

ANTARCTIC ANIMALS.¹

THE Trustees of the British Museum have published in stately form some of the natural history results of the National Antarctic Expedition (1901-1904), and we cannot but express our satisfaction that the volumes compare so well, both in matter and "get-up," with the similar publications of other European nations, and that they can be placed without reproach on the *Challenger* shelves. As the director of the natural history departments of the British Museum says in the preface to this second volume, "neither trouble nor expense has been spared in order to render the illustration and presentation of the natural history of the expedition worthy of the generous efforts both of Captain Scott and his fellow-explorers and of those who provided funds for that

the rorqual, the Australian whale (*Neobalaena marginata*), a bottle-nose, the killer (which levies toll on the seals and penguins), the dusky dolphin, and two new cetaceans. Dr. Wilson gives a very interesting account of the habits of the seals:—Weddell's seal (*Leptonychotes weddelli*), the sea-leopard (*Stenorhinchus leptonyx*), the crab-eating seal (*Lobodon carcinophagus*), the Ross seal (*Ommatophoca rossi*), the sea-elephant (*Macrorhinus leoninus*), Hooker's sea-lion (*Arctocephalus hookeri*). We should like to give an instance of the author's graphic style:—

"Coming back to the ship by boat from Enderby Island an hour or two after sunset, and on a particularly dark night, with neither stars nor moon, we watched the sinuous and graceful movements of about six large sea-lions that followed our boat apparently out of curiosity. Diving and twisting about beneath

