the fur of the winter-whitened stoat, as well as in the permanently white polar bear. I think Mr. Mudge's observations are a distinct help to us in getting at the meaning of these white coats. I should like to see what Miss Sollas can do with the hair of the variable hare, as in the whitened specimens of this animal I have never seen any trace of the yellow tints found in the stoat.

Mr. Mudge's note that the white areas of a piebald mouse can be turned pink by immersion in 5 per cent. nitric acid in 78 per cent. spirit, but only in summer or a warm temperature, is also of great interest. Does it not suggest a reason why pink colour in feathers is mostly found in summer plumages and in warm climates? And is not his production of brown in the hairs of white rats exposed to damp warm weather comparable with the well-known saturated tints so prevalent in animals living naturally in damp but warm countries?

While writing on winter whitening it may be well to direct attention to another point, which has always been difficult to explain on physiological grounds, namely, the fact that the black ear tips of the hare and the black tail tip of the stoat are not subject to winter whitening. This, however, would be explicable if, whereas the general body coat of both these animals is cast twice a year, the black hairs on the ears and tail are renewed only once a year. If they are renewed only once they must remain (apart from fading) of the same colour throughout the year. That such a single moult is possible, and even probable, in these two instances is shown by the fact that in the squirrel there are two moults of the general body coat, but only one of the ear tufts and tail hairs. Similarly in the Equidæ (according to Ewart), there are two moults of the general coat but one only of the mane and tail.

G. E. H. BARRETT-HAMILTON.

Kilmanock House, Campile, Co. Wexford, Ireland, November 3.

Helium and Geological Time.

I MUST apologise for an error in my letter published in NATURE of November 3. The sixteenth line and onwards should read "... for we have no knowledge of chemical affinity between helium and solid substances; while, in respect of solubility, it would probably be inferior to the other gases."

R. J. STRUTT.

Imperial College of Science, South Kensington.

THE SUBANTARCTIC ISLANDS OF NEW ZEALAND.[1]

THE naturalists of New Zealand have always shown themselves eager to take advantage of any opportunity for extending our knowledge of the fauna and flora of their country. Such opportunities are presented from time to time by the periodical official visits of the Government steamer to the outlying islands. In November, 1907, the s.s. *Hinemoa* deposited a large party of New Zealand men of science on Auckland and Campbell Islands, calling for them again on her return trip more than a week later. The expedition was undertaken at the instance of the Philosophical Institute of Canterbury, primarily for the purpose of extending the magnetic survey of New Zealand to the outlying southern islands, but the volumes before us consist chiefly of zoological and botanical observations, though there are also articles on geophysics and geology.

The work has been issued under the editorship of Dr. Charles Chilton, and the publication has been rendered possible by a substantial subsidy from the New Zealand Government. It comes at an opportune moment, and acquires a special interest in relation to the exploration of the Antarctic continent now in progress.

