

THE RAW MATERIAL IN FOOD PRODUCTION

Soil

By G. V. Jacks. (Nelson's Agricultural Series.) Pp. ix+222+10 plates. (Edinburgh and London: Thomas Nelson and Sons, Ltd., 1954.) 12s. 6d. net.

THE problem of food supply will always be with us; it will not be solved by pretending it does not exist; it can be properly approached only through some knowledge of the soil, which is the basis of all agricultural pursuits. The brown or grey surface layer of the fields—the 'earth' to the uninitiated—is but the visible sign of an ageless development of soil, in the genesis of which parent material, climate, vegetation, topography and time are the factors inextricably related and on which man can finally exert an influence that may completely upset for good or ill the slow change of centuries.

What is soil in its origin, physical and chemical properties, fertility, utilization? These are the questions that are dealt with in this book, the fifteenth in the Nelson Series for farmers and students of agriculture, and one that could also be profitably read by any others seriously interested in the question of food production. As becomes a writer with an enviable reputation and a wide knowledge of his subject, the text carries the stamp of authority; it is a straightforward statement in plain English of what we know and what we do not know, with the emphasis on general principles and the interplay of factors. Mr. Jacks has, in fact, most ably achieved his aim of presenting an interpretation of the scientific facts in language comprehensible to the non-specialist reader.

He has taken soil structure as the all-important measure of fertility, for it is upon structure that aeration, water absorption and movement and, consequently, the growth and health of the plant depend; a good soil is a complex and balanced biological medium adequate for those micro-organisms that assist in all the physical and chemical changes concerned in nutrition. To understand what is meant by structure requires some comprehension of the forces that have produced the complete picture or profile upon which the fundamental systems of classification have been based. The relationship between genetic classification and productivity ratings is not always precise, but soil science is young and practical applications have so far outstripped fundamental studies. Hence, although the successful renovation of worn-out grasslands and rehabilitation of sea-flooded areas, for example, are based upon well-established principles in soil chemistry and physics, the reasons for the build-up or break-down of the mineral-organic aggregates or stable crumbs of a fertile soil are still somewhat speculative, and it is here that wrong management, quite as much as mismanagement, has assisted the erosion forces of Nature and where conservation services—but not nearly enough of them—are striving to redress the balance.

The author constantly stresses the relative stability of the 'plant-made' soil in contrast to that of the 'man-made' soil. That the latter may become many times more productive in certain situations is the result of the system of agriculture established through trial and error and the sensible adoption of modern aids in the form of better machines, better

varieties and the fertilizers to improve and maintain fertility.

The well-chosen plates illustrate clearly the points in the text dealing with soil formation, structure, microbiology and conservation, and there is a short bibliography. One might criticize an occasional looseness in the nomenclature relating to nutrients, and there is an obvious slip at the top of p. 60; but the book is all but free of printing errors and is very well produced. A. M. SMITH

TISSUE CULTURE

The Cultivation of Animal and Plant Cells

By Philip R. White. Pp. xii+239. (New York: The Ronald Press Company, 1954.) 6 dollars.

THE foreword states that this book was written with three objects: to describe the major techniques of plant and animal tissue culture in sufficient detail to enable them to be used in research, to present a group of simple methods suitable for teaching purposes and to emphasize "the essential importance of the cell itself, as the basic physiological entity".

While it is probable that few people can master an intricate technique like tissue culture merely by studying a book on the subject, it is very valuable to have the methods of leading experts recorded for the benefit of other workers in the field.

The book begins on a philosophical note with a discussion of the relationship of the cell to the organism. This is followed by an account of the history of cell culture, and in this connexion an interesting chart is provided tracing the various lines along which tissue culture has developed. It is unfortunate that the name of T. S. P. Strangeways is omitted from this summary, since he was one of the pioneers of the method in Europe and wrote two of the earliest books on the subject. The author deals next with the many different types of plant and animal cells that can now be grown *in vitro* and then proceeds to describe the tissue culture laboratory, its equipment, and routine procedures such as washing glassware and sterilization; succeeding chapters are devoted to nutrients and the preparation of various types of cultures. As he tells us in his foreword, Dr. White has been animated by the laudable ambition "to strip from the study of this subject [cell culture] its former atmosphere of mystery and complication", and the procedures he advocates are not unduly elaborate.

The difficult and controversial questions of how to measure growth and how to interpret the quantitative results obtained are considered at some length, and it is wisely emphasized that the observer must "take into account not merely the numerical data but also many qualitative features of the results which cannot be set down in numerical form". The last chapter, which deals with the various ways in which tissue culture can be applied in different medical and biological fields, is perhaps the most stimulating. In the reviewer's experience, so much attention is sometimes paid to developing and polishing the method that this tends to become an end in itself; it is therefore important to stress the fact that tissue culture is merely a technique, and useful only in so far as it is applied to the solution of biological problems.

Finally, there is an appendix in which are described some fairly simple experiments for beginners; an