over, in exposed places the wind is sure to drive the film of oil to one side and make it more or less ineffectual. It therefore appears that oiling for the control of these mosquitoes is not practical. Drainage, in many cases, can not be considered on account of the numerous small pools in which the larvæ occur.

The difficulty apparently has been solved in a recent suggestion by Dr. Adolf Eysell.[1] Discussing a recent pamphlet on mosquitoes by P. Sack, he criticizes the antiquated views and states that in Germany only three species of mosquitoes, *Culex pipiens, Culiseta annulatus* and *Anopheles maculipennis,* hibernate as imagos and that these are distinctly house-mosquitoes. All the other species, including two of Anopheles, are "wild" and hibernate in the egg or larva state. For the control of those hibernating as eggs Eysell suggests an easy method which should prove effective. It is the removal and burning, late in the autumn, of the old dead leaves and plant débris from the dried-out pools in which the larvæ would later appear. He further suggests that when it is inadvisable or impracticable to burn the egg-bearing leaves they be stacked on higher ground in such a way that they can not be carried back into the depressions by wind or rain. The latter method appears less effectual to the writer on account of the difficulty, at least in many localities, of finding permanently dry spots for such plant-rubbish. When one considers the very small amount of water that is necessary for the development of mosquitoes (the writer has found larvæ and pupæ in puddles less than an inch deep on practically level ground) and the possibility of heavy rains hatching the eggs and carrying away the young larvæ, this method seems less promising. The burning of the accumulations of leaves and rubbish from depressions of the ground, however, should give the best results. It is to be hoped that some one in a locality with well-determined mosquito conditions will give this method a fair trial.

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[1] *Entomol. Mitteilungen,* Vol. I., No. 11, November, 1912, p. 366.

SCIENTIFIC BOOKS

Comparative Anatomy of Vertebrates. By J. S. Kingsley, Professor of Biology in Tufts College. Philadelphia, P. Blakiston's Son & Co. 1912. Pp. 401.

The author's purpose in writing this text-book, as stated in the preface, is to present a volume of moderate size which may serve as a framework around which the facts learned by the student in laboratory work in vertebrate anatomy may be grouped so that their bearings may be readily recognized and a broad conception of vertebrate structure may be obtained. "In order that this may be realized embryology is made the basis, the various structures being traced from the undifferentiated egg into the adult condition." "There has been no attempt to describe the structure of any species in detail, but rather to outline the general morphology of all vertebrates."

The task of preparing a text-book of this kind limited to a volume of moderate size is extremely difficult. Morphology, unlike physiology, or unlike chemistry or physics, lends itself to relatively few broad generalizations that may be stated without reserve. It deals essentially with data concerning the structure of a vast number of individuals in the adult condition and their development. While organisms are more or less readily classed into various broad and narrow groups according to the details of their structure and the genetic relationship of organisms, on the whole, may be most readily deduced from structural resemblances, nevertheless it remains true that living things are essentially individualistic in the character of their organic structure. Generalizations concerned with the structure of the tissues are much broader than those concerned with gross organic structure. The relatively simple conditions characteristic of the early stages in embryonic development also lend themselves to comparatively broad generalizations. The author, therefore, does well to devote rather more attention to the histological and embryological aspects of the subject than is customary in text-books of this character.

The introduction deals principally with the broader aspects of vertebrate embryology and histology. There then follow accounts of the integument, the skeleton, the cœlom, the muscular system, the nervous system, the sense organs, the digestive organs, the respiratory organs, the organs of circulation, the urogenital system, the fetal envelopes and the adrenal organs. A bibliography of the more accessible books and monographs dealing with the subjects treated, and a list of definitions of systematic names used in the text precede the index. The figures used to illustrate the text are, in large part, original.

