been such, that when the descendants of this generation, as the poetical Tyndall puts it, "shall have melted into the infinite azure of the past," the decade in which Charles Darwin's "Origin of Species" appeared, will form as bright an epoch in natural science as the age of Shakespeare in Dramatic Literature, as the discovery of America in History, or the advent of Christ in theology. And though the subject of this notice has received most of the honor gained by the publication of the theory, his co-discoverer and worker, Mr. Wallace, is entitled to a full share of the honor. With a generosity unhappily seldom known in science, he urged Mr. Darwin to bring the theory before the public in a worthy manner, while he himself stood in the background.

The "Origin of Species" was the first of a long series of books and papers upon matters intimately connected with the theories of natural selection and the struggle for existence. In 1862 appeared a volume "On the Various Contrivances by which British and Fore gnOrchids are fertilized by Insects, and on the good effects of Intercrossing"—a second edition, with many additions, being issued in 1877. This is a book full of interesting facts, told in a fascinating manner, and showing the benefits derived from occasional crossing. It is but one instance of the wonderful power of Mr. Darwin in observing, recording and commenting upon things which to other eyes would be unseen or inexplicable. In the hands of Mr. Darwin order is brought out of chaos, and what would under other circumstances be a mere jumble, is through the medium of his pen a work of lasting value.

He contributed various articles relating to the fertilization of plants, and the forms of flowers to different periodicals, but especially to the Transactions of the Linnean Society. These were afterwards republished with much additional matter in separate volumes. But in 1868 appeared the "Variation of Animals and Plants under Domestication," two volumes of over 800 pages, which contain innumerable facts, and the details of many experiments. A glance at the table of contents of these volumes gives a slight idea of the amount of labor necessary to prepare the work. Over one hundred pages are devoted to pigeons alone, and such marvelous changes are noted in the plumage, and in the structure of all parts of the skeleton, that the reader is astonished when told that all the 150 breeds of our domestic pigeons are descended from a single species, and is nearly ready to believe from facts there given, in the theory of the origin of one species from another.

This book was followed by another in 1871, in two volumes, on the "Descent of Man." Though Mr. Darwin, in his "Origin of Species," drew no direct conclusions as to the relation in which man stood to the rest of the animal kingdom, still the relationship was implied and well known. But now he applied the facts he had collected in relation to animals to the human race, and the "Descent of Man" was the result. He brought forward in the second part, the subject of Sexual Selection, a matter which had not until then been treated in any way completely. Another uproar was created by this book, for while many naturalists were willing to allow the descent of animals with modifications, they stopped at man, and contended that his origin was on a higher plane.

Then followed in 1872, as a sequel to this book, one on the "Expression of the Emotions in Man and Animals." Mr. Darwin had found that in order to satisfy himself and the public in regard to the close relationship of man and the higher classes of animals, that he must study the expression of the emotions, and in this volume he gives the facts he collected. He was indefatigable in his work. He studied in infants, in the insane, in paintings and sculptures, and in animals, the expressions and actions when under the influence of various feelings and passions. Further, in order to find whether the same gestures and expressions prevailed among savage races as were to be seen in civilized man, he had printed a set of sixteen or more questions which were sent for answers to various parts of the world. From all these sources Mr. Darwin gathered his information, and incorporated it in a work which takes as high a rank as the celebrated treatise of Sir Charles Bell on "Expression," for the contradiction of which it was, in fact, intended.

His next work was on "Insectivorous Plants," a volume of 450 pages, filled with details of experiments on various species of Drosera, on Dionæa, and other plants. This book is a marvelous production, not only because of the nature of the facts given, but from the methods by which they were ascertained, and it stands as a lasting monument to the patience of the man. As an example of the delicacy of the investigation, and of the accuracy of his methods, it is stated that a particle of cotton thread only $\frac{8}{1000}$ of an inch in length, and weighing $\frac{1}{78740}$ of a grain, was experimented with; and that the absorption of a particle of carbonate of ammonia weighing only $\frac{1}{134400}$ of a grain caused the tentacles of a leaf of Drosera to become inflected. Think of the patience of a man who could measure and weigh and experiment

with particles of matter so minute. And still it is only a sample of the pains-taking qualities of Mr. Darwin, and an example of his accuracy in research.

