It is rather surprising that parasitology, a subject presenting so many fields for investigation, should not have received more attention—at least in Great Britain—for parasites comprise a far greater number of both species and individuals than their hosts. The taxonomist will find in them a very wide range of interest, for to take only one example, the 500-odd British birds support very many thousand different parasites, including at least 1,500 species of Mallophaga, few of which have valid scientific names. Certain groups of parasites have been used for trying to demonstrate the true systematic relationships of their hosts. The Mallophaga, for example, are highly host-specific, each species being confined to some particular host, and their evolution has resulted in related birds for the most part harbouring related Mallophaga. Similarly each order of birds has its own particular cestode fauna, and the fact that grebes and divers harbour quite distinct tapeworms suggests that these two groups of birds should not be placed together in any natural scheme of classification.

The life-cycles of such parasites as trematodes, cestodes and nematodes are strange and wonderful, generally involving perilous journeys through different hosts, with a survival-rate from egg to adult of much less than one in a million. Yet, as pointed out by the editors of this series, there is not even one worker in Britain wholly occupied with the trematodes or flukes.

The physiology of most parasites is completely unknown; but the little information which is available suggests the existence of highly specialized metabolisms well worth the study of biochemists.

The authors include a general introduction in which parasitism, commensalism, symbiosis, the effect of parasites on their hosts and parasitism on parasites, and related problems are discussed. After dealing with the various groups of parasites, ranging from micro-organisms to the arthropods, including a chapter on the fauna of birds' nests, there is an account of the brood parasitism in the European cuckoo.

The authors are to be congratulated on the production of a book combining so pleasingly both wit and erudition; it should certainly find a place in every naturalist's library. E. HINDLE

GENETICAL STUDY OF EVOLUTIONARY PROCESSES

Genetics and the Origin of Species

By Prof. Theodosius Dobzhansky. (Columbia Biological Series, No. 11.) Third edition, revised. Pp. xi+364. (New York: Columbia University Press; London: Oxford University Press, 1951.) 32s. 6d. net.

IT is good to see a new edition of Prof. Dobzhansky's "Genetics and the Origin of Species". The previous edition appeared in 1941, and in ten years a great deal can occur in so active a science as the genetical study of evolutionary processes. The many who valued Dobzhansky's earlier editions will look to the new one for an equally informative account of the position as we see it to-day.

The basic principles of the genetical theory of evolution are, of course, unchanged. This theory rests on the postulates that heritable variation occurs in populations of living things and that, as a con-

sequence, the populations may undergo permanent changes. So in seeking to understand how adaptation and evolution come about, we must inquire into the nature, occurrence and origin of variation in natural populations; into the ways in which heritable variants bring about changes in the structures and properties of these populations; and into the means by which they come to be fixed, both uniformly within populations and differentially between them. In that it is explicitly built round these principles, Dobzhansky's third edition is like its predecessors; but in seeking to take into account the developments of the past decade it has had to be almost completely rewritten.

Ten years ago the discussion of variation centred on mutation and especially on the occurrence of changes which were either visible in the chromosomes themselves or, if genic in nature, produced drastic effects on the phenotype. The growing realization of the importance of continuous variation has moved the emphasis towards the storage of variability, the properties of balance, and the relations they bear to recombination. Dobzhansky's own experimental work has made a major contribution to this development and indeed his studies of variation and balance in wild *Drosophila*, summarized in the new edition, have an elegance and finality which few can fail to admire. All this is reflected in the book, the old being condensed and the new brought out, with perhaps that trace of conservatism understandable in a work which is likely to be so widely quoted.

In discussing selection, Dobzhansky is now able to draw on a much greater wealth of experimental evidence, including, as in the case of mutation, information from micro-organisms. As a consequence, drift, though by no means forgotten, looms less heavily in the consideration of agencies affecting the fate of variants in wild populations. Indeed the part played by drift is necessarily seen in a different perspective when considering the properties of systems of genes than when discussing the fate of single major variants.

Isolating mechanisms, by which genetical diversity is preserved, are again given just prominence. The distinction is drawn between bars to crossing, which can arise by selective action, and hybrid incapacity, which cannot be ascribed to direct selection, and their inter-relations discussed. Hybrid breakdown receives, however, a fuller treatment than do bars to crossing, doubtless because of the greater wealth of experimental evidence about it, especially in animals. This is a matter of emphasis which time can be expected to change. The study of plants has much to offer here, as it has had in laying before us the variety of ways in which a species governs its own breeding structure and genetical composition—a matter on which a geneticist more directly concerned with plants would perhaps have laid rather greater stress.

Argument about emphasis must not, however, be allowed to obscure the value of Dobzhansky's book. The new edition will be as widely appreciated for the picture it sets before us of things as they are to be seen now, as its predecessor was for giving us the picture of 1941. "Genetics and the Origin of Species" has the rare merit of moving with the times—times which Prof. Dobzhansky has himself done so much to move; and it has the even rarer merit of changing not merely by accretion of the new but also by judicious shedding and condensation of the old; for, most remarkable of all, the third edition is in fact shorter than the second. K. MATHER