

New York and Maine. He will be assisted by Mr. E. M. Kindle.

Mr. Bailey Willis will continue the supervision of the investigations in areal and stratigraphic geology. He will visit field parties in various parts of the United States and will investigate the stratigraphy along the eastern base of the Rocky Mountains in Montana and Wyoming.

Professor J. E. Wolff will continue the investigation of the areal and structural geology in the crystalline areas of New Jersey and southern Vermont.

July 12, 1902.

SCIENTIFIC BOOKS.

Lehrbuch der vergleichenden Entwicklungsgeschichte der wirbellosen Thiere. Allgemeiner Theil. Erste Lieferung. Erste und Zweite Auflage. By E. KORSCHOLT and K. HEIDER. Jena, Gustav Fischer. 1902. Pp. x+538; 318 figs.

When the third and final instalment of the 'special part' of the 'Lehrbuch der vergleichenden Entwicklungsgeschichte der wirbellosen Thiere,' by Professors Korschelt and Heider, made its appearance, zoologists who had the good fortune to be familiar with the work began to look forward with no little eagerness to the appearance of the 'general part.' It was, however, a case of hope long deferred, but now, after a lapse of nine years, expectations are in the way of being fulfilled. Our knowledge of the embryology of the invertebrates has increased greatly in the interval and a demand has arisen for a new edition of the 'special part,' but the authors, feeling that they were still in debt to the public to the extent of the general part, have decided to complete the work as originally planned before beginning a revision. As a result we have now before us a first instalment of the 'general part,' which is at once an earnest for the completion of the first edition and the beginning of the second.

Zoologists will find, however, for the loss resulting from the long postponement of the volume, ample compensation in the greater

thoroughness with which it is now possible to discuss the general problems of development. In the last decade the standpoint from which these problems are regarded has shifted greatly; the mountain tops, from which they were formerly seen but dimly, have been left behind and we are now upon the nearer plains, with numerous difficulties, it is true, still to be overcome, but with the advantage that we have come into actual contact with them and can, at close range, lay our plans for their surmounting. And that this is the case is largely due to the results obtained from experimental embryology.

In the present volume will be found one of the clearest and fullest statements of the results and aims of this department of investigation which has yet been presented. The first three chapters or almost half the volume is devoted to it, the first chapter, after a brief introduction discussing the influence of external stimuli on development; the second, the determination problem; and the third, the effects of internal factors. To one familiar with the 'special part' of the work it will suffice to say that the facts are presented in the present volume with the same wealth of detail and clearness of exposition that characterized the earlier volumes and to these there is again added a critical and judicious estimate of the value of the facts. The authors have carefully avoided the advocacy of extreme positions and have maintained throughout what may be termed a broadly conservative attitude, compared with views which have been promulgated by some recent writers. It is impossible to discuss here in detail the various topics considered in the volume, but a few quotations may not be out of place to indicate the standpoint of the authors on some of the more general problems which confront us.

"It results from this that we err in endeavoring to give a general answer to the question whether it is preformation or epigenesis which controls the phenomena of development. We must particularize and endeavor by experiment to answer this question for each individual stage and each form. It will be found that in many cases the development of a certain organ or some morphological relation

(axial or direction relations) is determined rather in the sense of a mosaic-work by self-differentiation; in other cases, on the contrary, it may be due to differentiation dependent upon the regulatory influences of the whole upon its parts. In many cases both these principles of development are commingled, frequently in a marvellous manner, in the formation of some complicated part, so that we must endeavor to determine by a thorough analysis in what respect self-differentiation and in what dependent differentiation predominates."

And again, "It is a question * * * whether the possibility of 'analyzing animal ontogeny into a series of induction phenomena' (Herbst) is conceivable, or whether still other components must be recognized. In this connection there is especially noteworthy the newer standpoint of Driesch, who, from the problem of the localization of the developmental processes, has been led to the opinion that other special vital components, which he figuratively terms forces acting from a distance, must be recognized. We are not yet convinced that the former of the possibilities mentioned above is at present to be regarded as completely excluded, and in this respect we agree with the conclusions of von Hanstein."

The fourth and fifth chapters, which complete the volume, treat of the ovum and oögenesis and of the spermatozoon and spermatogenesis. Here again there can be only praise for clearness in the arrangement of the topics and in their presentation, and it may be added that, for the sake of thoroughness, the germ cells of the vertebrates as well as of the invertebrates are brought within the scope of the discussion.

One is tempted to predict for the 'Lehrbuch,' when completed, an influence upon embryological research as great as that exerted by Balfour's classic 'Comparative Embryology.' Nowhere will there be found a work presenting more perfectly the facts and problems of embryology, and the gratitude of all zoologists is due to the authors for placing in their hands a book so reliable and authoritative. The concluding volume, which is to treat of maturation and fertilization, the general phenomena of segmentation and the for-

mation of the germ layers, is promised at an early date.

J. P. McM.

Among the Water-fowl. Observation, Adventure, Photography. A Popular Narrative Account of the Water-fowl as found in the Northern and Middle States, and Lower Canada, East of the Rocky Mountains. By HERBERT K. JOB. New York, Doubleday, Page & Co. 1902. Square 12mo. Pp. xxi+224, with many illustrations from photographs by the author.

Hunting with the camera has the double advantage of not decreasing the numbers of birds, while placing the results of the chase at the disposal of the public, instead of reserving it for a chosen few. In the present volume Mr. Job presents the results of many days' enthusiastic labor on the ponds and in the marshes of Dakota, on the Magdalen Islands and the historic Bird Rocks, and among the islands off the New England coast. From these we get a very clear idea of the breeding habits of many of our water-fowl; we learn how the auk and murre build no nest at all, are introduced to the slatternly homekeeping of the grebes and are shown the well-built and warmly lined nests of the ducks. Most of the water birds that breed within the limits of the United States have posed in front of Mr. Job's camera, or if not the birds, their nests have been photographed. And of ducks alone the author tells us he has found the nests of nineteen species. Perhaps the most interesting chapters are those relating to the grebes, since from their manner of breeding the nests are not readily accessible; and these nests are so low and so carelessly built that the loss of eggs must be very great. Mr. Job aptly terms the grebes 'the submerged tenth,' and in reading his account one is led to wonder if that great diver of old, Hesperornis, bred after the fashion of the grebes, since he must have been even more aquatic in habit.

It is not pleasant to recall that these same grebes are being slaughtered by thousands on their breeding grounds in California, and it is even more painful to read of the shooting of breeding birds on the Great Bird Rock.