

HANDBOOK OF PLANT DISSECTION

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9781760578183

Handbook of plant dissection by J. C. Arthur & John M. Coulter & Charles R. Barnes

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

J. C. ARTHUR & JOHN M. COULTER & CHARLES R. BARNES

HANDBOOK OF PLANT DISSECTION

HANDBOOK
OF
PLANT DISSECTION

BY

J. C. ARTHUR, M.Sc.,

Botanist to the New York Agricultural Experiment-Station,

CHARLES R. BARNES, M.A.,

Professor of Botany in Purdue University,

AND

JOHN M. COULTER, Ph.D.,

Professor of Botany in Wabash College,

EDITORS OF THE
BOTANICAL GAZETTE.



NEW YORK
HENRY HOLT AND COMPANY
1886

LIBRARY

COPYRIGHT, 1886,

BY

HENRY HOLT & CO.

Press of W. L. Mershon & Co.,

Rahway, N. J.

PREFACE.

A rich harvest of laboratory manuals has resulted to zoölogy from the publication of Huxley and Martin's Elementary Biology ten years ago. Although that work embraced both animals and plants with over half the examples from the latter, it has given rise to no similar aid to botanical study till the past year. The increasing laboratory facilities in this country seem to warrant the expectation that an elementary manual like the present work will now be found in many instances to afford welcome assistance to both teacher and pupil.

In 1882 one of the authors of this book drew up an outline of work for a few plants, which was used in the Summer School of Science of the University of Minnesota. Not long afterward the preparation of the present hand-book was actively undertaken by the three authors conjointly, and has since been gradually perfected and tested by repeated use with classes and individual students.

Although the present work is based upon Huxley and Martin's in form and mode of treatment for the laboratory part, it differs in excluding all matters of physiology so far as possible, as the present demands of vegetable physiology will hardly permit harmonious treatment along with a course of dissection.

In drawing up the outlines of work the aim has been to direct the student in a very careful and systematic examination of a few examples, so that while he is securing a knowledge of the main features of plant anatomy, he will

at the same time acquire the habit of close and critical observation, which is indispensable to the successful prosecution of natural history studies. To this end the directions for finding the different parts have been made as explicit as possible, and at the same time as little information given about them as seemed advisable; for the student having found the part is expected to examine it thoroughly until he has found out all that may be readily seen. This rule has been modified according to the difficulties to be overcome, and in extreme cases full information has been provided, which the student is only expected to verify. On the other hand, it will repeatedly happen that more may be learned by an acute observer than there is any hint of in the outlines, as the work, though deemed sufficiently exhaustive for the student, is far from being so for the specialist.

In the use of such outlines as these there is always danger that the student will slight the study of those parts which he is expected to work out for himself and only attempt to verify the portions where the information is fuller. If it be found that too great dependence is being placed on the manual it will be advisable to substitute plants allied to those named, thus withdrawing all exact information; the laboratory directions will still serve as a guide to the order and methods of examination.

It has been no part of the present aim to provide a key to the nomenclature of plant anatomy. When technical terms are used, as indeed is necessarily very frequent, they have usually been preceded by descriptive definitions, either direct or implied. A glossary is added to further assist the student, so that he may find as little difficulty with the names as possible, and devote himself chiefly to the objects themselves. On this account, and on account of the progressive series of forms which have been chosen, it is

hoped that the work will be found suitable not only for classes pursuing a regular course of lectures, but also for those who have never before studied botany, and for home use away from the assistance of a teacher.

The required apparatus, reagents and materials have been reduced to a minimum, difficult manipulations (except the cutting of sufficiently thin sections) have, to a large extent, been excluded, and the minute anatomy has been kept within the limits of the average microscope used in the botanical laboratories of this country. In short, the attempt has been to provide a guide to the study of a few common plants in which simple appliances, coupled with perseverance and keen observation on the part of the learner, are the only essentials.

Under "gross anatomy" the plant is first examined with the aid only of a hand lens, and then passing to "minute anatomy," every part is subjected to the compound microscope. A student's success in the latter may often be gauged by his ability to discover all there is to be seen under the former.

The laboratory work for each plant is preceded by directions for the preliminary finding and preparation of material. It is followed by annotations which serve a number of purposes: (1) to explain obscure matters, (2) to give additional information which for want of higher powers, special reagents or proper materials, the student is unable in the usual limited time to secure for himself, but which is essential to fully round out the subject, more especially, however, (3) to give some insight into the course of development from the lower to the higher forms which will serve as a thread on which the most important facts ascertained in the laboratory work may be strung, and not the least (4) to direct the student to sources of additional information by means of which he may pursue his inquiries as far as he

may choose. The annotations are necessarily fragmentary and disconnected, and the references to literature only sufficient to start the student in his researches.

January, 1886.

THE AUTHORS.

CONTENTS.

ILLUSTRATIONS IN GROSS ANATOMY.

Explanation of Plate I, - - - - -	x
-----------------------------------	---

ILLUSTRATIONS IN MINUTE ANATOMY.

Explanation of Plate II, - - - - -	xiii
------------------------------------	------

INTRODUCTION.

Instruments, - - - - -	1
Reagents, - - - - -	4
Care and use of microscope and lens, - - - - -	6
Section cutting, - - - - -	8
Mounting, - - - - -	11
Applying reagents, - - - - -	13
Care and use of material, - - - - -	15
Drawing, - - - - -	16
Books of reference, - - - - -	19

GREEN SLIME (*Protococcus viridis*).

Preliminary, - - - - -	22
Laboratory work, - - - - -	23
Annotations, - - - - -	25

DARK GREEN SCUM (*Oscillaria tenuis*).

Preliminary, - - - - -	28
Laboratory work, - - - - -	29
Annotations, - - - - -	31

COMMON POND SCUM (*Spirogyra quinina*).

Preliminary, - - - - -	32
Laboratory work, - - - - -	34
Annotations, - - - - -	39