RECENT CHALLENGER MONOGRAPHS.

FOUR great books of final reports of the Challenger expedition, together with two volumes of 'the narrative,' represent the outcome of the last few months of work of the Challenger staff. Commendation seems superfluous in describing a work so monumental in its character; but, on the other hand, it is impracticable to speak of it, either as a whole or in any one of its subdivisions, without the most enthusiastic praise.

Professor Turner of Edinburgh discusses the human crania in a paper of 130 pages (part xxix. vol. x.), which is one of the most important contributions to somatology ever printed in English. The last sixteen pages are devoted to general conclusions, drawn, not only from the study of the crania gathered by the Challenger in southern Africa and America, Australia and the Pacific Islands, but of those in the Edinburgh university museum and several other collections. The paper is, in fact, an essay upon the craniology of certain races, — the Bushmen, Fuegians and Patagonians, Australians, New Zealanders, and the Admiralty, Chatham, and Sandwich Islanders. A short paper, on the other human bones is to follow. The body of the memoir is densely packed with details of craniometry, for the most part in tabular form, and critical notices of past investigations. The 29 illustrations are exceedingly satisfactory, especially the diagrams of sections of skulls drawn by the author.

One of the most noteworthy results of this investigation is that it has given Professor Turner still stronger convictions upon the importance of craniology as the foundation of a classification of the races of mankind. Without undervaluing the classific value of such features as the color of the skin, the color and character of the hair and eyes, the shape of the nose and lips, the stature and the form of the pelvis, he maintains, that, by taking a combination of craniological characters, there may be laid down certain propositions as regards *unmixed* races of men, which, while allowing for the occurrence of occasional individual variations, will be as distinctive as those afforded by the study of any other series of physical characters.

In unmixed races, where the skull is markedly dolichocephalic, brachycephalic skulls never occur; and similarly in unmixed races, where the skull is markedly brachycephalic, dolichocephalic skulls are not met with. People resulting from mixtures, especially of dolicho- with brachy-cephalic races, are more difficult to deal with; for some will have heads which exhibit, with little variation, the characters of one or other of the two parent types, while in others intermediate characters will arise which incline toward those of one or other of the ancestral types. It is, he thinks, through lack of recognition of the true effects of mixture of races that discredit has been thrown on the value of the skull in the determination of racial characters.

The author, while inclining to the belief that, as a rule, unmixed races are either long or short headed, and that mesaticephalic peoples usually proceed from mixtures, admits that certain of the mesaticephali — for instance, the Tasmanians, and the Bush race of South Africa (not improbably the remains of the primitive people of Africa) — may be classed with the unmixed races.

The discussions of the extent and character of individual variation within the limits of a race are to be of a very scholarly and suggestive character.

The author advances the idea that the races of the extreme south, Bushmen, Fuegians, Australians, Tasmanians, and Negritos, with their feeble frames, small heads, low statures, and low intellectual development, may in the early unwritten periods of history have had in their respective continents a much wider range than at present, and have been pushed southward into their present restricted areas by the advance of the more powerful races which now surround them. If in their displacement they failed to mix with their invaders, their physical characters would remain pure, for isolation and long-continued interbreeding would preserve and even intensify the structural peculiarities of each race.

The enigma concerning the builders of the megalithic monuments on Ascension and Easter Islands, the Fijis, the Gilbert Islands, and Tongatabu, is simply restated, — the natives can neither account for them by tradition, or show physical evidence that their forefathers could have created such structures, nor are there any traces of races, pre-existing in the Pacific region, capable of such enterprises.

The study of the Patagonian and Fuegian skulls suggests interesting speculations as to the origin of the peoples of South America.

It is rather mortifying to find that our own countrymen have accomplished so little in the field of craniology, that in this exhaustive treatise there occurs but a single incidental allusion to any American authority.

Dr. Rudolph Bergh of Copenhagen, in an essay of 151 pages, with 311 figures of structural details beautifully drawn by himself (part xxvi. vol. x.), treats of the Nudibranchiata. The paper is purely descriptive and critical, and deals chiefly with the 25 forms collected by the expedition, which include 11 new species and 3 new genera. He gives, however, a list of all known forms in each genus

which comes up for discussion, the number sometimes being very large, as in Chromodoris with its 95 species. The remarkable new genus Bathydoris, dredged in mid-Pacific at depths of 14,550 feet, is described at great length, and elaborately figured.

