**Fundamentals of
Botany Series**

**Plants and
Civilization**

Second Edition

Fundamentals of Botany Series

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Plants, Man, and the Ecosystem
W. D. Billings, Duke University

Plants and Civilization
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Preface

This book is an introduction to the study of plants in relation to man. It illustrates the profound influence of plants on man's economic, cultural, and political history, as well as the steps that man has recently taken to improve chosen plants for his purposes. Although the plants that will be used in the future may be different from those currently utilized, there is little doubt that man will continue for a very long time to be utterly dependent upon the solar energy stored by photosynthesis in plant materials. It thus remains vitally important that an appreciation of the human use of plants be widespread.

Indeed, as world population soars, wasteful methods of utilizing the photosynthetic bounty must be replaced by more conservative methods. The last chapter of this new edition of *Plants and Civilization* has been completely rewritten to emphasize how this challenge is being faced through improvements of conventional food-producing methods as well as through development of new methods of food production.

Considerable advances have taken place in a number of other areas of man's concern with plants—notably, in their use for drug production and in the domestication of important plants in various parts of the world. The text has been brought thoroughly up to date in each of these areas, with the addition of new illustrations. Increasing biochemical information about the plants referred to is becoming available and this is reflected where appropriate in the text; however, in a book of this size, details of plant structure and physiology cannot usually be given. Other books in the "Fundamentals of Botany" series can provide additional information, and there is a comprehensive list of suggested readings at the end of this book.

Plants and Civilization should be useful to students in a variety of fields—as a textbook in botany (at the introductory level as well as in more specialized classes dealing with “Plants in Relation to Man”), and as background reading for geography, anthropology, other social science, and humanities courses. Because it demands only a rudimentary acquaintance with plant science, I believe this book will be useful as general reading for any university student. Most of all, I hope that *Plants and Civilization* is readable for itself, apart from any value which it may have as a textbook. It is my desire to play some part in developing an understanding and respect for man’s alliances with plants in the economy of nature, so that they may be fostered.

During the writing of this book, a number of persons have given unstintingly of their help. In particular, I wish to acknowledge the assistance of Miss Susan Kreps, Mrs. Margaret Remerowski, and Mrs. Marian Spitzer for their work in typing the manuscript. The staff of the University of California Botanical Garden kindly facilitated my work in photographing specimen plants, and my wife was tireless in carrying out the photographic processing and other duties.

Series Foreword

Because of the immensity and complexity of the field of botany, the great diversity of plants, and the many methods of plant study, the problem of how to present to the student the highlights of botanical knowledge gained over centuries is not easy to solve. The authors and editors of the volumes in this series believe that an understanding of plants—their parts, their activities, and their relationship to man—is of fundamental importance in appreciating the significance of life. To stress this concept, the form and function of plants, tissues, and cells are treated together. At all levels of organization, in each volume, information gathered by morphologists, physiologists, cytologists, taxonomists, geneticists, biochemists, and ecologists is combined.

Thus, in the volume on *The Plant Cell* by William A. Jensen, the structure and function of the various cell parts are discussed together—for example, mitochondria and respiration, photosynthesis and chloroplasts. The volume by Stanton A. Cook, *Reproduction, Heredity, and Sexuality*, combines the principles of genetics with the means of reproduction in the various plant groups. *Nonseed Plants: Form and Function*, by William T. Doyle, and *Vascular Plants: Form and Function*, by Frank B. Salisbury and Robert V. Parke, cover the major plant groups and discuss the plants in terms of morphology, physiology, and biochemistry. The relation of plants, particularly vascular plants, to their environment, to each other, and to man is covered in the volume, *Plants, Man, and the Ecosystem* by W. D. Billings. The form and the distribution of plants of the past and their relation to the concepts of evolution are considered by Harlan Banks in *Evolution and Plants of the Past*. Herbert G. Baker, in

Plants and Civilization, discusses the importance of plants to man's social and economic development and the equally important consideration of man's role in the modification and distribution of plants.

In a series such as this, the editors are faced with the task of dividing a broad field into areas that can be presented in a meaningful way by the authors. There must be logic in the entire scheme, with few gaps and a minimum of overlap. Yet an instructor may not want to use the series of volumes in the sequence and manner preferred by the editors. Consequently, each volume must be usable alone and also in any sequence with the others. To achieve such a high degree of versatility is difficult, but we believe the series exhibits these features.

A concerted effort has been made by the authors and editors to maintain a consistent level of presentation. However, each author has been encouraged to approach his subject in his own way and to write in his own style in order to provide variety and to exploit the uniqueness of the individual author's viewpoint. Finally, while presenting the principles of botany we have tried to communicate the excitement of recent developments as well as the joy that comes with the extension of knowledge in any field.

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