HEP World's Classics

Plant Physiology and Ecology

植物生理生态学

FREDERIC EDWARD CLEMENTS

HIGHER EDUCATION PRESS

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内容简介

本书是美国著名植物生态学家克莱门茨的经典著作。本书首次将植物作为一个个体，探讨了植物的形态、性质与功能，以及生理生态学的基本内容，包括植物的应激反应，栖息地、水分、光照、温度等外部条件的变化对植物的影响等。除理论知识外，还包含大量实验操作。本书适合植物学、生态学及相关交叉学科的师生和热爱植物、亲近自然的大众阅读。

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Find Something Valuable

HEP World's Classics

There is a Chinese saying: "It is beneficial to open any book." It is even more fruitful to open and read classic books. The world is keeping on changing, but really fundamental and essential things stay the same since there is nothing new under the sun. Great ideas have been discovered and re-discovered, and they should be learnt and re-learnt. Classic books are our inheritance from all the previous generations and contain the best of knowledge and wisdom of all the people before us. They are timeless and universal. We cannot travel back in time, but we can converse with the originators of current theories through reading their books. Classic books have withstood the test of time. They are reliable and contain a wealth of original ideas. More importantly, they are also books which have not finished what they wanted or hoped to say. Consequently, they contain unearthed treasures and hidden seeds of new theories, which are waiting to be discovered. As it is often said: history is today. Proper understanding of the past work of giants is necessary to carry out properly the current and future researches and to make them to be a part of the history of science and mathematics. Reading classic books is not easy, but it is rewarding. Some modern interpretations and beautiful reformulations of the classics often miss the subtle and crucial points. Reading classics is also more than only accumulating knowledge, and the reader can learn from masters on how they asked questions, how they struggled to come up with new notions and theories to overcome problems, and answers to questions. Above all, probably the best reason to open classic books is the curiosity: what did people know, how did they express and communicate them, why did they do what they did? It can simply be fun!

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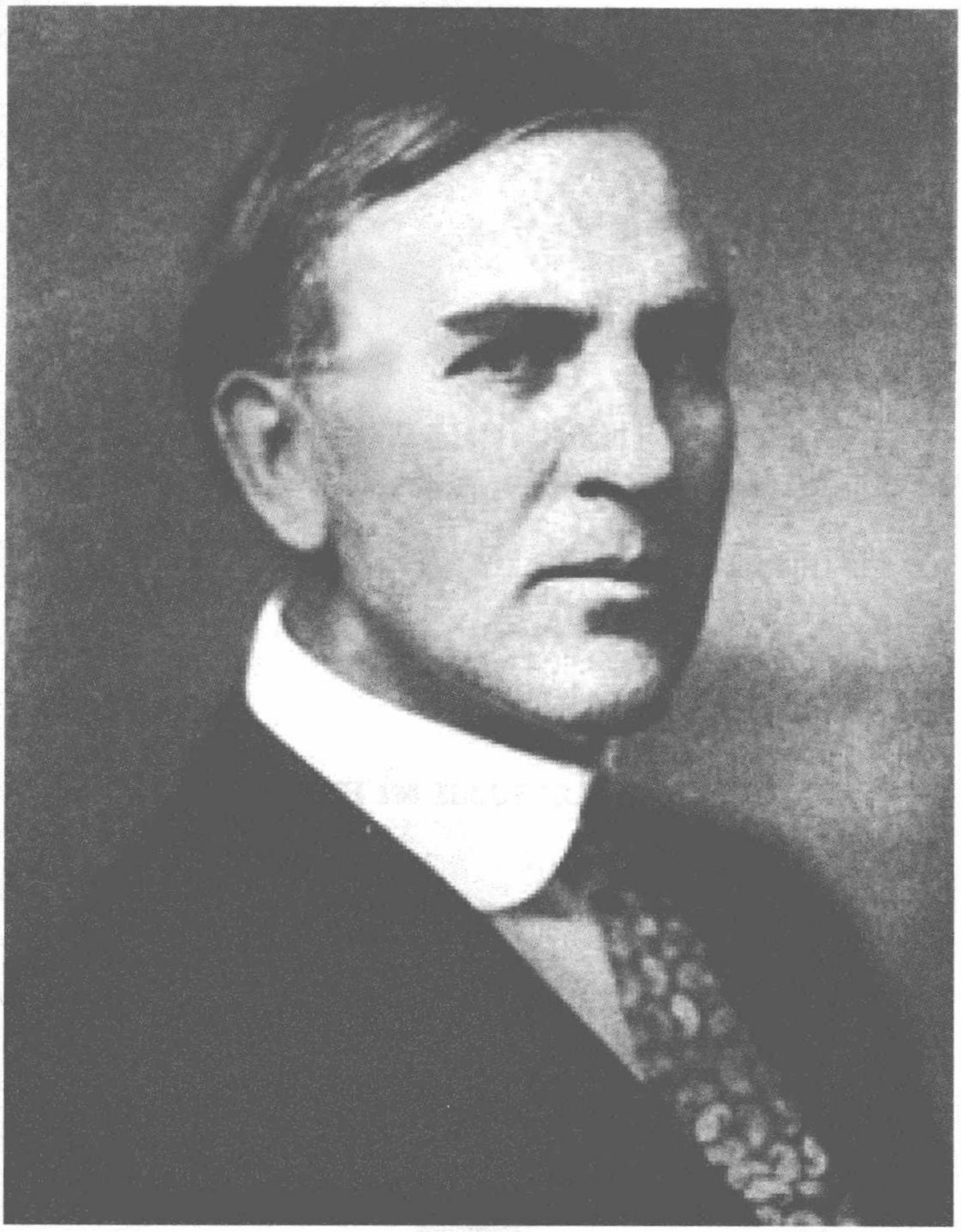

