can think of. I know of no way of choosing between them; it seems to depend on which siren's voice sounds the sweetest. I can only recommend, in the strongest possible terms, a liberal use of wax and straps.

All this, of course, does not mean that Mr. Whyte's book may not be of very great importance, for while the unitary principle may be a tyrant as a universal dictator, it is possible that it can be made a most effective slave. A universal principle that nothing can be created or destroyed would have been disastrous to science, for it would have prohibited the conception of entropy, yet conservation laws are of the greatest value in restricted fields. The greater part of Mr. Whyte's discussion is concerned with the application of his principle to biochemical problems, on which I am not competent to speak. It would be very regrettable if the general inadmissibility of the unitary principle were to lead to the ignoring of its possible usefulness in particular departments of study.

HERBERT DINGLE

TWO TOPICS IN THEORETICAL PHYSICS

Two Lectures

1. The Present Situation in the Theory of Elementary Particles; 2. Electron Theory of Superconductivity. By W. Heisenberg. Pp. 52. (Cambridge: At the University Press, 1949.) 3*s*. 6*d*. net.

THESE lectures, delivered in December 1947 at the Cavendish Laboratory, Cambridge, deal with two unconnected topics of theoretical physics.

The attitude of the author to the theory of elementary particles differs rather from that of the majority of theoretical physicists, who have spent a great amount of ingenuity and mathematical skill in an endeavour not to solve, but to eliminate, the difficulties of atomic theory arising from the appearance of infinite terms. In opposition to this 'subtraction physics', Prof. W. Heisenberg regards the divergences as a natural, and therefore satisfactory, feature of the present theory which cannot claim to be more than an application of the correspondence principle to a yet unknown field. Heisenberg outlines the general properties of this physics of the future in which all kinds of particles will be treated by one and the same formalism, the main parameter being the rest-mass. He sketches a diagram of the spectrum of rest-masses, representing the lowest states of the super-Hamiltonian to be discovered, and he thinks that it reveals already "a great deal" about the future theory, the most startling fact being the extreme stability of states that lie as high as the proton mass.

Yet he expresses doubts whether the Hamiltonian formalism is at all suited for this very general problem and indicates as an alternative his S-matrix method, which describes primarily the scattering of particles, but allows also the determination of stationary states of compound systems. Heisenberg points out that the S-matrix has a closer relation to immediate results of observation, thus using a philosophical argument which once led him to his greatest success, the discovery of quantum mechanics.

The theory of superconductivity is a problem of a very different type; here the fundamental laws are well known; but the phenomenon is of such a complicated nature that no consistent picture has so far been developed. Heisenberg moderately claims no more than a unification of previous disconnected, and sometimes discordant, theories of different aspects of the phenomenon. In fact, he offers a well-balanced, systematic, though somewhat sketchy, presentation, based on the following assumptions. Perfect conductivity, not diamagnetism, is the primary feature, and it is produced by electric (Coulomb) interactions of the electrons, not by magnetic forces (as other authors have assumed). These interactions lead to a kind of condensation of the electrons which form an ordered system, an electronic lattice, corresponding in the momentum space to an asymmetric deformation of the Fermi sphere. The destruction of superconductivity by a magnetic field is attributed not to a direct action of the field but to the production of stresses in the electronic structure (London stresses), which increase the free energy beyond the point where the superconducting state is stable. The Meissner effect is interpreted along the lines previously suggested by London.

Some of these assumptions seem to be open to criticism, and some important aspects are not discussed (such as the correlation of superconductivity to the lattice structure, discovered by Cheng). Yet the study of this fascinating lecture can be recommended to all interested in the subject.

M. BORN

NATURE'S CONTINUOUS CHANGE

The Floral Year

By L. J. F. Brimble. Pp. xiv+622+25 plates. (London: Macmillan and Co., Ltd., 1949.) 30*s*. net.

"THE FLORAL YEAR" has been written by a botanist who, for some years, has been preparing works on natural history which, while losing nothing in objectivity, were deliberately aimed to win the interest of the inquiring layman by appealing to his love of the æsthetic. In 1944 he published a book called "Flowers in Britain" which so skilfully combined the scientific and artistic approaches that it became a best-seller. Its success was soon paralleled by a companion volume, "Trees in Britain", which, the evidence shows, has considerably added to the number of tree-lovers in Britain. Two other works of this type dealing with birds and dogs have since appeared under the editorship of L. J. F. Brimble, and their public reception has been worthy of Brimble's own works.

The considerable appeal of these four books has led Brimble to attempt what must surely be the most ambitious venture of its kind to date. While "The Floral Year" will be warmly welcomed by botanical scholars, the author has designed it primarily for the general reader who is interested in field natural history. That the book would be well received by such readers is borne out by the publisher's confidence in the author in producing the book on such a lavish scale and, inevitably, at such a price. Their confidence has been well placed. Already the book has been greeted in rapturous terms in some of the more literary journals and has been selected by the Book Society (which has a strong selection committee of literary authorities) as one of its recommended books for June.