

cal studies were concerned, as completely as at Edinburgh, and at school." But however little he may have owed to the academic teaching offered at Cambridge, there cannot be the least doubt that through the friendship he there formed with Professor Henslow, the Professor of Botany, he came under the influence which determined, and may almost be said to have directly carved out, his future career. Darwin himself recognized this most fully. The direction of his energies and interests into the channels of Natural History was due to Henslow's teaching, encouragement and advice. The only exception to his general condemnation of lectures is made in favor of Henslow's, of which he says: "I liked them much for their extreme clearness and the admirable illustrations, but I did not study Botany." He then adds a picture which there is room for copying at the present day when the laboratory has to such a serious extent usurped the place of the fields and the hills: "Henslow used to take his pupils and several of the older members of the university on field excursions on foot, or in coaches to distant places, or in a barge down the river, and lectured on the rare plants and animals which were observed. These excursions were delightful." To give Darwin's own estimate to Henslow's influence, I again quote the former's words: "A circumstance which influenced my whole career more than any other was my friendship with Professor Henslow. Before coming up to Cambridge I had heard of him from my brother as a man who knew every branch of science, and I was accordingly prepared to reverence him. \* \* \* Before long I became well acquainted with Henslow, and during the latter half of my time at Cambridge took long walks with him on most days."

Towards the end of his time at Cambridge, Darwin was persuaded by Henslow to begin the study of geology, which he soon attacked in a practical manner, for on returning to Shropshire he examined sections and colored a map of parts around Shrewsbury. In the succeeding summer he had the advantage, through the kindness of Professor Henslow, of accompanying Professor Sedgwick on a geological excursion in North Wales. "This tour," writes Darwin, "was of decided use in teaching me a little how to make out the geology of a country."

There occurred one little incident during Darwin's last year at Cambridge which, I think, may be rightly judged as having an important influence upon his mind. At the time he was reading with profound interest Humboldt's Personal Narrative, and it stirred up in him an ardent desire not only to study, but also to visit scenes such as were described so graphically by the great traveler. Judging from the not infrequent references to Humboldt in his works, one can plainly see that the effect thus produced was not merely fleeting but left an indelible impression, and must be ranked as one of the forces which, acting on his mind, enabled him to achieve the great work of his life. Of patient and persevering observation and invincible determination to overcome obstacles, he had in Humboldt a splendid example.

#### The "Beagle" Voyage.

And now all the non-official influence of Edinburgh and Cambridge—Grant and MacGillivray, Henslow and Sedgwick and Humboldt, not omitting the negro bird stuffer at Edinburgh—had prepared him—had so educated him that

he was capable of accepting an offer which was the great determining factor in his life. I of course refer to the offer made to him to join the government ship "Beagle" as naturalist. We must not forget that he owed this offer to the recommendation of Henslow. A first his father opposed his going, but his uncle, Josiah Wedgwood, persuaded him to withdraw his opposition, and Darwin went to London to see Captain Fitzroy, the commander of the "Beagle." Fitzroy, as an ardent disciple of Lavater, was at first disposed to decline Darwin's services on account of the shape of his nose. Eventually however, this objection to the naturalist seems to have been abandoned.

The importance of the voyage of the "Beagle" is best described in Darwin's own words. He says, "It has been by far the most important event in my life, and has determined my whole career; yet it depended on so small a circumstance as my uncle offering to drive me thirty miles, which few uncles would have done, and on such a trifle as the shape of my nose."

"I have always felt that I owe to the voyage the first real training or education of my mind. I was led to attend closely to several branches of natural history, and thus my powers of observation were improved, though they were always fairly developed." And again, some years afterwards, in a letter to Fitzroy—"I think the 'Beagle voyage' far the most fortunate circumstance in my life. I often have the most vivid and delightful pictures of what I saw on board the "Beagle" pass before my eyes. These recollections, and what I learnt of natural history, I would not exchange for twice ten thousand a year."

