gists will not ignore the facts because the conclusions seem improbable, as they so long ignored facts proving the antiquity of man for no other reason.

A. R. WALLACE

MODERN ANGLING

The Modern Practical Angler. A complete Guide to Fly-Fishing, Bottom-Fishing, and Trolling. By H. Cholmondeley-Pennell, Inspector of Fisheries. Illustrated by Fifty Engravings of Fish and Tackle. 16mo, pp. 286. (London: Fred. Warne and Co., 1870)

TO those readers of NATURE who are not acquainted with Mr. Pennell, the following quotation may serve as an introduction: "Fishing has been in a special sense my mistress—the fairest and most loving wife—in many a wild and lonely spot where, but for her gentle companionship and solace, I should have felt myself in every sense of the word alone;" whilst those of us who have for some time had an acquaintance with his writings, know that in making this confession he is perfectly sincere, and that he is one of the most devoted disciples of Izaak Walton; so that we cannot help wishing he were an "Inspector of Fisheries" (as he describes himself on the title-page), instead of being appointed by the Government to investigate the causes of failure and possibilities of improvement of our oyster fisheries. His book has only a partial resemblance to Walton's "Complete Angler." Those passages of pleasing simple eloquence, those fine sentiments, those virtuous precepts, in short, all those characteristics which have rendered Walton's book immortal, must not be looked for in Mr. Pennell's "Modern Angler." To imitate Walton successfully, would, indeed, require a genius of no common order; and Mr. Pennell has contented himself with giving a mere manual of the piscatorial "art" and "science" (we must not be too severe with enthusiasts about terms); and judging of it as such, we can sincerely say that it is the best and most useful handbook we have yet seen.

The book is divided into four parts, treating minutely of tackle, fly-fishing, trolling or pike-fishing, and bottom-fishing. The author takes credit for several inventions or improvements. Thus, for instance, he describes or figures the "Pennell-hook," in which "the medium between theoretical and practical requirements" is believed to be hit. We are glad to see him advocating a reduction in the number of artificial flies used at present; he proposes to substitute six typical flies, three for salmon and grilse, and three for trout, grayling, &c. We feel sure that these flies, together with those which are especially used at certain localities, will be quite sufficient for all purposes. Mr. Pennell has thought a great deal at the river-side; he is never satisfied with simply describing what, according to his experience, has proved to be the most successful method or the deadliest instrument; he always gives the reasons. Thus, in one of the chapters, we find expounded the "true theory of trout-flies," in a second the "theory of salmon-flies," and in a third, of white trout-flies; however, we are afraid that in expounding theories he will not be more successful in convincing his readers than the majority of theorists. For instance, to the question, For what does the salmon take the artificial fly? he gives

the answer, "For its beauty and tempting appearance; probably it has an appetising effect." Let Mr. Pennell once watch a prawn (one of the principal articles of food of salmon in the sea) swimming in jerks through the water, and he will at once perceive that by means of our rod we impart to the fly the peculiar motion of the prawn, whilst the iridescence of the real creature is reproduced by the colours of the fly, which must vary according to the physical changes of the sky and water. No two things can be more unlike than a prawn and a dry artificial fly; no two things are more alike than a swimming prawn and that same fly in the water worked by a skilful hand.

But we must conclude our notice of this book, welcome and useful to every class of anglers. It is illustrated by numerous well-executed woodcuts, which are more instructive than the best descriptions. Lithographic plates of some of the more common freshwater fishes are evidently reproductions from the *Fisherman's Magazine*.

A. GÜNTHER

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.]

The Government and the Eclipse Expedition

WE are now within two months of the date fixed by Nature, whose name you so worthily wear, for a total Eclipse of the Sun, and it is not probable that she will postpone her appointment for a period sufficient to enable the joint committee of the Royal and Astronomical Societies to renew and succeed in their endeavour to teach the Government what such a phenomenon may, if duly observed, contribute to human knowledge. It may be taken for granted that no encouragement will be afforded by our thrifty rulers to an expedition of sixty-eight astronomers, projected for the quixotic purpose of collecting intelligence not calculated to increase the revenue.

This well-timed and praiseworthy frugality reminds me of some imputations which were, not long ago, cast at the Government by two eminent men of science, one of whom, the Astronomer Royal, lives to repent his injustice; the other, the late Dr. W. A. Miller, alas! can speak no more.

