the means of averting the dangers inherent in a monopoly. Only by careful attention to such matters can we hope that British broadcasting will continue to uphold its high standards and tradition, and to reconcile its function of selling a public service with the maintenance of an unrivalled reputation for integrity and political impartiality.

SUPERCONDUCTIVE ELECTRODYNAMICS

Superfluids

Vol. 1: Macroscopic Theory of Superconductivity. By Fritz London. (Structure of Matter Series.) Pp. viii+161. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1950.) 40*s*. net.

ALMOST twenty years ago Dr. H. London—then a young research student at the University of Breslau—realized when dealing with the problem of a perfect conductor in an alternating magnetic field that Maxwell's equation $J = \sigma E$ becomes inadequate when $\sigma \to \infty$, since it makes no provision for the inertia of the electrons. Instead he proposed $\dot{J} = (1/\Lambda)E$, where Λ is a new constant which he called "internal specific self-inductance". He thus showed that a magnetic field will enter a superconductor and that the depth of penetration is determined by Λ. In the same year (1933), Becker, Heller and Sauter published a paper in which by considering the problem of a rotating superconductive sphere they arrived independently at the same result.

In 1934, H. London joined his brother, F. London, in Oxford, but in the meantime an important development had taken place—Meissner had discovered the expulsion of a magnetic field from the superconductor. A confused situation had arisen leading to vain attempts at relating the new phenomenon of zero induction with the known fact of zero resistance by means of ordinary electrodynamics. In 1935, F. and H. London provided this link by proposing the new equation, curl $\Delta \dot{J} = -(1/c)H$, which in conjunction with the equation of H. London and Becker has since won general recognition as the fundamental law of superconductive electro-dynamics. In a number of papers F. and H. London have further extended the new electrodynamics, treating various aspects of the subject and providing great stimulus to experimental research. F. London, in particular, has elucidated the quantum-mechanical significance of the theory.

His new book is the first comprehensive summary of the work to be written in English. In 1937 he had written a rather shorter monograph in French[1], and another on the same subject, by M. von Laue, has more recently been published in German[2]. After introductory chapters on the magnetic phenomena and thermodynamics, the equations are introduced and applied to a number of problems. Then their significance is discussed in relation with the assumption of non-viscous flow. The determination of the penetration depth by measurements of the susceptibility and by microwave absorption is described. The next section, dealing with the intermediate state and domain structure, is followed by a discussion of the surface energy between the superconductive and the normal phase and of the transition of thin wires and films. The final section sets out a programme for the molecular theory of superconductivity, and contains the interesting conclusion that in the superconductor it is the momentum vector rather than the current which exhibits long-range order. It is this concept of momentum condensation on which the similarity with liquid helium II, stressed in the introduction, is based.

This clear and rigorous account of a difficult but fascinating subject will be greatly welcomed by all working on superconductivity. One could only wish that the author had been as careful when making historical statements as he has been with regard to the subject-matter. To say that Tisza's two-fluid model of liquid helium (1938) "was not taken seriously enough to be given an experimental test" which had to wait for Kapitza's work in 1941 is quite unjustified, since, in fact, such a test—which yielded a positive result—had been made in Oxford in 1939. The way in which the pioneer work of Becker and co-workers is introduced also does not do full justice to the achievement which it constituted at the time. The analogy between liquid helium and superconductivity has been suggested by others as well, and mention of their work would have detracted nothing from the author's own fundamental contribution. These are, however, very minor blemishes which do not affect the subject-matter of the book. It can certainly be recommended to any research student embarking on the theoretical or experimental study of low-temperature phenomena.

K. Mendelssohn

[1] London, F., "Une conception nouvelle de la supra-conductibilité". (Paris: Herman et Cie., 1937.)
[2] Von Laue, M., "Theorie der Supraleitung". (Berlin and Göttingen: Springer, 1949.)

IMPACT OF SCIENCE ON FARMING

The New Farming

By Dr. D. H. Robinson. New edition. Pp. 234+16 plates. (London: Faber and Faber, Ltd., 1951.) 16*s*. net.

THE line between pure and applied science is getting more indistinct, and much of the new knowledge now being used to good effect on the farm is neither simple nor elementary from the scientific point of view. For example, the scouring of cattle on the so-called 'teart' pastures might easily have been ascribed to copper deficiency, and it must be confessed that there was an element of luck in the discovery that it is, in fact, caused by an excess of molybdenum. The solution of the problem presented by the warble fly, or the disentangling of the many sheep diseases, has required much purely scientific work of a very high order. Consequently, a smattering of the elements of a few sciences is no longer sufficient for the agriculturist; he is faced with the task of keeping up with new advances in a number of fields of scientific endeavour.

Dr. D. H. Robinson has set out to simplify this task, and in a little more than two hundred pages he exemplifies the benefits that farming has received from new knowledge. The tale is not, of course, complete. The wider matters of economics and farm management are outside the scope of the book, and in each chapter the method is to pick out the more prominent cases where science has been successful by way of illustration, rather than to cover the subject completely. The examples are skilfully chosen, how-