The knowledge, experience and habits acquired through the constant collection, observation, dissection and comparison, and the careful description of what he saw—so well known to readers of "the Voyage of a Naturalist"—gave him the material and the power for the production of the great work which brought him so much fame in after years. He acquired the habit of concentrating his attention upon whatever work he was doing. Everything about which he thought or read was made to bear directly upon what he had seen, or was likely to see, and this habit—one which it is quite difficult to acquire—continued during his whole life. "I feel sure," he says, "that it was this training which enabled me to do whatever I have done in science."

#### Sir Charles Lyell.

It was during this voyage that he came under the influence of the second great scientific force, counting Professor Henslow as the first— I mean the geologist, Sir Charles Lyell. Darwin took with him on board the "Beagle" the first volume of Lyell's Principles of Geology, just published (1830) and he says that the book was of the greatest service to him in many ways. The many successful geological observations made by him, and palaeontological discoveries, were no doubt due to the interest and teaching of Lyell's great book. A remark of Darwin's brings this out very strikingly. "The very first place which I examined," he writes, viz: St. Iago in the Cape de Verde Islands, showed me clearly the wonderful superiority of Lyell's manner of treating geology, compared with that of any author whose works I had with me, or ever afterwards read." Again, in a letter to his cousin, Fox, written in 1835, he says—"I am become a zealous disciple of Lyell's views as known in

his admirable book, "Geologizing in South America;" I am tempted to carry points to a greater extent even than he does." The influence of Lyell on Darwin personally, and as an unconscious and even unwilling forerunner in the spread of the doctrine of evolution, can hardly be over-estimated; but to that point I shall refer later on.

After an absence of five years, the voyage of the "Beagle" came to an end, and in October 1836 Darwin was once more in England. In the following December he went to Cambridge, and resided there until the next spring.

After leaving Cambridge in 1836, until his marriage in 1839, he lived in London, being engaged upon the preparation of his Journal of Travels. In 1837, the Chancellor of the Exchequer granted £1,000 for publication of a volume to be called "The Zoology of the Voyage of the Beagle." During this time Darwin was elected secretary of the Geological Society, and he saw a great deal of Lyell, who no doubt exerted a stimulating influence upon his mind in the direction of making him persevere with his natural history and geological work. He also met quite often Robert Brown, the well known botanist. "I never expected my geology," writes Darwin, "would ever have been worth consideration by such men as Lyell, who has been to me since my return a most active friend."

Darwin was even at this early period so chronically subject to ill health that in 1842 he decided to leave London and settle in the country. Hence it was that in this year he settled at Dawn, a very retired spot in the county of Kent, where he ever afterwards lived, and, sad to say, in the same bad state of health.

In this same year (1842) his work on Coral Reefs was published. Of it Sir Archibald Geikie has said, "This treatise, the most original of all the author's geological memoirs has become one of the classics of geological literature. \* \* \* No more admirable example of scientific method was ever given to the world, and even if he had written nothing else, this treatise alone would have placed Darwin in the very front of the investigators of nature."

On the publication of a second edition of the "Journal of Researches" he wrote an important letter to Lyell. I once more quote Darwin's own words because they support what I am thoroughly convinced of, viz:—that the great geologist was one of the chief forces which made Darwin what he afterwards became. Having expressed a wish to dedicate the work to Lyell, Darwin writes: "I have long wished, not so much for your sake as for my own feelings of honesty, to acknowledge more plainly than by mere reference, how much I geologically owe to you. Those authors, however, who, like you, educate people's minds as well as teach them special facts, can never I should think, have full justice done them except by posterity, for the mind thus insensibly improved can hardly perceive its own upward ascent. \* \* \* Pray do not think that I am so silly as to suppose that my dedication can any way gratify you, except so far as I trust you will receive it as a most sincere mark of my gratitude and friendship."

The eight years from 1846 to 1854 were chiefly occupied on one work, and that the one least known to the general public, because it is the most technical of all his publications. This is a "Monograph on the Cirripedia," or Barnacle family. I draw attention to it because I consider it one of the great education-