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ANIMAL BIOLOGY

BY

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PREFACE

The fundamental propositions behind this text—the platform, so to speak, upon which it has been written—are as follows:

1. Life has a chemicophysical basis.
2. Life phenomena are the outgrowth of organization.
3. The central fact in life is metabolism.
4. Animals may be arranged in a progressive series with reference to organization.
5. The most complex animals are the most effective and also the most efficient from a metabolic standpoint.
6. Man, as the highest of animals, can learn by the study of animal life the principles of the most effective living.
7. He can also understand more fully his place in nature and can more justly judge the actions of his fellows; this in turn may contribute to his intellectual and spiritual development.
8. Every problem concerned with living is essentially a biological problem and capable of analysis and solution by the application of biological principles.

The book has been prepared for use as a class textbook, not as a work of reference, and contains an amount of material which experience has shown can be covered in three recitation periods a week for one year. Since it will generally be used in beginning classes in which the majority of the students are freshmen and sophomores, an effort has been made to present the material in such a manner that it can be easily handled by such students with normal preparation. In other words the idea is to give the student an amount of material which he can cover in a way he can understand. Also since the majority of the individuals in such classes do not intend to specialize in the field of zoology, technicalities have been minimized and emphasis placed upon the broader aspects of the science and the general significance of the data presented, leaving to subsequent courses the filling in of details for students majoring in the subject.

Feeling that the place to acquire a knowledge of the structure of animals is in the laboratory and not in the classroom, the author has reduced the amount of morphological material. In the case of those types handled in both class and laboratory, the facts given here are intended to tie the two together or to summarize the knowledge gained in the laboratory. In the University of Nebraska the "types method"

is followed in the laboratory work and two courses are offered, one carrying a credit of ten semester hours and the other six, and differing in the number of types covered. In the longer course, three recitation periods a week are required; in the shorter, two.

It is suggested that in the selection of material for a shorter course the lightening of the load be done by taking in the classroom only a brief survey of Chaps. XV to XVII, XXV to XXXIX, and XLI to LX, inclusive, picking out sections here and there for the particular attention of the students and letting the rest be merely read for the general impression gained. The numbering of the sections makes possible the assignment of certain ones for more intensive study and of others for consideration in connection with the laboratory work.

In the topics handled in Part V, three aims have been in view: (1) To give a general survey of the field of zoology with a fairly even emphasis upon the various aspects; (2) to review many of the facts presented in previous parts, putting them in a different setting, and developing on the part of the student a broader view and a greater ability to apply these facts; and (3) to establish points of attachment to which advanced courses in the department may be articulated. It is felt by the author that these chapters afford a means for more ready correlation between the general subject and such special courses. Cross references facilitate the development of the habit of thoughtful reviewing and the perception of analogies and homologies, resemblances and differences, that form a part of the basis for true scholarship.

Since correct spelling and exact pronunciation are among the clearest indications of careful training, the pronunciations of phylum and class names are given in the body of the text and the pronunciations of words in the Glossary are given. That the student may be led to observe the derivations of technical terms those of the phylum and class names are given and many common Greek and Latin roots are included in the Glossary. Italics are used in the text to indicate emphasis and also to call the attention of the student to words the definitions of which are to be learned.

In the preparation of the book the author has made free use of other texts and of works of reference, particularly of Parker and Haswell's "Text-book of Zoology," a copy of which should be available to every teacher, and of the volumes of the Cambridge Natural History Series. In connection with illustrations borrowed from other books acknowledgment is made of their sources and of the courtesy of the different publishers in granting permission. Of the figures, seventy-two are from borrowed engravings or were reproduced photographically by F. H. Shoemaker. Two of the original drawings (Figs. 108 and 115) were made by S. Fred Prince. With these exceptions all of the illustrations, either redrawn or original, are from drawings by the author's son, Robert A. Wolcott.

The author desires to acknowledge the help of many colleagues who have generously responded to requests for information and assistance, and, particularly, the advice and suggestions received from those associated with him in the zoological department at the University of Nebraska—D. D. Whitney, I. H. Blake, H. W. Manter, Otis Wade, E. F. Powell, H. E. Low, and G. E. Hudson. In the preparation of the manuscript he has profited by the intelligent cooperation of his assistant, Elmer Palmatier.

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