Catholic environment in which the possibility of scandal has to be reckoned with more seriously than in a pluralistic society in which individuals are unlikely to misinterpret ordinary courtesy in such matters.

Father Kenny's book covers much the same ground as that of Father McFadden, but it does so with considerably more brevity, and for this reason is perhaps better adapted for text book use in schools where less time is allotted to the study of ethics. It is well organized, clear and forceful in its presentation, but because of its brevity, it is less comprehensive than Father McFadden's work, and hence somewhat less valuable for purposes of reference.

KEVIN MEAGHER, O.P.

MECHANISM AND VITALISM, Philosophical Aspects of Biology, by Rainer Schubert-Soldern. Edited by Philip C. Fothergill; Burns and Oates; 42s. od.

'We looked for a beetle under a stone and confirmed both had an origin, but only the beetle had a purpose', states Rainer Schubert-Soldern in one of his pithy contrasts found in this text on theoretical biology. Schubert-Soldern, professor at the Vienna Institute for Experimental Zoology, Anatomy and Physiology, conducts a scientific enquiry into the nature of life. The crux of the discussion is whether life can be explained completely by physics and chemistry. He begins with the chemical laws which govern the reactions in living things and instead of arriving at a mechanistic theory of life, which is the usual conclusion from such a beginning, he uses the same scientific basis to arrive at a vitalistic theory. He does this by using the epistemological principle which can be the only source of knowledge in experimental sciences, namely, direct sense perception. The principle is used to draw conclusions on the relationships of molecules to the living cell and in turn to the whole organism from specific experimental data.

In investigating the sources of energy and the nature of the physico-chemical processes involved in a living cell the author leads the reader to the conclusion that the living cell exhibits chemical reactions which tend in a direction of order and balanced unstability which the molecules by themselves are quite incapable. The dead cell lacks this directive principle of order; it is only the living cell that is the fundamental unit of life.

From a variety of experiments with multicellular systems he develops the principle that the whole organism as well as the cell has a causal order, a purposiveness or end in view. In one such experiment the author describes a remarkable tissue transplant from a frog to a salamander. The primitive gut of a frog was transferred to the mouth area of a salamander embryo. In the body of the salamander the gut membrane of the frog produced a mouth where a mouth ought to be - but it was a frog's mouth! Results of this kind provide the author with rich experimental evidence for his discussions. In this case he shows that in multicellular organisms two systems of laws are operating with the

cell's individual life subordinated to a higher purpose, that of the organism as a whole.

From the adaptability and reactivity of organisms, he again shows the purposiveness and order involved within them and in their relation to the environment. Comparing a beetle to the stone that covers it he points out that a study of the purpose of a beetle leads to functional analysis of the organism, but the study of the purpose of the stone leads nowhere. In addition, the living thing does not exist merely for itself; its very form is the expression of its belonging to a definite living community. Such an observation is rich in social implications.

In higher animals hormonal action, reflex action and instinctive action also have purposiveness in common. And added to this animals have the ability to act upon experience. The author is anxious to apply these notions to man and concludes that man forms part of the same world as animals, but instinct and experience do not exercize a compulsion upon him; they act merely as directives. 'The human being can act the fool. The utmost an animal can do is to act, by chance, inappropriately.' Man is capable of intelligent action, recognizing actuality from potentialities which have never previously been actualized.

In a series of summaries each presented with a different emphasis, Schubert-Soldern enlightens the various approaches he uses. New insights developed from this overall study include the notion of 'wholeness' and 'end-causality' of the living being.

In the editor's preface Dr Fothergill states that he has 'liberally edited' the book to suit English readers, but to what extent this was done is not fully evident. Further, the translation of the original title to read '*Mechanism and Vitalism*' is misleading in that is misemphasizes the author's conclusions. From a biochemical point of view, the author occasionally tends to use terms loosely, for example the word catalysis, and certain other words pointed out by the editor. The text is well annotated with references and is aided by a substantial index. The numerous divisions, subtitles and recapitulations are a necessary courtesy to the reader who may not be fully conversant with the scientific terminology as well as with the philosophical argumentation.

The author skilfully develops a series of interlocking and logically drawn arguments, generously summarizing and restating his arguments as he leads the reader to his conclusion of purposiveness in life's ordered activity. But all the problems are not solved and questions linger. Is this purposiveness life? Does this purposiveness arise in the cell itself - is it something apart from the cell - is it the source of action - how is it to be grasped - where does it come from? It is a text intended to be studied and not merely a book to be read. To the philosopher it should prove a challenging interpretation; to the scientist it can give rich insight beyond his own experimentation.

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