APPLICATION OF GENETICS TO COTTON IMPROVEMENT. By Joseph Hutchinson. New York: Cambridge University Press, American Branch, 32 East 57th Street, New York 22, N. Y. 87 pp. 1959. $3.00.

A cursory reading of this book leaves the impression that the title is misleading and that the author is re-stating theses presented in an earlier publication (Evolution of Gossypium, by Hutchinson et al., 1947, Oxford University Press). But the book warrants more than a cursory reading.

The author first gives attention to the relatives of cotton as an indication of the limits of genetic diversity available for cotton improvement. The origin and spread of old world cottons (13 chromosomes) and new world cottons (26 chromosomes) are depicted within these limits of diversity. Changes within old and new world cottons represent separate pools of diversity which have been exploited to fit the needs of man.

The apparent association between genetic variability and natural population size has given distinct evolutionary patterns in cotton. These patterns are of interest to the cotton breeder in that the greatest diversity appears near the periphery rather than within the center of origin, which is contrary to the generally accepted thesis of Vavilov. The author emphasizes this in approaching the practical problems faced by cotton breeders.

Breeders may be regarded as an exercise in the management of variability, the author states. He proposes that a selection index based upon an estimate of the current genetic variance for each trait subjected to selection pressure maximizes genetic progress. The improvement of African cottons is cited as evidence that the genetic diversity of evolutionary significance has equal significance in cotton improvement. Further, although much could be said about breeding systems, the success of any system is a function of the measurable genetic diversity.

The book is well written and the author's views are clearly stated. The same views should excite the interest of plant breeders in general and cotton breeders specifically.—B. A. WADDLE, Department of Agronomy, University of Arkansas, Fayetteville.


This is the first volume published in a proposed six volume series, designed (in the words of the editor) to "say what Plant Physiology is about and to do this in sufficient detail and with sufficient analysis of, and even review of all the literature, so that each volume will be in large measure self-contained." Volume I, when published, will supplement Volume II on the topic of Cell Physiology and Problems Relating to Water and Solutes. Volumes III and IV will deal with the subject of Nutrition and Nutrition Physiology; Volume V and VI will be concerned with Growth and Development. The treatise aims, then, not simply at bringing research workers up to date on the latest advances in various specialties, but rather at synthesizing the current body of knowledge of plant physiology, much like the treatise of Pfeffer some fifty years ago.

Volume II is divided into seven chapters, each written by a different author(s). Runar Collander, in Cell Membranes: Their Resistance to Penetration and Their Capacity for Transport, discusses the ability of cells to control the passage of substances across boundary surfaces, particularly from the viewpoints of permeability and active transport. Water Relations of Cells by T. A. Bennett-Clark and The Water Relations to Stomatal Cells and the Mechanism of Stomatal Movement by O. V. S. Heath are written from the standpoint of osmotic behaviors and the water relations of specialized cells such as the guard cells of the stoma. The relationship of water to growing cells will be dealt with in a later volume. F. C. Steward and J. F. Sutcliffe, authors of Plants in Relation to Inorganic Solutes, discuss the regulatory mechanisms that determine the internal composition of cells, with respect to inorganic ions (salts are considered in this chapter primarily as solutes, not as nutrients since nutrition as such is dealt with separately). Translocation of Organic Solutes, by C. A. Swanson, and Translocation of Inorganic Solutes, by O. Bidleman, are concerned with the problems of the movement of dissolved substances from organ to organ. Data supporting the intriguing but often conflicting theories of both horticultural and soil scientists are discussed. Paul J. Kramer, in Transpiration and the Water Economy of Plants, treats the over-all economy of the plant in relationship to water not only at the cellular level, but of necessity, in respect to the plant body as a whole.

This treatise should occupy a unique position in the literature of plant physiology. The general plan of organization seems to be well-conceived and it is hoped that succeeding volumes continue to meet the same standards set by Volume II. The complete treatise should serve as an invaluable reference for workers in the plant sciences.—R. E. FRANS, University of Arkansas.


This book contains a description of electrophoretic techniques currently used for the identification, separation, and purification of electrically-charged particles. Among the topics covered are the moving boundary method of Tiselius, electrophoresis in a supporting medium, and paper electrophoresis. The principles of each technique are described, and the equipment required is discussed.

Three chapters in the book are devoted to the physical chemistry of electrolytes and colloidal behavior; another to the determination of particle mobilities. The importance of electrophoresis as a tool for soil research is apparent from the increasing number of papers now being published in which the technique is used. Audubert and de Mende have given a clear and concise treatment of the basic principles of electrophoresis, and they have described adequately the applications of these principles to the study of colloidal suspensions and solutions of electrolytes.—F. J. STEVENSON, University of Illinois, Urbana.


This book contains the papers presented at the Congress, together with discussion from the floor, on the general topic of potassium fertilization in relation to soil moisture. Of the 12 papers presented, 4 are in English. Summaries are given in four languages—English, French, Spanish, and German.

The President of the Congress summarized the key points of the various papers in his closing address. An author index and a rather complete subject index are included.

The papers were presented by authorities from Spain, Portugal, Germany, Great Britain, Israel, Japan, France, Italy, and Hawaii. The papers stress the basic principles of ion relationships in nutrition as influenced by soil moisture level. Potassium fertilization is discussed with different kinds of plants in temperate, subtropical, and tropical regions and on saline soils. General effects of potassium on the water economy and drought resistance of plants were presented.

The Congress was organized into four sessions: (1) The problems of fertilization in Spanish agriculture; (2) Water, potassium, and plant; (3) Water, potassium, and soil; and (4) Potassium in regions showing water deficit or water excess. Titles of the papers are: Potassium fertilization in irrigated areas of Spain; Availability of potassium present in the various mechanical soil components; The morphological and physiological conditions associated with resistance to drought; General effect of potassium on the water economy of plants; Interactions between potassium, water, and soil; Potassium uptake in relation to soil moisture; Potassium in saline soils; Irrigation with saline water and the ionic environment; The potassic fertilization in temperate regions; The potassic fertilization in tropical and subtropical regions; Potassium fertilization in the Hawaiian sugar industry.—R. E. WAGNER, American Potash Institute, Washington, D. C.


Many readers are familiar with the author's earlier book, Plant Anatomy, published in 1953. It was written as a complete treatment of the subject, and includes considerable detail on the entog.