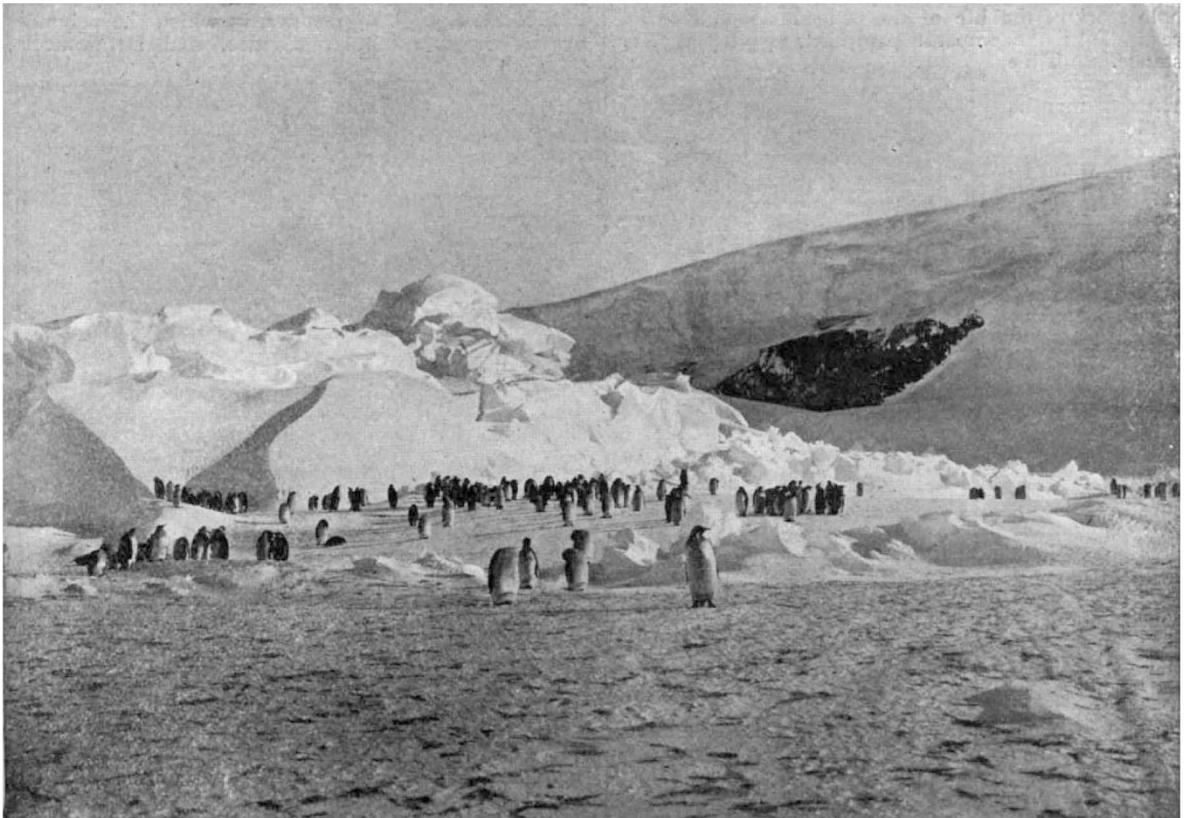


FIG. 1.—Emperor Penguins' Rookery at Cape Crozier. From the "National Antarctic Expedition, 1901-1904."

enterprise." Another matter for congratulation is that the results are being published so promptly, and for this thanks are due to the energy and organising ability of Mr. Jeffrey Bell, who has secured the co-operation of specialists, and has acted as sub-editor of the natural history portions of the reports.

The second volume begins with Dr. Edward A. Wilson's report on the mammals, a well-executed piece of work, most beautifully illustrated. The *Discovery* found no traces of the southern right whale (*Balaena australis*), which Sir James Ross reported as abundant in the Ross Sea in the 'forties of the last century, but

¹ "National Antarctic Expedition, 1901-1904." Natural History. Vol. ii., Zoology (Vertebrata: Mollusca: Crustacea). Vol. iii., Zoology and Botany (Invertebrata: Marine Algæ, Musci), with numerous plates and illustrations. No continuous pagination. (London: Printed by order of the Trustees of the British Museum, 1907.) Vol. ii., 34; vol. iii., 24, 105.

us in the pitch-black water, each animal was ablaze with light. Every limb and every movement could be seen, though they moved so rapidly that the eye could scarcely follow them; they played with one another and chased one another and the boat, now coming up to blow, as we could hear, a yard or two astern, and now diving deep down under the boat to appear often close in under the bulwarks; every stroke of the long powerful fore flippers was accurately conveyed to our eyes in the pitchy darkness by the brilliance of the phosphorescence covering them. . . . The sight was a most beautiful one. The animals moved with feints, and twists, and turns, now in curves, now in circles, but always with the sinuous motion of the body like a fish, supplemented by powerful strokes of the long fore flippers, and always with

the most wonderful rapidity. All this we saw most clearly in the blackest darkness, far more clearly, indeed, than such objects are wont to be seen even under the most favourable conditions, in the daylight."

Of course the memoir is not exactly full of sugar-plums of this sort; there are discussions of dental formulæ and plenty of other hard facts, but Dr. Wilson is to be congratulated on bringing not a little of the picturesqueness of reality into his scientific discourse.

In Dr. Wilson's report on the birds, we find abundant details regarding the life and ways of penguins. They are drawn or photographed in every conceivable attitude and situation—walking, "tobogganning," feeding, sleeping, on the nest and "on the run," crowing, piping, dirty and clean, moulting and "ecstatic." The pictures are delightful, and reflect great credit on artists and photographers, and the whole story of the life of the penguins is full of interest. Take the emperor penguin's egg-laying, for instance. The bird chooses the darkest months of the Antarctic winter in which to incubate its egg; it lays it upon sea-ice with no pretence at nesting, but removes it at once to rest upon its feet, where it is held wedged in between the legs closely pressed to a patch of bare skin in the lower abdomen, and covered from exposure by a loose-falling lappet of abdominal skin and feathers. Of course there is no "pouch," only a fold. The incubation requires seven weeks, and one bird cannot undertake this task. A dozen or more stand patiently round waiting for a chance to assist.

