

# PLANT PHYSIOLOGY

## The Plan of the Treatise

The treatise is planned in three main sections, as follows:

### Section on *Cell Physiology and Problems Relating to Water and Solutes*

The purpose of this section is to present the properties of cells, their energy relations (Volume I) and behavior toward water and solutes with the closely related problems of the movement of solutes within the plant body and the economy of water in plants (Volume II).

The underlying theme of Volumes I and II is the basis of plant physiology in cell physiology.

### Section on *Nutrition and Metabolism*

In this section the detailed facts and knowledge of nutrition and metabolism are presented, first with reference to the need for, and utilization of, inorganic nutrients (Volume III), and second with respect to the processes of organic nutrition (Volume IV). The treatment of organic nutrition leads to a reconsideration of photosynthesis and respiration at the level of organs and organisms. Volume IV describes the intermediary metabolism of carbon and nitrogenous compounds and presents a brief comparison of plants in health and in disease.

The main theme of Volumes III and IV is the nutrition, organic and inorganic, of plants and the biochemical steps by which these processes are achieved.

### Section on *Growth and Development*

The purpose of the last section is to present the problems of plant physiology as seen through the analysis of growth and development, mainly with reference to flowering plants. This entails (Volume V) a reappraisal of the main events of growth and development from the standpoint of morphology and leads to a consideration of growth of cells and of organs. Tropisms and the role of hormones and the effects of synthetic growth regulators are discussed. In Volume VI the attention is focused upon the quantitative analysis of growth and development, the physiology of reproduction, the development of fruits and seeds, the problems of dormancy and perennation. The role of environmental factors in the control of growth and development merits separate treatment. Finally the problems of growth and development are examined

from the standpoint of genetic control and from the interpretation of abnormal growth as seen in the formation of tumors. Throughout this treatment the controlling mechanisms of growth are evaluated.

Thus the last section of the work provides a synthesis of knowledge about plants since all their physiological processes converge upon growth and development.

The fulfillment of these objectives is possible only through the cooperation of many authors. The scope and treatment of individual chapters reflects the special interests of the contributors. While each volume is a complete unit, with its own table of contents and indexes, it is also an integral part of the whole plan.

### Outline of the Plan

#### Section on *Cell Physiology and Problems Relating to Water and Solutes*

Volume IA. Cellular Organization and Respiration

Volume IB. Photosynthesis and Chemosynthesis

Volume II. Plants in Relation to Water and Solutes

#### Section on *Nutrition and Metabolism*

Volume III. Inorganic Nutrition of Plants

Volume IV. Organic Nutrition and Metabolism

#### Section on *Growth and Development*

Volume V. Analysis of Growth

Volume VI. The Physiology of Development