

**A LABORATORY
MANUAL OF
INVERTEBRATE ZOOLOGY**

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A Laboratory Manual of Invertebrate Zoölogy by Gilman A. Drew

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GILMAN A. DREW

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INVERTEBRATE
ZOOLOGY

BY

GILMAN A. DREW, PH.D.

ASSISTANT DIRECTOR OF THE MARINE BIOLOGICAL LABORATORY,
WOODS HOLE, MASSACHUSETTS

WITH THE AID OF

FORMER AND PRESENT MEMBERS OF THE
ZOOLOGICAL STAFF OF INSTRUCTORS AT
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SECOND EDITION, REVISED

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PREFACE TO THE SECOND EDITION

THIS edition contains descriptions for the study of a few forms and a rather simple literature list that were not included in the first edition. There has been no attempt to make the literature list at all complete, but it seems desirable to refer students to some of the available papers, for by consulting them in connection with their laboratory work they become acquainted with methods of work and develop the spirit of research that is the beginning of real understanding.

Certain text-books should be used freely for reference. These have not been mentioned under the special heads, as they apply to practically all groups. Among these may be mentioned Parker and Haswell's "Text-book of Zoölogy," Macmillan; Lankester's "A Treatise on Zoölogy," Black; Harmer and Shipley's "The Cambridge Natural History," Macmillan; Lang's "Lehrbuch der Vergleichenden Anatomie," Fischer; or the English translation, Macmillan; Korschelt and Heider's "Lehrbuch der Vergleichenden Entwicklungsgeschichte," Fischer; or the English translation, Macmillan; and Delage et Hérouard's "Traité de Zoölogie Concrete," Schmidt.

For the many suggestions and criticisms from zoölogical friends the author is deeply grateful. To Dr. Lorande L. Woodruff, who has given much attention to the revision of the Protozoa, and to Dr. Winterton C. Curtis and Dr. Caswell Grave, who, with the men associated with them as instructors in the Zoölogy Course at the Marine Biological Laboratory, have given much attention to corrections and additions throughout the manual, special acknowledgments are due, for they have not only saved the author much labor, but have added materially to the value of the revision.

THE AUTHOR.

July, 1913.

PREFACE.

THE present manual has for its basis a set of laboratory directions prepared by members of the staff of instructors to meet the needs of the class in general zoölogy at the Marine Biological Laboratory of Woods Hole, Massachusetts. Those who were associated with me in the preparation of the first notes were Dr. Robert W. Hall, Dr. James H. McGregor, Mr. Robert A. Budington and Dr. Caswell Grave. Other members of the staff who have either aided me in modifying the original notes or who have added others are Dr. Winterton C. Curtis, Dr. D. H. Tennant, Dr. Otto C. Glaser, Dr. Grant Smith, Dr. John H. McClellan and Dr. Lorande L. Woodruff. Each year for the past six years the directions have been changed where experiences indicated changes should be made.

Probably few instructors will find it desirable for their students to follow closely all that is given in this manual, but it has seemed better to arrange the matter in a logical order, and in some of the forms to call attention to only the important points of anatomy or adaptation, than to try to make the directions for each form complete in themselves. To make the directions for each form complete would necessarily add much labor for the student and would, by the repetition of well-known facts, tend to blunt some of the new and important points to be gained.

The type method of laboratory study has for many years been the prevailing method, but care needs to be exercised to keep students from making everything conform to type, and in leading them to see the wonderful adaptations that fit the different animals for their particular lives. The manual is not intended to lead students to a knowledge of comparative anatomy alone, but to an appreciation of adaptation as well.

It has fallen on me year by year to see that desirable changes were made in the directions, and it has finally been my lot to put them into their present form, but much of the credit belongs to the men who have been associated with me in the instruction work at the Marine Biological Laboratory.

THE AUTHOR.

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