This book was followed at close intervals by six others, all on Botany, and treating of "Climbing Plants" (1875); "The Effects of Cross and Self Fertilization in the Vegetable Kingdom" (1876); "The Different Forms of Flowers on Plants of the same Species" (1877); A second edition of the "Fertilization of Orchids" (1877); "The Power of Movement in Plants" (1880); and lastly, during the past winter, by one on "The Formation of Vegetable Mould through the Action of Worms." All of these are full of new and interesting facts, and of new experiments, bringing to light things before unthought of, and creating in the minds of readers a thirst for more, and a desire to study and see for themselves the matters there treated.

In summing up an estimate of Mr. Darwin's work in science, we are profoundly impressed with his versatility. He was a geologist, as his "Observations on South America Geology," and upon "Volcanoes," will testify. He was a palæontologist. He was a biologist without a peer. His works upon the Cirripedia, and on Coral Islands, show a profound knowledge and wonderful observing power. His volumes on Botany, on Orchids, on Insectivorous Plants, Various forms of Flowers, Variation of Animals and Plants, show him to have been an observer of nature, and an experimenter without a rival. One who with an eye for everything, found nothing too insignificant to notice; and one who saw the meaning of matters which to another were meaningless. He was patient in his observations, never giving prominence to anything but what was worthy. He never allowed his judgment to be warped. He was fearless in stating facts, no matter what might be the conclusions drawn from them, honest in acknowledging his errors, and courteous in noticing the remarks of others. And as Prof. Gray says: "Mr. Darwin's evident delight at discovering that some one else has 'said his good things before him,' or has been on the verge of uttering them, seemingly equals that of making the discovery himself. It reminds one of Gœthe's insisting that his views in Morphology must have been held before him, and must be somewhere on record, so obviously just and natural did they appear to him."* His "Origin of Species," putting aside all theoretical deductions, is a perfect encyclopædia of facts; it is a condensed manual of observations made during

* Nature X., p. 80, June 4, 1874.

twenty years of study and investigation. It is a book to be read and re-read, and in which something new will be found at each perusal. His "Descent of Man," taken in connection with his "Expression of the Emotions," proves beyond a doubt, that between the bodily features and mental powers of animals and man, there exists only a difference of degree.

Mr. Darwin never was a man of robust health, and many of his recorded observations were made while confined to the house. Fortunately he leaves behind him sons, who have already done much toward the increase of human knowledge, and upon whom it is hoped, but can hardly be expected, the mantle of the father has fallen. Taking Mr. Darwin's work as a whole, it constitutes a contribution to science, and a monument to himself, which will be a lasting one. And even if the Darwinian theories of natural selection, and the struggle for existence should fall to the ground, his work will be remembered. It will make him live in the memory of mankind as long as science holds a place upon earth. Charles Robert Darwin is dead, but his spirit, and the life which he has infused in the whole scientific and material world survives him, and will continue to animate students for all time to come.

NOTICE OF THE WORK OF PROF. J. D. WHITNEY ON "THE CLIMATIC CHANGES OF LATER GEOLOGICAL TIMES."

By S. A. Miller.

The second part of the very excellent work by Prof. J. D. Whitney on climatic changes, has appeared in the memoirs of the museum of comparative zoology, at Harvard College. It is no doubt the best considered work that has been published in America upon this subject, and withal is very readable. In view of the statements so repeatedly made at the late Forestry Convention held in our city, that the destruction of forests produces important changes in the climate, a dessication of the earth, and the ruin of the people, it will not be uninteresting to some of our readers to know that this whole subject has been treated by an eminent scientist, who has shown that the cutting away of the forests has no such effect, that man has not been able to effect a noticeable change in the climate of any region, and that the