The family Onchidiadae — 'modified shell-less pulmonates,' resembling in form certain nudibranchiates — are treated of in an appendix, with historical and critical notes. Bergh believes that the tropical seas, though hitherto but slightly explored for nudibranchiates, will ultimately prove to be the headquarters of this group. The absence of allusions to American work emphasizes the fact, already pretty well appreciated on this side of the Atlantic, that in the study of this group there is an excellent opportunity for some one of our young naturalists who has not yet chosen a specialty.

The venerable George Busk prints part i. of his report upon the Polyzoa (part xxx. vol. x.), which treats of the Cheilostomata, enumerating 286 species from the Challenger's work, of which 180 are described as new. The workmanship of the paper is in the author's own peculiar style of excellence. There are nearly a thousand figures, and the pages devoted to an explanation of terms used in description are especially acceptable. The general conclusions arrived at by Mr. Busk are evidently withheld for the second part of his report. The geographical and bathymetrical distributions of the group are treated at great length, and illustrated by an instructive map. Four species of Polyzoa were taken by the Challenger in the North Pacific at the depth of 3,125 fathoms; and one of these, Cribrilina monoceras, was taken in the Australian region at a depth of 35 fathoms, — an instance of extensive range in depth unparalleled elsewhere.

Dr. Hoek's report upon the Cirripedia (part xxv. vol. viii.; part xxviii. vol. ix.), although the author mourns that his studies upon the deep-sea material have not yielded results equal to his own anticipations, is a very important contribution to zoölogy. It is printed in two parts, and is brimful of concisely stated observations and pregnant criticisms. It is an excellent example of the scholarly work which the naturalists of the Netherlands have of late been producing, and is no unworthy continuation of the classic memoir upon the same subject published a third of a century ago by Darwin. The systematic portion of the reports is devoted entirely to the description of the Challenger's collection, but in the introduction is given a critical review of all that has been discovered or written concerning the group since the time of Darwin, and also a new zoögeographical arrangement of all known species.

One of the most surprising of the recent reports is that by Dr. von Graff upon the Myzostomida of the expedition. Fifty-two of the 68 species discussed appear here for the first time. In fact, all the known species of the group have been brought to light by Dr. von Graff, with the exception of three described by Leuckart, by whom the genus Myzostoma was first discovered. These very remarkable animals, by Dr. von Graff placed among the arachnids, by other authorities among the worms, near Tomopteris, and only found parasitic upon and in crinoids, are being found in all the zoölogical collections, now that attention has at last been directed to their very inconspicuous existence. Twenty-two species, 14 of them new, are attributed to the explorations of the U.S. steamers Bibb, Hassler, Blake, and Corwin. A concise account of what is known concerning the Myzostomida serves as a preface, and there is a curious colored diagrammatic figure printed in with the text. The lithographic plates are exquisite.

In a second paper upon the Entomostraca (part xxiii. vol. viii.), Dr. G. Stewardson Brady treats of the Copepoda. His paper is mainly descriptive, and is, of course, prepared in his usual scholarly manner. There are 55 plates, diagrammatic and useful, but not artistic; and 142 pages of text, treating of 90 free-swimming species, and 15 fish parasites obtained by the Challenger, only one of which, Pontostratiotes abyssicola, dredged in a depth of 2,200 fathoms, is undoubtedly a deep-sea species.

The report upon the calcareous sponges, by Professor Polejaeff of Odessa, a pupil of Schulze's, enumerates 30 species, 23 of which are new. A considerable portion of the paper is devoted to destructive criticism of the previous work of Professor Haeckel, and the construction of a new 'natural classification' of the group. There are four superb plates of white sponges upon black backgrounds, as well as a number of anatomical figures beautifully drawn by the author.

Mr. Henry B. Brady's ponderous memoir on the Foraminifera, in two volumes, — one of text, 814 pages; and one of illustrations, 115 plates and at least 2,000 figures,—is really a monographic revision of the entire group, with an exhaustive bibliography, from the year 1565 to the present time, and a chapter on classification, historical, critical, and constructive, leading up to an elaborate synopsis of families and genera. The synonomies and the tables of geographical distribution are made up in a very workmanlike manner, and the index is a delight to weary eyes.

