

1916, with the path which was then so magically opened through it. Or if 1916 is too remote, then he would say that the modern period begins with the general adoption about 1923 of the Wageningen greenhouse equipment and methods, which every country has copied, for all results of value have flowed from them.

A striking feature of the bibliography is the immense preponderance of work in the English language. Even if one were to admit that some of the other languages have not been gleaned so thoroughly, yet it is true that practically all the creative work (work in Dutch excluded) has appeared in English, and to this all the English-speaking countries have made first-class contributions, including besides Great Britain, Ireland and the United States, Australia, Africa, India and Canada.

Virus workers—how long must we wait for 'virologists'?—have a gratifying esoteric feeling of working in a new medium in which anything may happen because it transcends the ordinary laws. For this reason they have not been popular with their fellows, who have failed to understand what they are doing, if anything, except squabbling incomprehensively. The present book removes this reproach, and virus workers themselves may, looking back over the labours of the last seventeen years, congratulate themselves *se valde profecisse*. They have compiled a body of learning which fits the facts of Nature, explaining what was previously inexplicable, and their theories are still fruitful. There is no other criterion of the truth.

PAUL A. MURPHY.

The Intimate Structure of Fibres

Fundamentals of Fibre Structure. By W. T. Astbury. Pp. x+187. (London: Oxford University Press, 1933.) 8s. 6d. net.

IT is a not uncommon complaint that the trend of thought in modern physics has been in such a direction as to make it almost impossible to devise an extended course of lectures suitable for extra-mural students. The study of quantum theory, wave mechanics, potential barriers and the like demands a mathematical equipment and a technical knowledge quite beyond the compass of those whose training, in mathematics especially, has not been regular and systematic.

That there is something in the complaint is seen in the practical fact that physical subjects do not bulk largely in adult educational syllabuses. Here

and there, swimming rare in the vast whirlpool of courses on economics, music, and all possible cultural aspects of literature, may be found a lonely set of lectures on the history of the physical sciences or on some astronomical topic; but on the whole, physical subjects are poorly represented in such syllabuses—a very different state of affairs from that which held fifty or sixty years ago when, to hear Tyndall, crowds queued up at the Free Trade Hall as at a theatre. The fault may be in the subject, or may be in the teacher.

Mr. Astbury's admirable lectures seem to show that, given an enthusiastic and clear-headed teacher, who speaks of what he really knows from first-hand acquaintance with the subject, an elucidation of some of the most recondite problems of modern physics may be satisfactorily presented to a lay audience.

X-ray analysis, of course, lends itself specially to exposition by means of models—using that word in a very wide sense—and Mr. Astbury has not been slow to avail himself of such assistance as models can afford. He has not been afraid to begin at the beginning, and by means of happy analogy and illustration has built up an atomic and molecular world in which his hearers, almost without realising the complexities with which they have to deal, are led from a molecule of hydrogen to those of methane and of benzene and, in a very little time, are finding structures such as that of tri-olein no more difficult to handle than that of ethyl alcohol.

The story of the X-ray analysis which has unfolded the crystalline structure of fibres is one of the most fascinating of the tales that applied science has to tell, and the story loses none of its fascination in the skilled hands of Mr. Astbury. It is clearly and authoritatively told by one who has played a large part in its development. The titles of his successive lectures—the fundamental nature of matter and radiation; the invisible fibres of the world of molecules; how atoms and molecules make patterns in space; an X-ray view of the inside of a textile fibre; the fundamental structural difference between wool and other fibres; and some inside information about the properties of the wool fibre—show sufficiently well the lines along which Mr. Astbury has developed his thesis.

The textile students of Cleckheaton are to be congratulated on their privilege of hearing these lectures which, in their present form, should appeal to a very wide audience.

ALLAN FERGUSON.