questions, however, can never be usefully determined until there exists on record a basis on which to work, in the form of a detailed description on each species accompanied, as far as practicable, by a figure. The scheme, therefore, includes provision for the publication of the scientific results in a book uniform with the sumptuous volume which Dr. Anderson has recently issued on the 'Reptiles and Batrachians of Egypt.' This work forms the first volume of the 'Zoology of Egypt.' He is at present engaged in working out the collections of mammals on which the second volume will be based. The 'Fishes of the Nile' will form the third volume of this monumental record of the fauna of the country.

SCIENTIFIC BOOKS.

Birds. By A. H. EVANS, M.A., Clare College, Cambridge. London, Macmillan & Co., Limited; New York, The Macmillan Company. 1899. 8vo. 144 text cuts. Pp. xvi + 635. Price, $3.50.

Mr. Evans's 'Birds' forms Vol. IX. of the 'Cambridge Natural History,' and is intended as a popular systematic review of the class Aves. In a volume of 650 pages it is, of course, impossible to treat in much detail any of the one hundred and thirty odd families of birds, or to particularize respecting many of the 12,000 to 13,000 or more species now recognized by systematists. It would seem, however, that a little more space might have been profitably given to the generalities of the subject, as structure, classification, geographical distribution, migration, etc., all of which is compressed into the short space of twenty-two pages, of which three are devoted to the terminology of the external parts of a bird. The remarks on classification and geographical distribution are mainly historical. Mr. Evans adopts, with 'some slight modifications,' Dr. Gadow's scheme of classification and Sclater's scheme of geographical areas. In referring to the wide differences of opinion among authorities on the subject of genera and species he says: "It cannot be denied that genera and species are merely 'convenient bundles,' and that divisions of either, if carried too far, defeat the object for which classification is intended. Genera are only more distinct from species, and species from races, because the intervening links have disappeared; and if we could have before us the complete series which, according to the doctrine of evolution, has at some time existed neither genus nor species would be capable of definition any more than races in many cases; while the same remark will apply to the larger groups." While such statements are not new they have not been presented in popular works, the lay reader being allowed to retain the old idea of the tangible nature of generic and specific groups. The tendency among certain systematists to recognize subspecies on the basis of the slightest recognizable differences leads naturally to the multiplication of genera, and the increase of subfamilies, etc., to conform, so to speak, to the new unit of measurement consequent upon the recognition, in nomenclature, of the grade of differentiation that is considered as a sufficient basis for 'races' or subspecies. It is to this, doubtless, that Mr. Evans alludes as being likely to 'defeat the object for which classification was intended.'

Beginning with *Archæopteryx*, and ending with the Finches, the various groups of birds are passed briefly in review. The characters of the ordinal, subordinal and family groups are succinctly stated, and some little account is given of the number, distribution and habits of the species, the latter usually in general terms. Very little is said about any particular species, though sometimes a characteristic member of a group is taken as the subject of more definite remark, or in cases where the number of species is so few that something may be said of each. The reader may be thus often disappointed, in seeking information regarding particular species, to find little, if any, reference to the object of his search. In a work of the dimensions of the present volume this must be inevitable, yet it will prove a convenient source of information on the general subject of bird life throughout the world. References to more detailed accounts of species or groups of particular interest are, however, often supplied in foot notes. Only about one-sixth of the work is de-

voted to the *Passeriformes*, which nearly equal in number of species the rest of the class, only a few pages being allotted to even the larger families; and the various generic groups are mentioned, as a rule, only by their technical generic names. The book is thus evidently not really adapted to beginners, nor wholly suited to the general reader, though apparently designed 'not only for the tyro in ornithology, but also for the traveller or resident in foreign parts interested in the subject.' The woodcuts that quite fully illustrate the text are, for the most part, excellent, and prepared especially for the work by G. E. Lodge; others are familiar through frequent previous use. Considering the limitation of space imposed for the subject, the author has, perhaps, supplied all that could be rightfully expected, and has certainly shown himself to be 'up to date' in all of the essentials of his subject.

J. A. A.

Experimental Morphology. By CHARLES B. DAVENPORT. New York and London, The Macmillan Company. 1899. Part Second. Pp. 228.

The second part of Davenport's Experimental Morphology that has just appeared deals entirely with phenomena of growth. The first volume described the effects of chemical and physical agents upon protoplosm, and it is intended to devote the third volume to cell-division and the fourth to differentiation. The author states that it is the aim of this series 'so to exhibit our present knowledge in the field of experimental morphology as to indicate the direction for further research.'

The present volume gives a clear, brief statement of what is known in regard to growth in plants and animals. Most of the illustrations are taken from plant physiology, and it may, therefore, be questioned whether a zoologist is in position to summarize so large and important a field of botanical research, but in justification it should be stated that Davenport has attempted to deal with the subject from a common biological standpoint.

In reading this volume one cannot fail to be impressed by the enormous difference in our knowledge of growth-phenomena in plants and animals. The subjects dealt with cover one of the most interesting fields of biological study—the responses of organisms to their surroundings and the relation of these responses to the conditions of life under which the form is living or has lived in the past. The introductory chapter is intended to give an idea of normal growth. Organic growth is defined as increase in volume—'it is not development, not differentiation and not increase in mass.' A broad definition of this sort, while convenient to include a large number of changes resulting in 'an increase in volume,' may lead to difficulties if an attempt is made to find a common explanation of all the phenomena included in the definition, for the processes that take place in plants and animals that produce an increase in volume may be entirely different in their nature. The author has skillfully avoided this pitfall in most cases, although at times one cannot but feel that a most heterogeneous collection of facts has been included in the same category.

The first chapter (XI.) deals with the effects of chemical agents on growth, and gives in compact form a large amount of useful information. In most cases the action of the substance seems to be purely physiological and only secondarily formative. It is not obvious why so much space should be given to pure plant physiology. It is, no doubt, difficult to draw the line between substances that act as foods and others that produce growth, since the latter often (but not always) depend on the former.

An admirable account of the rôle of water in growth is given in Chapter XII. Here the author has some new facts that bear on the problem. In the next chapter, dealing with the effect of density of the medium on growth, the results are summed up as showing that 'the diminution or growth is proportional to the osmotic action of the medium.' It is possible, however, that the effect is due also, in part, to the direct injurious action of the salts used to increase the density of the fluids. If due to osmotic action alone, then, the results that follow when different substances are used should be in proportion to their osmotic equivalents, but the few facts that are given do not entirely support this general conclusion.

In Chapter XIV. the effect of molar agents is