On the 31st March last, I read at a Society of Arts' conference, by request of the Council, a paper on the subject of the Relations of the State to Science. A discussion followed, in the course of which the Astronomer Royal remarked that "having had a somewhat long connection with the Government, he was quite competent to say that there had never been any unwillingness, as far as instances occurred to him, to promote liberally the purpose of speculative science when brought before the Government, with a good cause shown, and upon the responsibility of some person in whom they placed confidence."

Here Mr. Airy lays down, with his usual clearness, the conditions necessary to induce our Government to promote liberally speculative science, namely, "a good cause shown, and on the responsibility of some person in whom they placed confidence." Our failure, then, to obtain aid on the occasion in question must have been due to one of three things—either a good cause was not shown, or the Government had no confidence in the persons showing it, or the Government differs considerably from Mr. Airy's portrait of it. Who were the persons whose worthiness of confidence is thus doubtful? The Astronomer Royal himself, the President of the Royal Society, and the President of the Astronomical Society; and these untrustworthy beguilers of our too liberal guardians of the public purse were the accredited representatives of a select joint committee of the two first scientific societies in the kingdom. As to the goodness of the cause, that is to be inferred from the character, requirements, and position of the three personages above indicated, who had the presumption to advocate it. To these two causes it is evident that the failure is due, and not to any want of liberality in statesmen, for whose readiness to promote speculative science Mr. Airy himself, one of the unsuccessful petitioners, has vouched.

The late Dr. Miller spoke as follows on the occasion above referred to:—"Gentlemen," he observed, "representing great branches of science, like the Astronomer Royal, were met by the Government with liberality; and scientific bodies, such as the Royal Society, when they made an application, after careful consideration of the objects they had in view, were also listened to with respect, and, in the majority of instances, their applications were granted. It appeared, therefore, that the great difficulty on the part of the Government was to be sure that what they expended was wisely laid out."

Dr. Miller, as Treasurer of the Royal Society, spoke with authority; he shared with the Astronomer Royal the error of imputing to Government a liberality towards science utterly inconsistent with that true economy for which they have, in so many other matters, earned high renown.

The whole transaction, considered as the latest notion in civilisation, is so ludicrous that it is difficult in speaking of it to do so seriously. It may be argued that Mr. Airy and Dr. Miller were perfectly correct in their picture of former Governments, but that our present Ministry act on different principles, and refuse to promote what their predecessors would have thought worthy objects. This hypothesis is so extremely disparaging to the Ministers of to-day, that I for one cannot adopt it. When the speeches I have cited were made I offered no reply, but I was far from assenting to the estimates of Government liberality to science in England given by Mr. Airy and Dr. Miller. I do not now for the first time say that, not only have English Governments, past and present, been backward in promoting science, but that no English Government has ever shown that it understood the value of science—how it should be promoted, or what were their duties respecting it. This inability to realise the requirements of Science is not confined to Governments—it largely pervades the most intelligent portion of the community—the whole governing class. For one man of high position and culture who comprehends the mode of advancing science, and the certain effects of advancing it, there are, not hundreds, but thousands, who have clear views regarding art, literature, and general education. Every man of wealth covers his walls with pictures and books, but how many equip a laboratory or an observatory? The knowledge of science which most educated men possess has been acquired by reading only, and their notions of what is needed to advance science, of the extent of field remaining still unoccupied, of the means requisite for cultivating it, and of the value of the produce, are, we find from every-day experience, exceedingly hazy.

The true explanation of the difference between the distinguished speakers and those who think with me I believe to be this—that the demands made upon the State by scientific men and bodies have hitherto been so moderate, so desultory, and so infrequent, that few of them could, with decency, be denied by men not utter barbarians. I am of opinion that the moderation of scientific men has been exceedingly detrimental to the nation, and utterly opposed to true economy. For it has led to the waste of the two most valuable gifts of Providence—the human intellect and the forces of nature. This moderation has encouraged the comfortable creed of English statesmen that private enterprise will do all that is needful, and that the utilisation of those two gifts forms no part of their national duties. But suddenly those who have suffered Government to hug itself in its inaction, and live in a fool's paradise of indifference to duties which they do not understand, are startled by their own teachings recoiling on themselves in a rebuff unequalled for its narrow-mindedness since the time of Galileo.

But a new school of scientific men is now astir, and this rebuff will quicken its energies and so do good. A Royal Commission on Science now sits, and at such a tribunal this wrong to Astronomy must be heard and judged. Let us hope that when next the sun is eclipsed, the darkness on the minds of men may not equal the darkness on the earth's face.