"Every adult bird, both male and female, in the whole rookery has a keen desire to 'sit' on something. There is every reason to believe that when the sitting bird feels hungry it hands over its treasure to the nearest neighbour that will undertake the duty of incubation."

But we must not quote more, strong as the temptation is. Dr. Wilson deals with five species of penguin, two skuas, Wilson's petrel, the Antarctic petrel, the giant petrel, and a score of other birds.

Mr. W. P. Pycraft has made out some very interesting points in his study of nestlings and embryos of the emperor and Adélie penguins. He shows that penguins develop two successive down plumages before assuming the normal definitive feathers. Another remarkable fact is that the feathers are moulted from large areas of the body at once. In their pterylosis the penguins are the most primitive of all Carinatae. This accomplished osteologist also shows that the embryological evidence confirms what

the palæontological evidence hints at, that the penguins are descended from birds which possessed full powers of flight. He gives an interesting discussion of their relationships, and of detailed points of interest such as the sealing up of the nares, which seems to have been a common heritage of all the birds belonging to the great Steganopod branch, except the Colymbi.

The collection of fishes, reported on by Mr. Boulenger, was a very small one, consisting of representatives of ten species, four of which are new.

Dr. W. G. Ridewood deserves congratulation in respect of his fine memoir on the two species of Cephalodiscus obtained by the *Discovery*. He gives a detailed account of *C. hodgsoni*, n.sp., and *C. nigrescens*, Lankester, compares the six species now known, discusses their relations with Rhabdopleura, and clears up a number of obscure details. He proposes to divide the genus into two subgenera—*Idiothecia*, e.g. *C. nigrescens*, in which the polypides live in separate tubular cavities, and *Demiothecia*,



FIG. 2.—Hooker's Sea Lion. From the "National Antarctic Expedition, 1901-1904."

e.g. *C. hodgsoni*, in which the cavity of the tubarium is continuous. In both the new species obtained by the *Discovery* there are hermaphrodite individuals, with one ovary and one testis, as well as males and females with two ovaries and two testes respectively. Some light is thrown on the development of the buds and of the tubarium, as also on Harmer's "problematical body" (obliquely interlacing cross-striped muscle fibres) and on the peculiar refractive beads in the end bulbs of the plumes of *C. hodgsoni* (material of the tubarium in process of secretion). The seven plates illustrating this valuable memoir are of great excellence.

As to brachiopods, Mr. Edgar A. Smith describes two new species of Magellania, one of which, *M. sulcata*, is remarkable on account of the concentric sulcations and the coarse perforations of the shell. Its marked lines of growth have no analogue among recent forms, but recall the surface ornamentation of *Terebratula sulcifera* from the Lower Chalk.

Turning to molluscs, we find that the *Discovery* obtained only one cephalopod—a larval Histioteuthid—

in regard to which Dr. W. E. Hoyle communicates some notes furnished by Dr. G. Pfeffer. There were also some mandibles, obtained from the stomachs of seals and penguins. Mr. Edgar A. Smith finds twenty-one new species of gastropods in a collection of twenty-six. The most striking forms are *Trophon longstaffi*, and a new genus, *Trichoconcha*, which has a flexible tough shell, like a chestnut skin, and a beautiful hairy periostracum. The collection does not show any particular resemblance to the Arctic fauna, most of the genera having a world-wide distribution. The almost total absence of colour in nearly every instance is characteristic. Mr. Smith also describes a very remarkable Chiton (*Chaetopleura miranda*, n.sp.), simultaneously reported by Dr. J. Thiele (*Notochiton mirandus*, n.g. et sp.) from Bouvet Island—an instance of wide distribution. The third and seventh valves are stained red, the rest being dirty-whitish. In the collection of fourteen species of lamellibranchs, Mr. Smith found ten that are new, e.g. a beautifully sculptured Lima (*Limatula hodgsoni*).

