(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 formation 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.

The Canadian Government should absolutely prohibit all shooting on the Bird Rocks and all taking of eggs after the first of June. In pleasing contrast to this Mr. Job tells of the increase of gulls and terns at some localities on the New England coast, where they have been protected. He shows us these gulls and their nests, not only on the ground, but perched in spruce trees, where most of us would hardly think of looking for such birds. The largest colony of gulls described was in Dakota, where Mr. Job found thousands of Franklin's rosy gull breeding in and about a shallow lake, the nests being so numerous as to be often within a few feet of one another. Some of the best views in the book are from this colony, but perhaps the most striking are some of gulls in full flight, taken by Mr. von Bargen in San Francisco Bay.

Not quite all of Mr. Job's hunting was done with a camera, for he gives some very vivid glimpses of sea duck shooting off the Massachusetts coast, although, truth to tell, these are the exceptions.

The ornithologist and the casual reader will find this book most enjoyable, full of pleasantly given information, accompanied by illustrations that illustrate. Some of these are not quite up to the modern standard, but when we read how many of them were obtained we cease to wonder at this, and can only admire the pluck and perseverance that obtained them. F. A. L.

Die Bakterien. By Johs Schmidt and Fr. Weis. Jena, Gustav Fischer. Pp. 406.

The extraordinary development of the science of bacteriology has resulted in the production in the last fifteen years of a large number of manuals and text-books devoted to various phases of this general subject. Books upon general bacteriology have appeared in many languages and it would hardly seem that there could be found room for another work upon the same general subject. The authors of the book before us have, however, found a niche which has been hitherto unoccupied and which they have succeeded in satisfactorily filling. Bacteriology is preeminently a *practical* study. At first it created an immense amount of interest because of its application to the fascinating subject of disease, and more recently because of its intensely practical value to the agriculturist. Most works on bacteria have, therefore, devoted at least a large part of their attention to the practical applications of bacteriology in one direction or another. The works upon bacteriology which may be now found in our libraries are devoted in part to the study of bacteria as scientific objects, and in part to their relations to disease or to natural phenomena with which they have been found to be so intimately associated. The work of Schmidt and Weis leaves out of consideration all practical considerations and all practical applications of bacteriology and is devoted wholly to the study of bacteria from a standpoint of pure science.

The authors divide the subject into three sections. In the first they study the morphology and the systematic relations of bacteria; in the second their physiological relation; and in the third the systematic relations of the most important of the species of bacteria which have been described in literature. The work has the further advantage that of the two authors, one has been able to devote himself to the morphology and systematic study, and the other to the physiological study of bacteria. The result of this is that both sides of the study of bacteriology are more satisfactorily and authoritatively treated than when a single author attempts to deal with both aspects of this somewhat complicated subject. The work becomes, therefore, one of special value; its treatment of the problems considered is clear, concise and authoritative. It shows the greatest familiarity with the most recent advances and discoveries in connection with bacteriology, and presents all of the subject considered in a clear and sometimes in a fresh light, which is very suggestive. The language which is used is simple, straightforward and extremely clear, and on the whole there is probably no work yet published which contains such a clear, concise and authoritative account of the morphology and physiology of these immensely important microorganisms.