ALEX. STRANGE, Lieut.-Col.

The Geological Bearings of Recent Deep-Sea Explorations

YOUR report of the Proceedings of the Geological Section of the British Association (No. 51, p. 503) makes Sir Roderick Murchison say that "he hoped Mr. Jeffreys did not share the opinion of his colleague Dr. Carpenter, that their discoveries tended to upset modern geology." I have the authority of Sir Roderick to state, that he did not accuse me of any such absurdity; and that I

should find what he did say on that occasion, in dissent from some of the views put forth by Prof. Wyville Thomson and myself, fully expressed in his introductory address, of which he has given me a copy. As, however, he there attributes to a passage in a lecture which I delivered eighteen months since at the Royal Institution, a sense which I never meant it to convey, I shall be obliged by your allowing me to give a precise explanation of my meaning.

The passage cited by Sir Roderick is as follows:—"The facts I have now brought before you, still more the speculations which I have ventured to connect with them, may seem to unsettle much that has been generally accredited in Geological Science; and thus to diminish rather than to augment our stock of positive knowledge; but this is the necessary result of the introduction of a new idea into any department of scientific inquiry."

Now I gave not the remotest hint of impugning those great doctrines of Stratigraphical and Palæontological succession, to which Sir Roderick refers as accepted by Uniformitarians, Catastrophists, and Evolutionists alike; my chief heresy being the indorsement of the doctrine of which my colleague, Prof. Wyville Thomson (himself a sound and accomplished Geologist), was the originator, "that we may be said to be still living in the Cretaceous Epoch." Our meaning was this:—There can now be no question that a formation, corresponding with the Chalk of the Cretaceous Epoch, alike in its material, and in the general character of its Fauna, is at present going on over a large part of the North Atlantic Sea-bed. This similarity is marked, not by the occurrence of a few types of life (like the Lingulæ and Terebratulidæ of the older formations, referred to by Sir Roderick Murchison), but by the persistence of those which constitute the formation itself, viz., the Globigerinæ, the Coccoliths and the Cocospheres; as also of numerous types of Echinodermata that were formerly considered as essentially Cretaceous, and of a great variety of those Sponges (including Xanthidia), and Foraminifera, whose abundance in the White Chalk is one of its most important features. The explorations carried on by the United States Coast Survey in the Gulf of Mexico have furnished results entirely coinciding with our own in many of these particulars.

Now it is, of course, quite open to any geologist to maintain that this Formation is a mere repetition of the Cretaceous, at a later date, under generally similar conditions. Such was, I presume, the idea of those who, several years before our researches began, had pointed out the conformity of the material of the Atlantic deposit with that of the old Chalk; and such had been my own belief, until Prof. Wyville Thomson suggested to me the probability of a continuity between the past and the present deposits, on the following ground:—The oscillations of the earth's crust, in the Northern part of the Northern Hemisphere,* during the whole Tertiary period, have not been shown anywhere to exceed 1,500, or at the most 1,800 feet, or 300 fathoms; and as the general depth of the North Atlantic Sea-bed ranges from twice to ten times that amount, there is no reason to suppose that the formation and accumulation of Globigerina-mud have been interrupted in any part of its duration. Now the termination of the Cretaceous Epoch is commonly regarded as having been marked by the elevation of the Cretaceous deposits of the European area into dry land; but there is no evidence that this change of level stopped the formation of Chalk in the deep sea elsewhere. On the contrary, according to the received doctrine of Geology, it is highly probable that coincidently with the elevation of the European area, there was a gradual subsidence of what is now the North Atlantic Sea-bed; so that the Globigerinæ and Coccoliths of the former area, with such accompanying types of animal life as could accommodate themselves to the change of conditions, would progressively spread themselves over the latter.

Now there is nothing more heterodox in this view than in M. Barrande's doctrine of "colonies," which is now, I believe, universally accepted as the explanation of a large and very important series of geological facts—the persistence, in certain outlying localities, of a Fauna characteristic of a formation stratigraphically inferior to that in which it presents itself. The only difference here is in the relative extent of the existing Cretaceous deposit in the North Atlantic, which may hold to that of Europe somewhat the relation that the English-speaking race which has colonised America does to that of the mother country, instead of

* This statement has been recently met by our friend Mr. J. Gwyn Jeffreys, who adverts to the well-known fact of the elevation of Tertiary strata in the South of Europe to 11,000 feet. But there is no evidence, so far as we know, of any such elevation in the latitude of Great Britain, or north of it.