

**EXPERIMENTAL
PLANT
PHYSIOLOGY**

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Experimental Plant Physiology by D. T. MacDougal

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EXPERIMENTAL

PLANT PHYSIOLOGY

BY
D. T. MACDOUGAL

University of Minnesota



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PREFACE.

THE appreciation shown toward the translation of Oels' *Pflanzenphysiologische Versuche* prepared by the present writer, together with the comments and suggestions from laboratories in which it has been used, has led to the preparation of this manual, which it is hoped will conform somewhat more nearly to the needs of American students. The general form of Oels' manual has been retained, and many cuts from the translation and a few paragraphs of the text have been repeated here without indication of their origin.

Only the more important and better established portions of the subject are treated, and these in the manner already in general use. With the rapid advance of investigation it is next to impossible that an elementary laboratory manual should include the latest results, especially when the essential points of many of them may yet be in controversy and need the critical treatment which is certainly not within the province of a work of this character. In the hands of an instructor in touch with current botanical thought, such deficiencies are easily supplied.

In the interests of precision, the term "assimilation" is here used exclusively to denote a general function of protoplasm, while the term "photosynthesis," which was introduced into the translation of Oels' manual (Preface and page 30), is adopted to signify the special process of forming carbohydrates from carbon dioxide and water in the presence of chlorophyll and sunlight.

The author is indebted to Mr. R. N. Day and Miss J. E. Tilden for the demonstration and drawing for Figure 32.

D. T. MACD.

MINNEAPOLIS, MINN., April 15, 1895.

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