building corals as far down as the reef extends; if, on the other hand, Sir John Murray's explanation make a nearer approach to the truth, layers of chalky ooze will be present at depths greater than that of the limit of coral growth (Fig. 25).

No one who has any notion of the extraordinary thoroughness with which Darwin attacked this as every other problem that he investigated, will be at all surprised to learn that the same solution had already occurred to him, and in a letter to A. Agassiz (May 5, 1881) he sighs for "some doubly rich millionaire, who would take it into his head to have borings made in some of the Pacific and Indian atolls, and bring home cores for slicing from a depth of 500 or 600 feet." As the wished-for millionaire did not appear to be forthcoming, it appeared to me that the boring might be achieved in another way, by a method very familiar to this Association—I allude, of course, to a "Committee." On approaching Professor Bonney with a suggestion to this effect he warmly entertained the proposal, and in 1891 a strong Committee, including the most distinguished supporters and opponents of Darwin's theory, was formed, having for its object the investigation of an atoll by boring and other means.

Through the kind offices of Professor Stuart, of Sydney, we obtained from the Government of New South Wales the offer of the free loan of a diamond drill. Our next step was to select an island for investigation. This was rendered an easy task through the invaluable assistance afforded by Admiral Wharton, whose extensive knowledge of coral-reefs renders him one of the most formidable of Darwin's opponents. At his suggestion our choice fell on Funafuti, one of the Ellice or Lagoon Islands, situated in the middle of the Pacific (lat. $8\frac{1}{2}^{\circ}$ S.), seven days' sail northwards of Fiji. No better selection could possibly

and yet this would scarcely show greater wisdom than the procedure of the geologist who, from a knowledge of the earth's history during the past few thousand years, should endeavour to deduce from it the rate of events during 30,000,000 of years in the past!

Dr. Buckland was succeeded by Professor Phillips, a man of most varied genius, a classical scholar, an expert mathematician, an omnivorous reader, facile both with pencil and pen, interested in all science and a master in his own. He taught in this University for more than twenty years, and during that period he enriched our science by numerous contributions of the highest value. A smooth and easy progress marked the course of geology, and knowledge steadily enlarged its bounds. The great Cetiosaurus, one of the greatest of the old-world monsters, larger even than the great Iguanodon which is now represented in our museum, we owe to him. Towards the end of his career, geology, like all other science, was confronted by the reappearance of an old and discredited doctrine, but now presented afresh with new and startling vigour; it was the doctrine of evolution as expounded in the famous "Origin of Species by Natural Selection." Once more an Oxford professor was called upon to pronounce judgment on one of those momentous questions which arise from time to time to disturb the steady current of established thought.

Darwin's present of a copy of his book was accompanied by the following letter:—

"MY DEAR PHILLIPS,—I have directed Murray to send you a copy of my book on the 'Origin of Species,' which as yet is only an abstract. I fear that you will be inclined to fulminate awful anathemas against it. I assure you that it is the result of far more labour than is apparent in its present highly condensed state. If you have time to

read it, let me beg you to read it all straight through, as otherwise it will be unintelligible. Try not to condemn it utterly till you have finished it and reflected on the recapitulation. Not that I am so foolish as to expect to convert any one who has long viewed the subject from an opposite point of view. I remember too well how many long years my own conversion took. The utmost which I hope is that you may see that more can be said on the side of mutability of specific forms than is at first sight apparent. If, indeed, your own observations have made you at all sceptical on the subject, then my book may produce some effect. . . .

"Yours very sincerely,

"CHARLES DARWIN."

Phillips had for a long time previously given careful attention to the "Succession of Life on the Earth," and had chosen this subject for the Read lecture, which he delivered before the University of Cambridge, shortly before the appearance of the "Origin of Species."

His pronouncement on Darwin's work was adverse. "Dead against," as Darwin wrote. His opinion as expressed in a letter to Darwin, of which he did not preserve a copy, called forth the following reply :—

"ILKLEY WELLS HOUSE,

"OTLEY, YORKSHIRE, 26*th November*, 1859.

"MY DEAR PHILLIPS,—Thank you for your note. Permit me to say one word about my book. Though many facts in palæontology may appear, or be really, opposed to my notions, and though my explanations may be quite fallacious, I earnestly beg you to consider whether a theory wholly false would explain, as it seems to me to explain, several classes of facts—as affinity of inhabitants of islands to nearest continent; the nature of the inhabi-

tants of oceanic islands; the affinities and classification of organic beings and their arrangement in groups; the strange fact of a member of one group being adapted to the habits of another group; the facts of morphology or homology; embryology and rudimentary organs. If you think the theory of Natural Selection does not to a large extent explain these classes of facts, I have not a word to say. Pray forgive me saying a word in favour of my own offspring to one whom I consider an important judge.

"Yours very sincerely,

"C. DARWIN."

That Phillips betrayed no bigoted opposition to the doctrine of evolution is shown by several attempts which he himself subsequently made to construct a phylogeny of different groups of animals from a knowledge of their fossil remains; but while he succeeded in tracing several interesting lines of descent among species, he confessed himself unable to bring the more widely-separated groups or genera into an ancestral connexion. Since these early attempts of Phillips, we have learned not only to affiliate species and genera, but even families and orders, and the frequent discovery of missing links offers the most striking testimony to the truth of the theory of evolution.

That Phillips was thoroughly justified in his position towards evolution is suggested by the fact that even Huxley, the most philosophic advocate of the theory, fully admitted that at the time of publication of the "Origin," palæontology lent to its doctrine no support.

An argument which evidently had great weight with Phillips, in his rejection of the theory of natural selection, was the excessive duration that it postulated for geological time. This still remains an argument of weight, so that some biologists impressed with the vast periods which the Darwinian theory demands for its