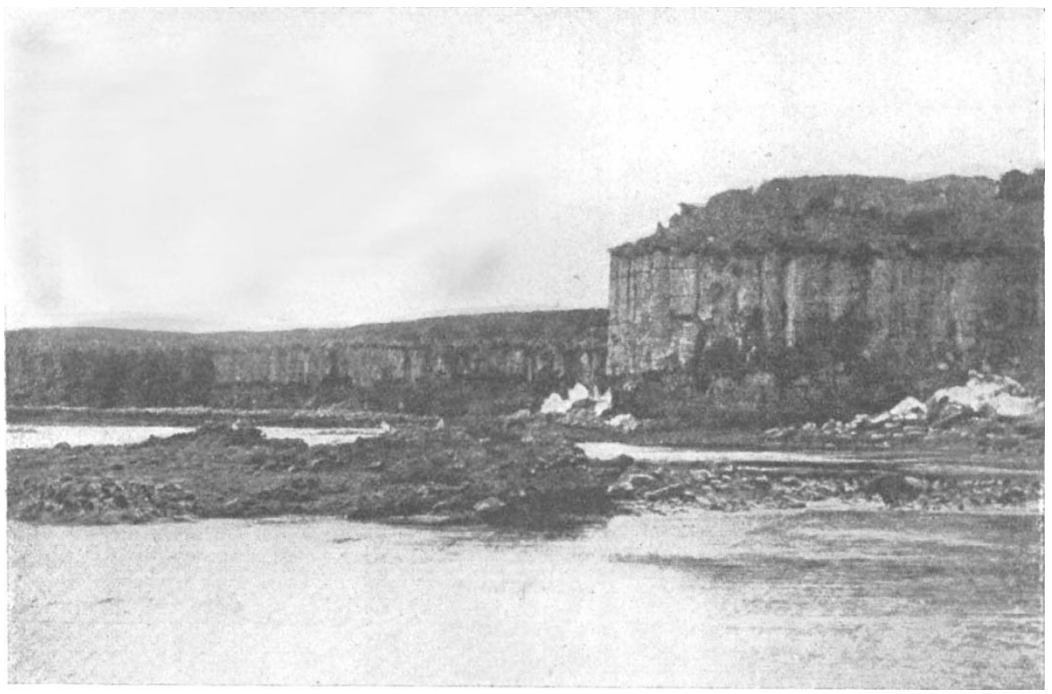

FIG. 1.—Cliffs of Columnar Basalt, Enderby Island. From "The Subantarctic Islands of New Zealand."

The time at the disposal of the expedition was, of course, all too short for a complete biological survey, and the collections were evidently, at any rate in many cases, very fragmentary, but many very interesting results were obtained. The zoologists were undoubtedly right in devoting most of their energies to the terrestrial fauna, which is much more likely to be modified or even exterminated by human agency than the marine fauna, but we cannot help wishing

[1] The Subantarctic Islands of New Zealand. Reports on the Geo-Physics, Geology, Zoology, and Botany of the Islands lying to the South of New Zealand. Based mainly on Observations and Collections made during an Expedition in the Government Steamer *Hinemoa* (Capt. J. Bellons) in November, 1907. Edited by Prof. Charles Chilton. Vol. i., pp. xxxv+388, vol. ii., pp. 389–848. (Wellington, N.Z.: Philosophical Institute of Canterbury. London: Dulau and Co., Ltd., 1909.) 2 vols. Price 42s. net.

© 1910 Nature Publishing Group

that the latter had received a little more attention. No fewer than 168 species and varieties of Foraminifera were discovered by Mr. Chapman in the dredgings sent to him, and if other groups are equally well represented in these seas there must be a rich harvest waiting to be reaped. Incidentally we may note the surprising and very satisfactory fact that of these 168 species and varieties of Foraminifera, from a practically unknown region, only four species and two varieties had to be described as new! Such a record gives one hope that some day our systematic knowledge of the marine fauna will be approximately complete. In the report on the sponges, on the other hand, Prof. Kirk mentions only two species, and of holothurians there were only three.

A large proportion of the collections, both botanical and zoological, has been worked up and reported on

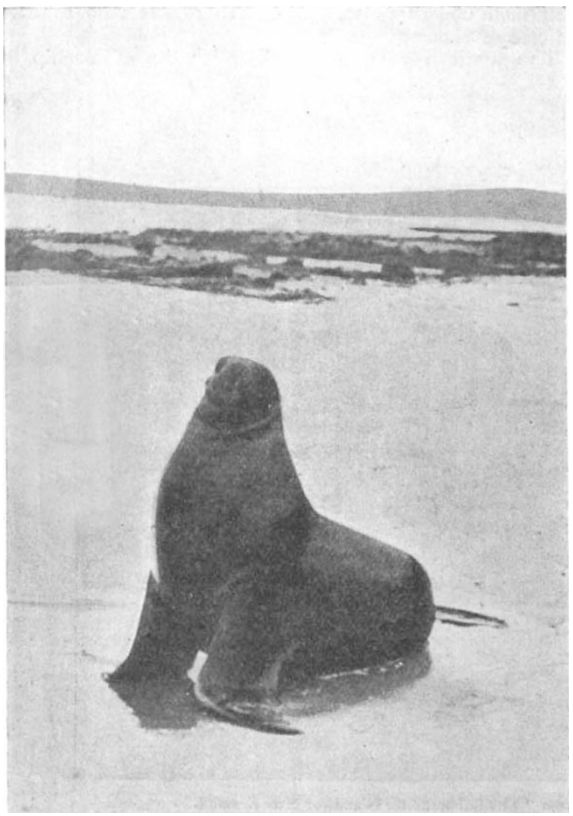

FIG. 2.—Young Sea-lion (*Arctocephalus hookeri*), Carnley Harbour, Auckland Islands. From "The Subantarctic Islands of New Zealand."

