

The book will appeal to those who are concerned to arrive at a reasoned view of the relations between science and society, rather than to cull material in support of a particular political theory or other preconceived idea. Mr. Barber has definite views on the place of science and the social order, but they are not obtrusive. While he is careful to state fairly the pros and cons in any controversial issue, such as the planning of science, his writing is refreshingly free from bias and the urge to advance a particular point of view, and with a certain rather charming persuasiveness seeks to stir the reader rather than make his own independent judgment, even by seeking further facts. Complete in itself, the book does not purport to be more than an introduction, and while in some chapters, notably that on the scientist in the American government, it presents with remarkable accuracy and skill the quintessence of a long series of voluminous reports, its selection and judgment can easily be verified. The busy reader may welcome the reliability and accuracy of this compression; those able to probe further will find the way made easy.

R. BRIGTMAN

## COTTON YIELDS IN EGYPT

### The Yields of a Crop

Based on an Analysis of Cotton-Growing by Irrigation in Egypt. By Dr. W. Lawrence Balls. Pp. xv+144. (London: E. and F. N. Spon, Ltd., 1953.) 21s. net.

It is not often that agricultural science is presented with the distilled wisdom gathered from an intimate acquaintance with forty-four generations of an economic plant. Yet this is what Dr. Lawrence Balls has given us in this classical account of the history of cotton yields in Egypt. The author's unique contribution to the study of the behaviour of cotton in the field is in the domain of methodology. The cotton plant is especially suitable for studies in field physiology by reason of the fact that yield is built up first by the number of flowers which the plant produces, expressed as "flowers per plant per day" and later as "bolls per plant per day". The plant thus acts as an integrator of the complex environmental conditions under which it has been grown. This powerful method enables the usual procedures of the statistician either to be abolished or supplemented, according to the special psychological orientation of the observer.

In recent years two major sets of factors have interacted in a complex way to affect the yield of the cotton crop in Egypt.

On one hand there has been a rise in the water-table which has progressively diminished the volume of soil available to the roots of the crop. On the other hand, notable improvements have been effected in agricultural techniques by the author and his colleagues. Plant breeding, soil chemistry and entomology have all played a part in the augmentation of yield. But by a masterly process of first evaluating and then discounting these favourable factors, the author clearly demonstrates by a wealth of graphical data that the yield of cotton in Egypt is going down and that a vast engineering project is necessary to mitigate the effects of one simple factor, namely, that for many years the cotton crop has been getting a lot more water than is good for it. In other words, "the whole technique of Egyptian irrigation would have to be re-designed and

largely re-learned from the beginning, in small details of maintenance as well as in great constructional works". It is certainly true also of some other cotton-growing countries such as Peru. The author demonstrates that crop physiology needs the employment of a variety of disciplines for the solution of its special problems. In his analysis he has made use not only of facts from plant physiology, but also from irrigation engineering, meteorology, soil chemistry and physics and entomology. Few agricultural scientists are equipped with the necessary background to do this; but they may at least profit by the author's insistence that "the invisible root is of equal importance with the visible stem, and that better methods are needed for its study".

Finally, tribute must be paid to the magnificent prose which the author writes whenever the omission of technical detail permits.

S. C. HARLAND

## LIME IN AGRICULTURE

### The Use of Lime in British Agriculture

By H. W. Gardner and H. V. Garner. (Agricultural Series.) Pp. xv+216+12 plates. (London: Farmer and Stock-Breeder Publications, Ltd., and E. and F. N. Spon, Ltd., 1953.) 26s. net.

It is commonly accepted that the most important single factor responsible for crop failures and reduced crop yields in British agriculture is the low lime status of many of our soils. For this reason, agricultural teachers and advisers have for many years emphasized the importance of adequately liming soils which show deficiency, and the authors of this book are to be commended for focusing attention on this major problem.

Addressed primarily to present and future farmers, the book admirably presents a comprehensive survey of the liming problem, covering in its eleven chapters the agricultural aspects, the development of soil acidity and assessment of lime requirements, the sources and production of liming materials and the effects of lime applications both on crop yields and crop composition.

The first chapters present the problem facing the agriculturist of the present day, followed by a historical survey of liming, culminating in the decline of the once-popular practice of heavy applications, and a discussion of the benefits to be obtained by judicious applications of lime to deficient soils. The rather ill-defined usage of the term 'lime' in the agricultural world is clarified and the relevant chemistry of the simple calcium compounds discussed to enable the non-scientific reader to follow successfully the somewhat complicated reactions occurring in the soil. A digressionary chapter on pH and its measurement should be helpful to enable the scientifically inclined reader to appreciate the significance of what, to many practical agriculturists, is simply a convenient and apparently arbitrary convention for indicating degrees of soil sourness. Apart from these slight excursions into the realms of pure science, the book is essentially based upon practical experience and interpretation of field experiments, and it is especially valuable on this count. The assessment of losses of lime from the soil under natural and husbandry conditions, the effects of liming on arable rotations and on grassland of various types are fully supported by experimental