It would probably be impossible for an author in a text-book of this size to condense biological generalizations in a manner wholly satisfactory at all times to other students of the subject. Thus, for instance, in describing the neuron Kingsley states that "the processes are physiologically divisible into afferent and efferent tracts, the body of the cell being the place for the regulation and correlation of the impulses and, apparently, in many cells for the inauguration of new impulses." Most neurologists would be inclined to consider the primary function of the cell body to be the regulation of the nutrition of the neuron. Kingsley does not seem to discriminate in the text between "dendrites" and "telodendrons." It is quite certain that the corium is not derived wholly from the somatic wall of the myotomes, as is implied in Kingsley's description of the development of the integument. In describing the articulations of the endoskeleton Kingsley states that "the bones may be so articulated that one can move on the other (diarthrosis), or there may be no motion possible (synarthrosis), each with several varieties." These brief descriptions of the two main types of joints are certainly not happily chosen. In describing entochondrostosis the author states that the cartilage becomes broken down in the interior, some of the cells becoming modified into osteoblasts. This is not the generally accepted view of the process at present. The notochord is certainly not of entodermal origin throughout the vertebrates. In describing the vertebræ the author would have done well to state what becomes of the costal elements of the lumbar and sacral vertebræ. While the use of the term "anterior" to mean the head-end of the animal and the term "posterior" to mean the tail-end of the animal is satisfactory for all vertebrates, including man, it is a mistake to translate "anterior" into "front," and "posterior" into "behind," as may be seen from the following description: "In man it (the sternum) consists of three parts, a manubrium in front, a middle piece, and a xiphoid (ensiform) process behind." The description of the origin of the muscles of the diaphragm in mammals is incorrect and nothing is stated about the interesting nature of the innervation of the diaphragm. The sternocleidomastoid muscle should not be placed in the same group with the scalene and intercostal muscles. The author's division of the muscles of the limb into intrinsic and extrinsic does not seem to aid in giving a clear picture of the morphology of the limb musculature. The Vidian nerve does not represent a distinct sympathetic trunk. The width between the bases of the pillar cells in the organ of Corti increases from the base to the apex of the cochlea instead of decreasing, as described by the author. It is incorrect to describe the duodenum as that part of the alimentary canal which extends from the pyloris to the entrance of the bile duct. The text description of the embryonic origin of the thyroid is unsatisfactory, and the parathyroid glands are not mentioned. The epiglottis does not fold back toward the glottis during deglutition. Hemoglobin does not combine with carbon dioxide. The origin of most of the larger blood vessels in the body from embryonic vascular plexuses, which forms so striking a feature of the development of the circulatory system, is not clearly described by the author, but, on the other hand, the doubtful theory of the development of blood vessels as remnants of the segmentation cavity has a couple of paragraphs devoted to it.

The proof-reading appears at times to have been somewhat careless. Fig. 22 is upside

down. The lettering on the coracoid process, Fig. 108, is incorrect. The olecranon process is described on page 120 as extended beyond the elbow joint to the attachment of the extensor muscles of the lower limb. The lettering of the pancreatic duct in Fig. 242 does not correspond with that of the legend.

Kingsley's book lends itself for comparison most readily with Wiedersheim's "Comparative Anatomy of Vertebrates," especially with the English edition edited by W. N. Parker. The general field covered is similar, although there are about one hundred more pages in Wiedersheim. Wiedersheim has the advantage of having been extensively used and revised since the first edition in 1882, so that the weaker parts have been gradually strengthened and the cruder errors eliminated. On the other hand, a text-book revised from year to year over so long a period may display many points of view less satisfactorily than a text-book newly written. The relatively greater attention given by Kingsley to histology and embryology is a distinct advantage and might be satisfactorily carried out further. On the other hand, both illustrations and text descriptions are, in many phases, clearer in Wiedersheim's than in Kingsley's text-book. The bibliography given in Wiedersheim is far more extensive, but, on the other hand, that given in Kingsley is, on the whole, well selected, and, possibly, for beginning students, by being less extensive may be more useful.

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The Growth of Groups in the Animal Kingdom. By R. E. Lloyd, M.B., D.Sc. London, Longmans, Green and Co. 1912. Pp. 185, with two colored plates. Price $1.75 net.

"The aim of this small book is to lessen the belief in natural selection as a creative agency." "The word group appears in the title of this work and will be found throughout the text. It is used in place of the more usual terms species, sub-species and variety." "A group is a number of individuals (more than one), each possessing some particular character or characters which are chosen arbitrarily as the distinguishing marks of that group." "From a practical point of view species are those groups which have been described as such."

Although the idea expressed in the last quoted sentence is by no means novel, it is interesting as illustrative of a change which seems to be coming over biology. Many will still dispute both the author's and the reviewer's statements. However, it is indisputable that not only is the "method of the origin of species an open question," but it is more than ever a question as to what a species is if it be more than a mere convention. It is curious that so many well-informed taxonomists accept evolution as a principle, but stick to the independent creation of species in practise. The "splitters" are unconsciously breaking down this practise, for species are being based on fewer and less important characters than ever. The process is a *reductio ad absurdum* and can not help but end in the definition of species just given. The author seems justified in saying: "If it is true that our conception of a species has changed it is necessary to modify our opinion as to the origin of a species. Some of those who are interested in the origin of species do not know how small are the differential gaps which separate our modern species."

About half of the book is devoted to an account of the different sorts of rats found among about 100,000 killed during the work against the plague in India. Some of these have already received names differentiating them from *Mus rattus*. Other have not. As a contribution to our knowledge of the amount of readily appreciable variation in a feral "group," this work is valuable. It is the only important original thing the book contains and is followed by a lengthy résumé of some of Tower's work upon *Leptinotarsa*. Unfortunately the author did not subject the rat "mutants" to experimental tests, nor does he refer to the breeding work already done with rats. The facts collected are believed to be in harmony with that part of the mutation theory which asserts that the attributes of