The animals of this group are distributed everywhere over the ocean-bottom, as well as at the surface and in mid-waters. The presence or ab-

sence of the calcareous shells of some of the pelagic species at different depths and in different localities is connected with some of the most important problems in oceanography. It was of the greatest importance that all questions relating to geographical and bathymetrical distributions should be discussed with reference to a thorough understanding of the relations of all existing forms; and it was, indeed, a fortunate thing that a naturalist so familiar with the Foraminifera as Mr. Brady should have undertaken this work.

Mr. Brady, referring to certain views held by Dr. Wm. B. Carpenter and his colleagues concerning the existence or non-existence of true species amongst the lower Protozoa, which are, he admits, "from a purely biological stand-point, for the most part incontestable," holds that they really embody only one aspect of the subject. Although in some families, not merely reputed species, but reputed genera, are connected by a close array of intermediate modifications and dimorphous forms, and all sharp demarcations have ceased to exist, in others the successive modifications appear to be less closely connected, and to possess distinctive characters of greater persistence. "Admitting," he writes, "the intimate relationship which often prevails throughout an entire generic group, admitting even that all the members of a genus may be referred to a common ancestral type, the question still remains how the different terms of each series are to be recognized. The various modifications which have been referred to differ not merely in details of form and structure, but in habit. They are met with under diverse conditions as to latitude, depth of water, nature of sea-bottom, and the like, and their modes of life are often totally distinct; furthermore, fossil specimens, with similar peculiarities, appear to have existed under precisely corresponding circumstances. Whether 'species' or not, the more important of them possess characters which afford means of easy identification, and it is obviously necessary that they should be provided with distinctive names." He admits the value, as a method of study of the plan proposed by Parker and Jones, in their memoirs on North Atlantic Foraminifera, of grouping the almost endless varieties of the Foraminifera around a small number of typical and sub-typical species, but denies that this plan may be made a basis of nomenclature. The binomial system must be retained, and it is impossible to deal with the multiferous varieties in this group without a much freer use of distinctive names than is permissible among animals endowed with more stable characters.

The chapter on the chemical composition of the tests of the Foraminifera possesses considerable interest in connection with the study of bottom deposits. That upon pelagic species would be much more satisfactory to the reader if rather more definite conclusions could have been attained by the author of the memoir in a manner satisfactory to himself.

Eozoon is admitted to a place in the synopsis, but Mr. Brady does not commit himself to any opinions. In the introduction to his bibliography, he states that many of the titles of the less important contributions to the Eozoon controversy are admitted. The American names in the bibliography are those of Isaac Lea, the earliest, 1833, S.G. Morton, J. W. Bailey, E. de Verneuil, J. Hall, Meek and Hayden, G. G. Shumard, W. M. Gabb, J. W. Dawson, Count Pourtales, J. P. Whiteaves, C. A. White, H. A. Johnson and B. W. Thomas, T. A. Conrad, Angelo Heilprin, and J. Leidy.

The publication of the results of the Challenger is evidently being forwarded as rapidly as the limitations of painstaking research will permit. It is much to be regretted that the French zoölogists who have the work of the Talisman and Travailleur in charge do not profit more by this example.

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DROUGHT AND WEATHERCOCKS.

A WRITER in *Symons's meteorological journal* calls attention to a connection between drought and weathercocks. The connection does not always exist. Some weathercocks are entirely independent of drought or floods, and some are very seriously affected. The former are those which do not carry any of the usual letters N, E, S, W, or which are wholly of metal, and carried on metal or stone supports. The weathercocks which suffer from drought are those which have the cardinal points indicated by the letters, and which (though themselves of metal) are carried at the summit of a tall pole. The pole, under the influence of sun and drought, splits, and the cracks run nearly along its length, but not precisely. They are slightly inclined, and all run parallel. If the drought is prolonged, they become numerous, and, though no one crack may be a tenth of an inch, the aggregate amount becomes large. We have ourselves measured one on which the letters were, during the July drought, carried round 44°; the S letter was carried around until it pointed almost exactly S.W. With subsequent moisture the cracks have partly closed, and possibly by November the letter S will be nearly back in its true position; but as to this we have no knowledge. It is evidently necessary for observers to watch for the occurrence of this somewhat strange error.