by local naturalists, Prof. Benham, Prof. Chilton, Prof. H. B. Kirk, Mr. Edgar Waite, Mr. Henry Suter, Mr. E. V. Hudson, Mr. T. Brown, Mr. T. F. Cheeseman, Dr. L. Cockayne, Mr. R. M. Laing, and Mr. Donald Petrie, many of whom also took part in the expedition. Other collections were sent to specialists in other countries and reported upon by them.

Amongst the more interesting forms obtained, we may note two new species of land nemertines, from Auckland and Enderby Islands, a remarkable addition to this extremely limited group. These are described by Mr. A. D. Darbishire, who contributes some useful notes on the taxonomic value of certain anatomical characters. In addition to the purely systematic reports, we have others of more general interest. Thus Dr. Cockayne contributes a long essay on the ecological botany of the islands, with a number of beautiful photographic illustrations, and Dr. Chilton gives us an account of the history of the scientific investigation of the islands, and a very useful summary of the biological results of the expedition, especially from the biogeographical point of view.

The results in general appear to support the current view that the existing islands of New Zealand are mere fragments of a very much larger land area, which at one time extended southwards beyond Campbell Island, eastwards beyond Chatham Island and Antipodes Island, and north-westwards towards New Guinea. Thus the fauna and flora are essentially Novæ-Zealandian in aspect, but with a large Antarctic element which may perhaps be accounted for by a former northward extension of the Antarctic continent. The existence of an Antarctic continent has, of course, long been used in explanation of certain striking resemblances between the fauna and flora of New Zealand and those of South America, but, as Dr. Chilton points out, we must also suppose that at some former time the climate of Antarctica was sufficiently mild to allow of the existence of a far more abundant animal and vegetable population than we find there to-day. Such a supposition is justified by the geological observations of recent Antarctic expeditions. Fossil leaves were found near the winter quarters of the *Discovery*, and coal still further south by Shackleton, while the Swedish Antarctic expedition met with abundant fossil plants in rocks of Tertiary age on Seymour Island, indicating a temperate or subtemperate climate.

In conclusion, we must congratulate the New Zealand naturalists on the performance of a fine piece of work, and at the same time express our regret that they still have to labour under numerous disadvantages. Of these the want of adequate scientific libraries appears to be one of the most serious. The New Zealand Institute, with its various local branches, has for many years past played a most useful part in promoting scientific research in the dominion, and it appears to us that the Government might do well to assist in some scheme whereby the defect referred to might be remedied, and the necessary scientific literature provided, not only for Wellington, which is the headquarters of the New Zealand Institute, but also for those large provincial towns where the principal branches of the institute are situated.

ARTHUR DENDY.

BIRD MIGRATION

OF all the many problems of animated nature awaiting solution, few, if any, have of late received more attention than—perhaps the most mysterious of all—the migration of birds.

Mr. Eagle Clarke and the other painstaking observers working with him have during the last few years learnt and taught us much, but only enough to show that still, as Prof. Newton wrote some twenty years ago, "our ignorance is immense."

What is the propelling power which at the appointed seasons sets the great hosts in motion? It seems now at least probable that almost every bird is in some degree migratory, and that even the robins and thrushes that come to the windows for crumbs in winter are more often than not other birds than those which nested in the garden in the spring.

When and how in the long-past eternity were the great aerial highways from zone to zone first marked out, to last apparently for all time? Our boasted

1 "Ornithological Notes from a South London Suburb, 1874–1909. A Summary of Thirty-five Years' Observations, with some Facts and Fancies concerning Migration." By F. D. Power. Pp. 60+chart. (London: Henry J. Glaisher, 55–57 Wigmore Street, W.) Price 3*s.* 6*d.* net.

© 1910 Nature Publishing Group