Sir Charles Eliot describes five species of pteropods, and points out at once the distinctness and the relatedness of the northern and southern species of *Limacina* and *Clione*. It may be that some once cosmopolitan species have undergone similar but not identical changes in North and South Polar waters. The same authority also reports on the nudibranchs, twelve in all, ten of which are new. He establishes two new genera, *Tritoniella* and *Galvinella*, near *Tritonia* and *Galvina* respectively, and comes to the conclusion that the Antarctic and Arctic nudibranchs are similar rather than identical.

As to crustaceans, Dr. W. T. Calman describes two species of decapods obtained within the Antarctic Circle, viz., *Choriomus antarcticus* (= *Hippolyte antarctica*, Pfeffer) and *Crangon antarcticus*, Pfeffer, both of which were also collected by the German Polar Commission of 1882-3 at South Georgia. With the exception of the very imperfectly known *Crangon capensis*, Stimpson, *C. antarcticus* is the only southern species of the genus, and is widely separated from all the other species, which are confined to the temperate and (if *Sclerocrangon* be included) Arctic regions of the Atlantic and Pacific.

No Cumacea have previously been obtained from within the Antarctic Circle, but the *Discovery* collected four species, which Dr. Calman describes. Three are new, and the fourth is a variety of *Campylaspis verrucosa*, known from the north Atlantic and the Mediterranean, though probably with a much wider range.

Mr. A. O. Walker reports on fifty-three species of amphipods (eighteen new) in forty-three genera (four new). As in the Arctic regions, the Lysianassidæ preponderate. It was quite the usual thing to take ten to thirty thousand specimens of *Orchomenopsis rossi* in a single haul. Some of the forms have a wide distribution; thus *Ampelisca macrocephala* is an abundant Arctic species, and the ascidiicolous *Leucothœ spinicarpa* appears to be ubiquitous (the *Discovery's* winter quarters, Ceylon, Maldives, and our own seas). Among the peculiar forms we may notice *Thaumetelson herdmanni*, the only known amphipod with its telson in the vertical plane, *Epimeria macrodonta* with long curved and sharp teeth on the body segments, and *Iphimedia hodgsoni*, so densely clothed with fine spines directed backwards that it has a shaggy appearance.

Dr. Johannes Thiele finds that the only leptostracan collected was *Nebalia longicornis magellanica*; Prof. G. Stewardson Brady reports on nine species of ostracods, of which seven are new, including a new cytherid genus *Linocheles*; Dr. A. Gruvel briefly discusses four cirripedes, including two new species of *Scalpellum*.

Mr. T. V. Hodgson has had an interesting task in dealing with the large collection of pycnogonids, which evidently have their headquarters in southern seas. He describes three new genera and twenty-three new species, raising the total of Antarctic forms to sixty-three. The new genus *Austrodecus*, perhaps a close relation of *Tanystylum*, is a curious little form with a slender and elongated proboscis, like the snout of a weevil beetle, no chelifori, six-jointed palps, and small ovigers; *Austroraptus*, another new genus, is remarkable for its spurred body and the length of its legs. These two genera, along with the genus *Leionymphon*, which is re-cast, belong to the family *Ammotheidæ*, but no true member of the genus *Ammothea* was found. The most interesting form is, of course, *Pentanymphon australis*, which excited much interest at the time, since it has an extra pair of limbs. It is abundant in circumpolar waters, where also the Scottish Expedition, under Dr. W. S. Bruce, collected a still finer species with the same peculiarity, which turned out to be *Decolopoda australis*, described by Eights some seventy years ago in a forgotten paper. The "bipolarity theory" is affected only by *Colossendeis australis*, for it is, among the numerous species of this genus, nearest to *C. proboscidea*, which occurs at the opposite end of the earth. We may direct attention to the useful device Mr. Hodgson has adopted of giving a brief *résumé* of the most important specific characters at the beginning of each detailed description. The author also contributes an interesting essay at the beginning of the third volume on collecting in Antarctic seas. Dr. E. L. Trouessart describes an Antarctic variety of the Arctic species of halacarid—*Leptospathis alberti*. The two forms hardly differ except in size and proportions, but as the author believes that the species will turn out to be cosmopolitan or subcosmopolitan, he does not attach any importance to its bipolar distribution. As a matter of fact, however, the species is not as yet known except in the two polar seas.

