writers have contended. He believes that many of the forms that now have their center of dispersal in the southeast originally came from the southwest, either directly or possibly by way of the West Indies, and that changes in climate since the early Tertiary have extinguished the primitive forms in the southwest.

It has been possible in this review only to touch upon a few of the main points in the book, but enough has been said to show that many of Dr. Scharff's conclusions will not meet with general acceptance. However, even if they should be entirely overthrown, the general usefulness of the book will not, in the opinion of the reviewer, be impaired, for the summary of data and generalizations can only be of the greatest use and a source of inspiration to students of the American fauna.

ALEXANDER G. RUTHVEN

RECENT ANTARCTIC WORK

*National Antarctic Expedition, 1901–1904.* Natural History, Vol. VI., Zoology and Botany. London, British Museum. 1912. 4to. Pp. xvi + 81, 8 plates.

With the publication of this volume, the series of reports of this expedition relating to the natural history is brought to a close. The special reports included in it are "On a Collection of Young Holothurioids," by Professor E. W. Macbride; on the Polychæta, by Professor Dr. E. Ehlers, and on the freshwater algæ, by Dr. F. E. Fritsch, these being the only freshwater organisms obtained by the expedition.

The series comprises altogether some fifty memoirs descriptive of the fauna and flora of the Antarctic region. This area, like other cold seas, teems with species, of which 227 new forms have been described in these volumes. Of some Amphipod Crustacea 10,000 to 30,000 were occasionally taken at a single haul and in the collection one species of Schizopod is represented by nearly 10,000 specimens. The great kelp (*Lessonia*) has a frond as much as 24 feet long, but the mosses show signs of degeneration. No evidence in favor of the theory of "bipolarity" has been gathered from the collection. Twenty-three new genera of animals, and 201 new species were obtained, and 26 new species of plants. The collection of young echinoderms includes free-swimming larvæ of three out of four groups of echinoderms, which is of interest in view of the opinion, which had been expressed, that all species of the polar seas would be found to have development of the shortened type without free larvæ.

The freshwater algæ are exceptionally numerous in species, 91 in all, belonging to 35 genera, of which 25 species are Diatoms. Huge sheets of *Phormidium* and occasionally of *Lyngbya* flourish in the ice and during the milder portion of the year in the waters of the ponds and lakes. These sheets serve as a substratum for a rich growth of other forms and are probably the breeding places for the bulk of the algal flora. The scarcity of green algæ is notable, while Diatoms are rather scarce, but desmids are relatively abundant. *Microcystis* sometimes colored the ice of a dull brick red. The conclusion is reached that reproduction in the bulk of the Antarctic algæ is a very slow process and possibly several seasons elapse before a new generation reaches maturity.

The plates of this volume attain the same high degree of excellence noticeable in the previous issues of the series, and a convenient index to the whole set is included both for authors and subjects.

*Expédition Antarctique Française, 1903–1905, Commandée par le docteur Jean Charcot.* Hydrographie-Physique du Globe, par A. MATHA et J. J. REY. Paris, Bureau des Longitudes. 1911. 4to. Pp. vi + 615, 9 plates, with figures in the text.

The expedition of Dr. Charcot on the schooner *Francais* was due to the enthusiasm of its leader and the generosity of private individuals aided by the efforts of the Parisian journal *Le Matin;* through which after a hard struggle something less than $100,000 was obtained, a small three-masted schooner built, and outfitted for two years. Instruments and books were lent, the members of the party served freely or for a nominal wage,

and the official Bureau des Longitudes took the expedition under its motherly wing and has now published the volume of which the title is above cited.

This expedition was scientific in its aims and pole hunting formed no part of its program. The staff comprised five members beside the leader, with a crew of fourteen; all provinces of France were represented.

The plan of the leader was, in brief, to take up the work inaugurated by the *Belgica* expedition and extend it by explorations of the southwest part of Graham Land, investigating in all branches of science as well as geography, so far as their personnel and equipment would permit.

This program was carried out in its main features. The present volume includes an introduction in which a brief résumé of previous researches in the same region is given, after which the hydrography, tides, chronometric record, pendulum observations and the density and salinity of the seawater, are discussed by Lieutenant Matha, atmospheric electricity, meteorology and terrestrial magnetism by Lieutenant Rey. The work is carefully printed and the charts are of the quality one expects from the bureau which issues the volume.

Wm. H. Dall

## *SPECIAL ARTICLES*

### A CASE OF SEX-LINKED INHERITANCE IN THE DOMESTIC PIGEON[1]

In breeding work with tumbler pigeons begun at the Rhode Island Agricultural Experiment Station some years ago a careful study was made of the manner of inheritance of certain of the commoner colors of these birds, especially black, dun, red, yellow, blue and silver. This work was referred to in the Twenty-first Annual Report of the Station, 1908, p. 301, and a full report of the results, it is expected, will be published during the present year. These experiments made clear the fact that dun, yellow and silver are dilute conditions of black, red and blue, respectively. Indeed, this might have been surmised from their appearance, but the fact was substantiated by their behavior in the breeding tests. As has been found in other animals, notably in rabbits and mice, the dilute condition depends upon a single factor, or more strictly the absence of a factor, which produces the effect upon whatever color it chances to be associated with. In other words, "intense" is dominant to "dilute," that is, if the factor for the intense condition is present, the color of the bird takes that appearance. This relationship, in the case of blue and silver, has been pointed out by Bonhote and Smalley (p. 603).[2]

Although the earlier experiments showed the general relationships of these characters, it was only by the results of certain experiments of the past year that the interesting relationship of the intense and dilute condition to sex has come to light. No secondary sex characters (in the ordinary sense) exist in pigeons, and as a consequence there is no way of determining the sex of the birds until they are old enough to reveal it by their behavior. In the case of certain crosses made last year, in which the male parent was a dilute (yellow or dun) and the female a black baldhead,[3] both black and dun offspring were produced, and it became evident this spring that all the blacks were males, while all the duns were females. The following examples will serve to illustrate.

*Case I.*

Parents: ♂ 540 B, dun
♀ 647 A, black baldhead.

Offspring:
790 A, black, ♂
790 B, black, ♂
847 A, dun, ♀
893 A, black, ♂
893 B, dun, ♀
954 A, dun, ♀

[1] Contributions from the Laboratory of Experimental Breeding, Wisconsin Agricultural Experiment Station, No. 1.

[2] Bonhote and Smalley, "On Color and Color-pattern Inheritance in Pigeons," *Proc. Zool. Soc.*, London, 1911, pp. 601–619, Pls. XXIII.–XXVI.

[3] In this discussion pattern is disregarded, since it is due to independent factors with which we are not at present concerned.