LABORATORY GUIDE FOR THE STUDY OF THE FROG

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649445981

Laboratory Guide for the Study of the Frog by Bertram G. Smith

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

BERTRAM G. SMITH

LABORATORY GUIDE FOR THE STUDY OF THE FROG

Trieste

303

LABORATORY GUIDE

FOR THE STUDY OF

THE FROG

AN INTRODUCTION TO ANATOMY, HISTOLOGY AND PHYSIOLOGY

BY

BERTRAM G. SMITH, PH.D.

Associate Professor of Zoology in the Department of Natural Science, Michigan State Normal College, Ypsilanti

SECOND EDITION

PUBLISHED BY THE AUTHOR

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA.
1917

COPYRIGHT, 1917
BY BERTRAM G. SMITH

PREFACE.

For the introductory study of the structure and physiology of a typical vertebrate, there is no form better adapted than the common frog. To be sure, the frog is not so generalized in structure as the more primitive urodele; but this slight disadvantage is offset by the greater ease with which frogs may be obtained in large numbers, and the better development of the hind limbs is favorable for the study of muscles. Since the more specialized structures of the frog are mainly concerned with its mode of locomotion, these adaptations do not markedly affect the internal organs other than the skeleton and the muscles. In order that the student may realize in what respects the frog is modified from the primitive tetrapod type, comparison of the form and orientation of the body should be made with the more typical caudata; for this purpose articulated skeletons, as well as entire specimens, should be used.

The order of topics in this guide should be closely followed, since it is planned to give a distinct picture of each organ-system in its relation to the whole, with the greatest economy of time and material. If the student has not had previous training in biology, an exception should be made in the case of certain histological topics; it is best to begin the microscopical work with the study of some simple tissues, such as epithelium, blood, cartilage and perhaps also connective tissue and unstriated muscle fiber, before attempting the study of cross-sections of such complex organs as the intestine, stomach and kidney. An introductory ex-

035118

ercise of this nature is inserted in the preliminary directions. By following the sequence of topics in this guide, all the study of gross anatomy, excepting the work on the circulatory system and the skeleton, may be done on a single specimen. In case time is limited, the course may be shortened by a judicious omission of topics; in case material is limited, an entire frog may be saved for each student by omitting the special dissection of the venous system.

A first-hand knowledge of biological material, and training of the powers of observation and interpretation of biological phenomena, are assumed to be the primary aims of laboratory work in this field. In this guide these ends are sought by a combination of the verification method with the investigation or problem-solving method, in a manner suited to the needs of students with little or no previous experience in biological laboratory work. In using the verification method it is believed that more valuable results will be secured if descriptions, rather than drawings or diagrams, are used as a guide for study; the drawings made by the student then constitute a searching test of what he has actually observed. Charts and text-book figures may be used afterward in reviewing the subject. In general the laboratory work on a given topic should precede the lecture or text-book lesson on that topic. This method and order of work make it necessary that the laboratory guide shall be something more than a mere catalogue of the names of parts to be studied; the descriptions should be complete enough to enable the student to identify the structures, and the questions should call for observation and interpretation rather than for an exercise of the memory. In the solution of a problem involving more than a single observation, the motto

of the student should be "divide and conquer"; by focusing the attention upon one feature at a time, the various elements of a complex structure or process are gradually revealed. When properly carried out, such a laboratory course represents not only an important accessory to the classroom instruction in biological principles, but a training which in itself is of the highest value to the general student as well as to the future biologist.

BERTRAM G. SMITH.

STATE NORMAL COLLEGE, YPSILANTI, MICHIGAN,
January, 1917.

CONTENTS.

PRELIMINARY DIRECTIONS.

THE FROG.

APPENDIX.