As to "worms," Dr. G. Herbert Fowler reports on three species of Chætoznatha. He found the same three and one other in an old *Challenger* collection. He points out that *Krohnia hamata* ranges from 81° 30' N. to 77° 49' S., being cosmopolitan and fairly eurythermal; that *Sagitta hexaptera* is cosmopolitan and pantothermal; and that *S. serrato-dentata*, though found in subantarctic as well as north temperate seas, was absent at the colder stations of both *Discovery* and *Challenger*. Dr. O. von Linstow describes *Leptosomatium australe*, n.sp., which is the largest known free nematode, the female attaining a length of almost 50 mm., the male of 37.7 mm. He proposes a new group, *Adenophori*, for the free nematodes, which will not fit into the three groups *Secernentes*, *Resorbentes*, and *Pleuromyarii* into which he has disposed the parasitic forms. Mr. Arthur E. Shipley describes three species of *Dibothrioccephalus* (two new) which were found living together in the stomach of Ross's seal. It is rather remarkable that the only cestodes brought back by the naturalists of the *Discovery* were got in one rare animal, and that they belong to one genus. The pleuroceroid stages may possibly be found in some cephalopod. We may note the author's enthusiasm; he speaks of *D. wilsoni*, n.sp., as a very attractive little tapeworm of few proglottides.

Turning to Cœlentera, we find, first of all, an interesting memoir by Prof. S. J. Hickson on the Alcyonarians. He finds that *Ceratoisus spicata*, n.sp., is a connecting link between the groups of species formerly separated into the two genera *Ceratoisus* and *Primnoisus*. The latter name must now disappear. Another new discovery is *Primnoella divergens*, which links *Primnoella* and *Caligorgia*. The collection in-

cluded another new species of Ceratois and five other forms previously described. Prof. Hickson and Mr. F. H. Graveley deal with the hydroid zoophytes, which include some interesting forms, especially *Hydractinia dendritica*, n.sp. Though there is no definitely new generic type, there are ten certainly new species and five more probably new—a very large proportion out of a total of twenty-five. It may be noted that only two of the twenty-five were got outside the limits of McMurdo Bay and the edge of the great ice-barrier, so that we have here a fine representation of the hydroid fauna from the most southerly limit of our knowledge of marine zoology. It is also interesting to find that three of the species are common on British coasts. Dr. John Rennie makes a note on the extraordinarily long tentacles of some unknown siphonophore. They were about as stout as an ordinary boot-lace and nearly twenty feet in length. Mr. Hodgson gives a graphic account of the difficulties attending their capture.

Among the sponges, Mr. R. Kirkpatrick found four species of Tetractinellids, forty-three Monaxonellids, twenty-four Calcarea, no Keratosa, and ten species of Hexactinellids. He describes the Hexactinellids, of which three were new genera and eight new species.

The third volume ends with a report on the marine algæ (Pheophyceæ and Florideæ) by Mr. Gepp and Mrs. Gepp, a description of a new coralline by Dr. M. Foslie, and an account of the mosses by M. Jules Cardot. It need hardly be said that with such bulky volumes before us it has not been possible to give more than a hint of the amount of sound and interesting work which they contain.

THE CURE AND PREVENTION OF SLEEPING SICKNESS.

