

Urgent questions must be explored even if their complexity makes answers less confident and less precise. Fair treatment is not necessarily final treatment, and the reader can be given the means of making up his own mind as to how far he is prepared to pursue an argument or accept an opinion.

This is not to say that Professor Penrose avoids all controversial matters or confines himself to stating generally accepted views. Indeed he warns his readers that in the last chapter, on "Eugenics and Dysgenics" his own opinions predominate. Much in this chapter will be accepted as sound and salutary, but much strikes at least one reader as open to very sharp challenge. For example, we read on page 119 that "variability in a population is biologically desirable because it provides the necessary energy for adaptation and evolution", the variability referred to being by implication not merely genetic but also much of it of the pathological or near pathological kind to which a major part of the book has been devoted. Some kinds of genetic variability are unquestionably the basis of adaptation in plant and animal species. But are not other kinds—the lethals and the crippling mutations—merely the outcome of unavoidable breakdown in the genetic materials and genetic system? And does any kind of genetic variability have the same importance for progressive adaptation in man as in other species? This is surely a matter for discussion rather than assertion: here above all places definite and final answers are hardly possible at present.

Then again, the discussion of intelligence and fertility is hinged on a single gene model which results in the conclusion that "the genetic backbone of the population is, in fact, the despised mentally inferior tenth". The conclusion is of course implicit in the assumption and the model does serve to show how complex and surprising in their consequences genetical situations can be. But when it leads to such a conclusion can anyone take the model seriously? Does Professor Penrose really believe that it fairly, or even usefully, represents, albeit at a simplified level, the situation with respect to intelligence and fertility?

The significance of variability in man and the intricacies of his population genetics have provided many arguments and they will provide many more. They are indeed matters of significance not merely to geneticists but to us all, and all should be aware of the questions at issue, the consequences of error and drift, and the pressing need for more research and more knowledge. Professor Penrose is doing a valuable service in presenting human genetics to the general reader.

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THE MECHANISM OF EVOLUTION. 2nd edition. By W. H. Dowdeswell. London: Heinemann. 1958. Pp. 115. 7s. 6d.

NATURAL SELECTION AND HEREDITY. Revised 3rd impression. By P. M. Sheppard. London: Hutchinson. 1959. Pp. 212. 10s. 6d.

Dowdeswell gives us an account of what we may call phenotypic evolution. The latest evidence of variation and selection of phenotypes in nature, and also the study of the fossil record, are considered in relation to what Darwin and others have said about them. Within these limits the account is admirable. But is it right to set such limits? Since the word "mechanism" is used, it is strange that the mechanism of heredity and its variation is not roundly presented. Is that not a part of the mechanism of

evolution? Darwin thought so and would have said something about it if he could have done so.

By implication, of course, something is said but it is not too reassuring. What are these "genes" that suddenly crop up? (p. 14). Perhaps Mendel invented them. Ought we to talk about the "fact" of dominance (p. 15)? Can polyploids be understood without any explanation of diploids? (p. 21). Can autogamy in *Paramecium* (p. 43) be understood without a discussion of meiosis? This book is intended for schools. But if beginners are shown their subject dismembered, and with its parts in the wrong order, will they ever unlearn their mistake?

The same criticisms apply in part to the new impression of Dr Sheppard's book. Great advances will no doubt continue to be made from studying the working of natural selection as naturalists have studied it in the past. But what about the great questions of reproduction, hybridity, fertility and sterility which concerned Darwin so much, questions to which we have now found answers? More and more advances will fail to be made if we pretend that naturalists need not worry about the answers to such questions. Or if we imagine that natural selection does not affect them.

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THE CHEMICAL BASIS OF DEVELOPMENT. Ed. by William D. McElroy and Bentley Glass. Baltimore: John Hopkins Press; London: Oxford University Press. 1959. Pp. 934. £6.

CELL, ORGANISM AND MILIEU. Ed. by Dorothea Rudwick. New York: Ronald Press. 1959. Pp. 326. \$8.

DEVELOPMENTAL CYTOLOGY. Ed. by Dorothea Rudwick. New York: Ronald Press. 1959. Pp. 215. \$7.

These three symposia overlap in interest and in all of them some papers are of concern for genetics.

The Chemical Basis of Development deals chiefly with animal biochemistry but there is a discussion of enzyme induction in *Escherichia* and two papers on slime moulds. Gall gives a valuable account of polytene and lampbrush chromosomes and Swift analyses the relations of RNA with the nucleolus in amphibia. The most important contribution is Hadorn's account of the tissue and phase specificity of gene action, especially in regard to the rosy gene in *Drosophila*. This is surely to be related to the observations of chromomere variation in polytene chromosomes. Both types of observation indicate that one gene may be having effects which vary in different cells at the same time, and at different times in the same cell.

There is no general or biological discussion of the chemical basis development but there is a summation of 12 pages by Paul Weiss and a summary of 68 pages by Bentley Glass and there are copious discussions of separate papers.

Cell, Organism and Milieu ranges from the effects of the RNA of live microsomes in changing fibroblasts into neuron-like cells in tissue culture, on the one hand, to the action of hormones of the auxin complex and their substitutes in stimulating fruit development at various stages, on the other hand. Both these types of investigation have wide biological implications.

Developmental Cytology, like the other symposia, deals mainly with peripheral problems which do not do justice to the title. Beermann's discussion of polytene structure and activity is, however, most appropriate. Lehninger's views on reactions within and between mitochondria and other particles