Frederic Edward Clements (1874—1945)

弗雷德里克 · 爱德华 · 克莱门茨 (Frederic Edward Clements, 1874—1945), 美国著名植物生态学家, 机体论学派代表人物。克莱门茨 1898 年取得博士学位, 1917—1941 年在华盛顿卡耐基研究所从事生态学研究。最重要的贡献是提出植物群落演替学说, 以及植物群落分布气候顶极或单元顶极理论。他还首次提出了生物群区 (biome) 的概念, 并将这一概念作为生物群体的基本单位。著有《植物的演替》(1916)、《植物演替和指示植物》(1928)、《植物生态学》(1925) 等。

PLANT PHYSIOLOGY

AND

ECOLOGY

BY

FREDERIC EDWARD CLEMENTS, PH.D.

Professor of Botany in the University of Minnesota

WITH 125 ILLUSTRATIONS

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PREFACE.

THE point of view and the methods of study first advanced in "Research Methods in Ecology" have proved so satisfactory in teaching as to make it desirable to embody them in a text-book. The present text has been based largely upon "Research Methods," though most of the matter is new or rewritten. The manner of treatment is essentially the same, but the subject-matter has been rearranged and broken up into a larger number of chapters. The plant is first considered as an individual, with respect to factor, function, and form, and then as a member of a plant group or formation.

The reasons for regarding ecology and physiology as essentially the same have been given elsewhere, and need not be repeated here. An endeavor has been made to give the various parts of this vast field their proper importance. Since ecology and physiology are merged, it is manifestly impossible to give to either what would be regarded as a complete treatment by a specialist in either line. No attempt has been made to touch all the points in each, but it is thought that nothing really fundamental has been omitted.

The book is intended for use with classes in second-year botany in college and university. In manuscript form, it has been in such use for two years with good results. Although the amount of laboratory and field work is large, it is possible to accomplish all of it in a course requiring 6–8 hours of laboratory time each week.

This can be done only by careful planning on the part of both instructor and student, and for this reason the following suggestions are offered as aids.

The instructor will find it imperative to plan in advance for the experiments for the whole year, in order that plants may be ready as needed. Seeds and fruits

for the study of migration should be collected in the fall. Shade tents, water-content series, and competition cultures must also be prepared early in the year. Types of hydrophytes, xerophytes, etc., should be grown in the plant-house in so far as possible. Students should be instructed to make duplicate plantings of all plants to be used in order to make sure of an adequate supply at all times. It has also been found desirable to teach the students the use of the paraffin method of embedding tissues, thus saving much time and securing better results. The work on adaptation to water and light is best carried on in the form of joint experiments, in which each student is assigned a definite part. In the experiments much use has been made of the common sunflower. This is on account of the ease with which it may be secured and grown, but when a larger choice is possible other plants may often be substituted to advantage.

In just as far as possible, the work of the student should be among plants out-of-doors. This is imperative in the chapters on vegetation, and is very desirable in all cases where it is feasible, even in the study of plant functions. For vegetation work, the knowledge of the more important genera and species of the several formations is indispensable. If the student does not already have this knowledge, the names should be furnished him by any desirable method, without taking the time necessary for identification.

A bibilography has not seemed necessary and has not been given. A fairly full list of the more important works is found in "Research Methods." Apart from the latter, Pfeffer's "Pflanzenphysiologie," MacDougal's "Text-book of Plant Physiology," Sach's "Text-book of Botany," Vines' "Lectures on the Physiology of Plants," and Kerner's "Pflanzenleben" have been frequently consulted in the preparation of the text.

Grateful acknowledgment is made of the kindness of Dr. C. E. Bessey, Dr. D. T. MacDougal, and Dr. Edith Clements in reading and criticizing the text. The author is also indebted to Dr. Edith Clements for many drawings, and for the use of cuts from "The Relation of Leaf Structure to Physical Factors," and to Mr. R. J. Pool and Mr. A. W. Sampson for the loan of several photographs.

FREDERIC EDWARD CLEMENTS.

THE UNIVERSITY OF NEBRASKA,

March 1907.

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