

The background of the book cover is a brown, textured surface with numerous circular, crater-like indentations. In the upper right quadrant, there is a detailed illustration of a scud shrimp, which is light-colored with prominent red appendages and legs.

General Zoology

SIXTH EDITION

Villee • Walker • Barnes

General Zoology

Sixth Edition

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SAUNDERS COLLEGE PUBLISHING

Philadelphia New York Chicago San
Francisco Montreal Toronto London
Sydney Tokyo Mexico City Rio de Janeiro
Madrid

Address orders to:
383 Madison Avenue
New York, NY 10017

Address editorial correspondence to:
West Washington Square
Philadelphia, PA 19105

Text Typeface: Zapf Book
Compositor: Clarinda Company
Acquisitions Editor: Michael Brown
Developmental Assistant: Leesa Massey
Project Editor: Patrice L. Smith
Copyeditor: Rebecca Gruliow
Managing Editor & Art Director: Richard L. Moore
Art/Design Assistant: Virginia A. Bollard
Text Design: Caliber Design
Cover Design: Lawrence R. Didona
New Text Artwork: J & R Technical Services
Production Manager: Tim Frelick
Assistant Production Manager: Maureen Iannuzzi
Page Layout: Carol C. Bleistine

Cover credit: A male and female shrimp (*Perelemones imperator*) on a sea cucumber (*Bohadschiz graffei*). Courtesy of Charles R. Seaborn.

Library of Congress Cataloging in Publication Data

Villee, Claude Alvin, 1917-
General zoology

Includes bibliographies and index.

1. Zoology. I. Walker, Warren Franklin.
II. Barnes, Robert D. III. Title.
QL47.2.V5 1984 591 83-20253
ISBN 0-03-062451-7

GENERAL ZOOLOGY/6e

ISBN 0-03-062451-7

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All rights reserved. Printed in the United States of America.
Library of Congress catalog card number 83-20253

4567 032 987654321

CBS COLLEGE PUBLISHING
Saunders College Publishing
Holt, Rinehart and Winston
The Dryden Press

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Preface

A text book is remarkably like a living organism; it can grow (or decrease in size), adapt, evolve, and relate to its environment. In text books this process, which tends to occur cyclically, is termed a new edition. Our text of GENERAL ZOOLOGY is a prime example of one that changes greatly in form and substance from one edition to the next, yet remains unchanged in its goal of presenting clearly and understandably the theories and facts that constitute modern zoological science.

The sixth edition represents another major revision as we continue our effort to provide students and teachers with an accurate, up-to-date, and readable text. Many chapters have been rewritten and reorganized so that the sequence of chapters seems to be optimal. In Part I, the text begins with animal cells, their properties and the chemical basis of modern cell biology. This is followed in Part II by a presentation of the structure and functions of animals and their organ systems. We have used a comparative approach to the problems faced by all animals in their attempts to survive, and to the variety of solutions that the various groups have evolved. Symmetry, life style, skeletons, muscles, nutrition, gas exchange, circulatory systems, homeostasis, nervous systems, sense organs and hormonal controls are discussed in turn. A consideration of reproduction at the end of this section sets the stage for the discussion of the continuity of life in Part III. In this we consider both Mendelian and molecular aspects of genetics and follow with the basics of population genetics. The discussion of evolution, which has been extensively rewritten, develops from the discussion of population genetics and proceeds with discussions of evolutionary concepts and evidence.

Part IV deals with the immense diversity of animal forms, ranging from the protozoa (which most biologists now regard as protists, classified with algae and other unicellular organisms) and sponges (which lack most of

the features typical of animals) to the primates, including human beings. Part IV is introduced by a chapter on the origin of life and a discussion of the methods used to classify animals and to determine their evolutionary relationships. A summary of the major phyla concludes this chapter. Chapters are devoted to each of the major invertebrate phyla and to each of the classes of vertebrates. The vertebrates are considered in detail because of the comparisons possible with the human condition and because of their importance in tracing the evolution of human beings. Notable changes have been made in the discussion of flight, the evolution of endothermy, and reproductive patterns in mammals and in the discussion of human evolution.

Finally, in Part V we examine the relations of animals to their environment as evidenced by their behavior and by their interrelations with their environment both living (biotic) and nonliving (abiotic). The chapter on behavior has been rewritten to focus on concepts of comparative ethology and the evolution of behavior.

We have added many features that will make it easier for students to use the book. Each chapter begins with an Orientation, a brief statement of the chapter objectives and the main points on which the student should focus his or her attention. This is followed, in the chapters dealing with the animal groups, by a summary of the important features of the group. In addition to the information and concepts considered in the text, we have placed some less essential but illustrative material in separate boxes. The derivation of most important terms is given in the text where the term is first mentioned, and should assist the student in reaching an understanding of these new terms. The glossary and index have been combined so that the student need consult only one list to find the meaning of a term and where in the text it is defined and used.

This edition has many new illustrations, both color and black and white. Illustrations in color are used

where this will help clarify animal structure and depict the great beauty of many animal forms.

Acknowledgments

Many new illustrations have been prepared for this edition and we are deeply grateful for the care and artistry with which Mary Ann Nelson, Caroline Herbert, Britt Griswold, and Young Sohn prepared the many new line drawings. The contributions of other scientists and artists who have permitted us to use certain of their drawings and photographs are acknowledged with each figure. We also thank Jan Creidenberg for his help with various tasks in the preparation of the manuscript.

Our special thanks are due to Michael Brown, Lee Walters, and Leesa Massey for their help in developing this edition and to Patrice Smith for guiding it through the production phase. We are indebted to the following persons for the contribution of their time and experience to the sixth edition: Jerry M. Baskin, University of Kentucky; William A. Brueske, Humboldt State University; John A. Byers, University of Idaho; David Cook, Wayne State University; Fred Coyle, Western Carolina University; Jack A. Cranford, Virginia Polytechnic Institute; Gayle Davis, University of Alabama; Lee C. Drickamer, Williams College; William G. Dyer, University of Southern Illinois; Frank Fisher, Rice University; Lemuel Fraser, University of Wisconsin, Madison; Peter Gold-

man, Northeast Missouri State University; Judith Goodenough, University of Massachusetts, Amherst; Mark S. Hafner, Louisiana State University; W. Holt Harner, Broward Community College; Richard L. Hurley, Humboldt State University; Gerard F. Iwantsch, Fordham University; Gwilym S. Jones, Northeastern University; Byron H. Knapp, East Stroudsburg State College; Paul K. Lago, University of Mississippi; Harris J. Linder, University of Maryland; Margaret T. McCann; Elizabeth A. McMahan, University of North Carolina, Chapel Hill; Dale M. Madison, State University of New York, Binghamton; Donna Maglott, Howard University; Dean E. Metter, University of Missouri, Columbia; Dorothy B. Mooren, University of Wisconsin, Milwaukee; Willard C. Myser, The Ohio State University; David O. Norris, University of Colorado, Boulder; John A. Novak, Colgate University; Paul Peck, Montgomery College, Rockville; Robert Reed, Shippensburg State College; Daniel J. Simons, Montgomery College, Rockville; Curtis J. Swanson, Wayne State University; Barry D. Valentine, The Ohio State University; Frederick vom Saal, University of Missouri, Columbia; Harry Weller, Miami University of Ohio; F. M. Williams, Pennsylvania State University. We are grateful to them for their comments and suggestions, but we, of course, assume responsibility for any errors and shortcomings that remain.

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