

regard them as 'latent viruses' or merely as normal cell components of that particular host. The inference is that they are very numerous. The newly described latent virus of sugar-beet is a case in point. Transfer of this to the cowpea produces in outdoor plants a virulent disease. Other instances are the paracrinkle virus of King Edward potatoes and the latent virus of dodder.

Methods of detecting the presence of such latent or potential viruses are at present very crude and consist mainly of hit-or-miss trials with indicator plants. It is possible that the electron microscope will aid in this search, although the difficulties in interpreting the many virus-like particles seen in cells of apparently healthy plants are very great.

Mr. Bawden is to be congratulated on his book, which is clearly printed and illustrated with many excellent photographs.

K. M. SMITH

FUNGI FOR EVERYONE

The Molds and Man

An Introduction to the Fungi. By Prof. Clyde M. Christensen. Pp. viii+244. (Minneapolis: University of Minnesota Press; London: Oxford University Press, 1951.) 21s. net.

THIS book is written for "beginning students in mycology, whether amateur or professional". It would certainly be most useful for such people, but it may prove to be one of the few books which present scientific facts without strain to the non-scientific reader. The language is clear and the text most interesting of itself; many narrative novels have less power to hold the attention.

There are chapters on what fungi do and how they grow, on their reproduction and dissemination, and an appendix on their classification. Discussion of fungus partnerships with other plants includes lichens and mycorrhizas of orchids and forest trees. Partnerships with animals bring descriptions of scale insects and their fungus houses, ants and fungi, ambrosia beetles, the nitrogen cycle, and the fascinating behaviour of *Pilobolus* on horse dung. Plant diseases are treated with the importance they deserve, for Dr. C. M. Christensen himself lived mainly on corn-meal mush in the winter of 1916-17, when stem rust of wheat "emptied the breadbasket of North Dakota". Typical rust diseases of various food plants and fungi which cause heart rot in trees are the two subjects chosen to illustrate the whole. Fungi also destroy stored food-products—grain, butter, meat and eggs—and they rot wood, paint, fabrics and other materials. The section on parasites of micro-organisms and insects includes an account of 'snaring' mechanisms on some fungi which trap and feed on nematodes. It also describes several entomogenous species, and considers the possibilities of biological control of insect pests. Fungal parasites of fish, land animals and man expand the total of our awareness of fungi as enemies. On the credit side, fungi add to our food, either directly, as in the cultivation of mushrooms, or indirectly, to flavour, as in Roquefort or Camembert cheese. Enzymes and acids are now produced by mycological methods, while the fascinating development of penicillin and streptomycin is discussed in the text.

Dr. Christensen is an artist with words, and his book should bring mycology much more within the

orbit of an increasing body of non-specialist but discriminating readers. Why, however, does he ration his book so sparsely of illustration? The few pictorial representations which do occur suggest that he may have a wit of delineation in addition to an ease of language.

J. GRAINGER

TOWARDS THE ABSOLUTE ZERO

Low Temperature Physics

Four Lectures. By F. E. Simon, N. Kurti, J. F. Allen, K. Mendelsohn. Pp. vi+132. (London: Pergamon Press, Ltd., 1952.) 21s.

THE four lectures in this volume were delivered at the Royal Institution, London, in February and March 1950, but the opportunity has been taken during the interval to revise the text and to bring the subject-matter up to date. The references include papers published as late as the first quarter of 1952. Three of the lectures are by leading members of the low-temperature school at the Clarendon Laboratory, Oxford, and the fourth by Prof. J. F. Allen, of the University of St. Andrews.

Prof. F. E. Simon in his introductory lecture describes low-temperature physics as one of the most flourishing parts of modern science and gives a masterly general survey of the characteristic features, with particular reference to the guiding principle of the third law of thermodynamics and the fact that quantum laws cause all systems to approach a state of perfect order. Dr. N. Kurti discusses the temperature-range below 1° K., a region which has been explored for about ten years only and for the attainment of which, being below the lowest temperature obtainable with liquid helium, methods other than that of the standard method of gas liquefaction have been devised. The magnetic cooling method is fully dealt with, and nuclear paramagnetism, which is a very recent development, is shown to be a fruitful field of investigation for the application of extremely low temperatures.

The peculiar and most interesting properties of liquid helium, many of which are still not understood, are described by Prof. Allen, and finally Dr. K. Mendelsohn deals with that equally puzzling and perhaps in some ways related phenomenon, superconductivity. Discovered forty years ago and investigated both theoretically and experimentally in great detail since, a wealth of information has been collected; but there are grave difficulties in the way of a satisfactory explanation of the phenomenon. Dr. Mendelsohn suggests that what is missing is a new concept in physics, a new form in which the particles of matter can associate. He emphasizes the curious analogy between superfluidity in liquid helium and superconductivity, in both of which, at a certain temperature, the degree of order in the system suddenly increases; and he advances the idea of a fourth state of aggregation of matter, an ordering or condensation with respect to the momenta, in addition to the three states of aggregation of positional order.

The volume should prove most useful to honour students, to those intending to specialize in low-temperature physics and to more advanced physicists who wish to obtain a clear, authoritative picture of the present position of knowledge of low-temperature phenomena.

S. WEINTROUB