THE sleeping sickness is, and unfortunately continues to be, the most burning problem of European colonisation in equatorial Africa. Like any other medical problem, that of sleeping sickness has two sides, which may be distinguished broadly as prevention and cure. Investigators in all parts of the world have been experimenting actively with the object of finding a drug, or method of treatment, which shall act in sleeping sickness as quinine does in malaria; that is to say, which shall destroy the parasites in the blood, without seriously affecting the health of the patient. Up to the present, the atoxyl treatment has given the best results, but it has often failed to produce more than temporary amelioration, and it is open to doubt if it has produced a complete cure in any case, while, like other arsenical compounds, it may have serious toxic effects. On Thursday last, however, a communication was made to the Royal Society by Drs. H. G. Plimmer and J. D. Thomson, of the Lister Institute, on the effect of certain antimony salts; and, to judge from the preliminary experiments on rats, these compounds appear to be far more efficient in their curative action, and at the same time less toxic in their effects, than atoxyl. The experiments will be extended at once to larger animals and to man, and though it would be premature to say that the long-sought-for cure has been found, the outlook is certainly more full of hope than it has ever been before.

The question of the prevention of sleeping sickness is of course, bound up with the etiology of the disease. It is known that the disease is caused by the presence of a minute flagellate parasite or "trypanosome," first in the blood, later in the cerebro-spinal fluid of the patients; and it is known that the trypanosomes are conveyed from diseased to healthy subjects by the bite of one, possibly more than one, of the species of blood-sucking tsetse-flies. It cannot be

too emphatically stated, however, that the tsetse-fly is not, as so often stated, the "cause" of the disease; if the fly be not infected, its bite is harmless, and Koch and others have reported the existence of large areas in which the fly swarms, but in which sleeping sickness does not as yet exist, although the necessary condition for its diffusion is found.

It follows that the problem of prevention may be attacked in two ways; extirpation of the fly, or control of the infection. Considering the vast extent of the range of the species of tsetse-flies in Africa, considering, further, that these flies, being viviparous, have no free larval stages in which they can be destroyed, like mosquitoes, any notion of extirpating tsetse-flies must be considered as frankly utopian. The measures adopted by our Government are wisely directed towards controlling the spread of the infection. Since the fly haunts thick bush on the lake-shore exclusively, the jungle is to be destroyed at all ports, ferries, and landing-places on the lake, where it is unavoidable that human beings should visit the lake-shore; at other points the natives are to be removed from the shore, and persuaded or coerced to live out of the effective range of the fly. Natives known to be diseased are to be segregated, prevented from wandering into the "fly-belts," and placed under treatment. By this means it may be reasonably expected that the spread of the infection may be checked.

There remains, however, the possibility that some wild animal may play a part in spreading the infection, since other animals besides man are known to be susceptible to the trypanosome when inoculated with it in the laboratory. As yet, however, no vertebrate, other than the human species, has been proved to harbour the trypanosome of sleeping sickness in a state of nature. It is well known, however, that other species of trypanosomes, in no way connected with sleeping sickness, are found commonly in wild animals of all classes; and it may be added that the tsetse-flies are quite as willing to suck the blood of a reptile or bird as that of a mammal. Hence there is always the possibility that some species of wild animal may act as a "reservoir" from which the supply of the trypanosome of sleeping sickness may be kept up indefinitely through the agency of tsetse-flies. It is, therefore, of the utmost importance that further researches on the etiology of sleeping sickness should be carried on, with the special object, among others, of discovering any such indigenous source of the disease, for it need hardly be pointed out that it would be of little use to prevent tsetse-flies becoming infected from human beings if they could also obtain the infection from natural sources.

THE POLLUTION OF RIVERS.

ON Thursday, October 31, an influential deputation from the British Science Guild interviewed Mr. Burns, M.P., at the Local Government Board, upon the subject of legislation with respect to the prevention of the pollution of rivers, and the protection of the public against the contamination of shell-fish.

In most directions the tendency to the pollution of our water supplies increases with the demand for pure water, and the area from which such water can be obtained in the neighbourhood of our towns is diminishing. The existing local authorities have conflicting interests when dealing with river pollution, and considerations of guarding the purity of streams are often subordinated to those of refuse disposal and manufacturing requirements. What too often happens is that a sanitary authority, situated toward the head of the stream or upon one of its tributaries,