# BOOK REVIEWS

## PARANORMAL EVOLUTION

### The Living Stream

A Restatement of Evolution Theory and its Relation to the Spirit of Man. By Alister Hardy. Pp. 292. (London: William Collins, Sons and Co., Ltd., 1965.) 30*s*. net.

THE Gifford Lectures, delivered annually at the University of Aberdeen, were intended by their founder, Lord Gifford, for "promoting, advancing, teaching and diffusing the study of Natural Theology, in the widest sense of the term". This has provided considerable scope for lecturers in past years; the list of past lecturers is an impressive one, including, among others, philosophers, physicists, astronomers, theologians and a distinguished physiologist. The series of lectures during the session 1963–64 were given by a distinguished zoologist, Sir Alister Hardy, and the first of the series has now been published under the title *The Living Stream*.

Hardy approaches the task assigned to him primarily as a student of the evolutionary adaptation of animals to their environment, and, in agreeing with the definition of natural theology as a theism which is derived empirically from the study of nature, man and human history, he is concerned to emphasize that current ideas of evolution are not fully explanatory of this process. "I venture to suggest", he writes, "that there is something more about the process of evolution than is generally conceded by most biologists today; and this 'something more' does, I believe, link natural theology to the biological scheme". It is not easy in a short review to summarize, without doing injustice to his various lines of reasoning, all the arguments on which the author relies for substantiating his main thesis, particularly as this book may be assumed to be a general biological survey intended to preface the second series of lectures that now await publication. Hardy makes it clear in his introduction that, while rational theology has usually maintained that God's existence could be proved by reason alone, "to this I do not subscribe". He also makes a distinction between natural history as "the qualitative description of nature" and science "the quantitative and experimental analysis of its interactions". Whether such a distinction is accepted as valid or not, some may find it difficult to accord these preliminary statements with the exhortation in the last sentence of the book that we need to "show the way to a re-establishment of the idea of God as both a philosophical and scientific reality". But the inconsistency of thought implied in these references is perhaps more apparent than real when considered in relation to the detailed discussions generally. The author gives a remarkably lucid and concise account of the development of modern evolutionary ideas and the nature of the gene, and he agrees that selection acting on small random changes in the inherited nuclear material is the main physical mechanism of evolutionary change. He lays particular emphasis on the consciously directed behaviour of animals in seeking out new environments, or in attempting to adapt themselves to changing environments, as one of the most important factors for evolutionary progress by providing the opportunity for the selection of appropriate mutations as they arise. Further, he envisages a "group mind" or a "species mind" representing a psychic side of animal life, and determining certain configurations of form and behaviour unfolding automatically according to the DNA code of the particular species concerned. He suggests, however, that the psychic side of an animal may be independent of the DNA code, though it may also interact with the physical system in the evolutionary process through organic selection. Finally, he invokes the phenomenon of telepathy (in his view, as well as in the view of other students of psychical phenomena, well established by experimental tests such as card guessing) for an explanation of the rapid and widespread development of new behaviour patterns among different geographical groups of the same species.

No doubt there are those who will feel disinclined to follow Hardy so far in such a speculation, but it is well to note that he himself remarks that "these fancies, without more facts and experiment, lead to folly". Indeed, he goes on to say "I do not expect that my speculation is right, but by being shown to be wrong or impossible it may give rise to better thoughts which may help towards a solution of some of our conundrums". It will be at once admitted that to disprove a hypothesis of communication by telepathic means between individuals of a species would certainly be very difficult indeed. But the question will inevitably be asked whether it is in fact necessary, or useful, with our present knowledge of the potentialities of known evolutionary mechanisms, to postulate a conception such as telepathy as an additional factor determining biological adaptations. Opinions will no doubt vary widely on this matter, but all readers of Hardy's book will share the opinion that it is eminently readable as well as being pleasingly provocative.

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## MUSCLE CONTRACTION

### Molecular Biology of Muscular Contraction

Edited by S. Ebashi, F. Oosawa, T. Sekine and Y. Tonomura. (BBA Library, Vol. 9.) Pp. xii + 206. (Amsterdam, London and New York: Elsevier Publishing Company, 1965.) 110*s*.

RECENT research has simplified our ideas on the biochemistry of skeletal muscle and there is now widespread acceptance of the grosser aspects of contraction: contraction occurs as the result of rigid filaments sliding past one another; energy is provided by the hydrolysis of ATP and calcium released from the sarcoplasmic reticulum provides the trigger for contraction. This has led to a division of interest among research workers. On the one hand how does the action potential cause the release of calcium, and on the other hand how is this calcium able to elicit contraction of the myofibril ? In either case the interest lies in the explanation of these events at the molecular level.

*Molecular Biology of Muscular Contraction* is a tribute to Prof. Kumagai, who has done much to foster the vigorous groups in Japan working on muscular contraction. It was his discovery of the granular nature of the relaxing factor that paved the way to its identification as fragmented sarcoplasmic reticulum. Nineteen contributions from the United States and Japan cover many aspects of the field. However, considering the title of this book, it is unfortunate that no mention is made of the molecular architecture of the filaments. The absence of a paper on tropomyosin is also surprising as Japanese workers have been largely responsible for elucidating the role of this protein in the myofibril.

The papers are divided into six sections on ion binding, myosin, actin, actomyosin, comparative aspects of muscle