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**MR0446882 (56 #5201) 02A05****Putnam, Hilary****★Philosophy of logic.**

Harper Essays in Philosophy.

Harper Torchbooks, No. TB 1544.

*Harper & Row, Publishers, New York-London, 1971. v+76 pp.*

The author of this book has made highly regarded contributions to mathematics, to philosophy of logic and to philosophy of science, and in this book he brings his ideas in these three areas to bear on the traditional philosophic problem of materialism versus (objective) idealism.

The book assumes that contemporary science (mathematical and physical) is largely correct as far as it goes, or at least that it is rational to believe in it. The main thesis of the book is that consistent acceptance of contemporary science requires the acceptance of some sort of Platonistic idealism affirming the existence of abstract, non-temporal, non-material, non-mental entities (numbers, scientific laws, mathematical formulas, etc.). The author is thus in direct opposition to the extreme materialism which had dominated philosophy of science in the first three quarters of this century.

Much of the book is written in a loose and informal fashion allowing the author to convey his enthusiasm for the subject without entangling the reader in technical intricacies. The author has not, however, avoided the usual disadvantages of informal discourse: a few technical errors have crept in and there are philosophical passages whose normal interpretations are almost certainly not what the author intended (e.g., there are places in which the author seems to espouse a kind of inverse logicism in which logic is based on mathematics). Another unfortunate consequence of the looseness is the presence of passages which seem to convey disrespect for materialists and which give to the book an undesirable, polemic tone not in accord with the scientific nature of the subject. Moreover, the book is virtually devoid of references to the literature, so some readers may get an impression of more originality than is warranted. These defects detract from the suitability of the book for use by students. For related reasons, the reviewers cannot recommend the book to mathematicians conversant with recent work in philosophies of logic, mathematics and science.

However, the book can be recommended to the scientifically literate, general reader whose acquaintance with these areas is limited to the literature of the 1950's and before, when it had been assumed that empiricistic materialism was the only philosophy compatible with a scientific outlook. To this group the book presents an eye-opening challenge fulfilling the author's intention of "shaking up preconceptions and stimulating further discussion".

Reviewed by *J. Corcoran* and *W. Ebersberger*

MR0469684 (57 #9465) 02A05

**Quine, W. V.**

★ **Philosophy of logic.**

Sixth printing.

Foundations of Philosophy Series.

*Prentice-Hall, Inc., Englewood Cliffs, N.J., 1970. xv+109 pp.*

This short book, written by a distinguished philosopher who has made well-known contributions to mathematics, bears the stamp of its origin as a series of lectures for undergraduates. Accordingly, the mathematician will note the absence of sophisticated mathematics and may come to view the book as a compendium of small points lately fussed over in undergraduate philosophy courses (proposition-sentence, use-mention, type-token, predication-membership, “definition” of ordered pair, “elimination” of individual constants and function symbols, satisfaction, etc.).

But closer reading will reveal a deeper purpose of some importance to mathematicians interested in foundations. The author has constructed a clear and useful definition of logic which he uses to elucidate, if not solve, some outstanding and messy foundational issues, including the question of a borderline between logic and mathematics. The fruits thus harvested may bring some mathematicians to realize that what appears to be fussing over small points is rather more like highly skilled pruning essential to the health of the tree.

In the opinion of the reviewer, the author has “shown”, in a more thorough way than previous writers, that mathematics, including set theory, is not logic, and in particular that number theory is not part of logic. Moreover, the analysis that the author’s argument rests on is more perceptive and more consonant with traditional mathematical and logical practice than that of previous arguments to the contrary (including the Whitehead-Russell argument). Some readers, including this reviewer, who are unable to accept the whole of the author’s philosophy of logic, will nevertheless still subscribe to the portions of it which imply the foundational results. Thus, the book has a wider appeal than might be expected on ideological grounds.

From the point of view of this book, the first problem involved in the delimitation of “logic” is to define “logical truth” or “validity”. The second issue, then, would seem to be to account for how knowledge of validity and invalidity is gained. Roughly speaking, the book defines a sentence to be valid if every sentence of the same logical form is true. (Considerable attention is paid to the details of this definition; in particular, to the grammatical nature of sentences, to the definition of truth, and to the nature of logical form.) As far as knowledge of validity is concerned, the book is very close to the traditional view that knowledge of logical validity is gained through deductions involving “obvious” logical axioms and “visibly sound” rules of inference. As far as knowledge of invalidity is concerned, the book is less explicit, but again a traditional view seems implicit, viz., that knowledge that a given sentence is invalid is gained through knowledge that a sentence of the same logical form is false, in other words, by means of a counter-instance.

The author repeatedly emphasizes the point, implicit in his definition of validity, that validity is

not merely a matter of language but rather, through dependence on truth, it involves (nonlinguistic) reality in an essential way. It is worth noting, however, that although validity depends on reality, knowledge of validity seems not to involve experience of reality; the validity of logical axioms is said to be “obvious” and rules of inference are said to be “visibly sound”. In the reviewer’s opinion these views are attractive but more discussion of the “obviousness” of logical axioms and of the “visible soundness” of rules of inference would be desirable.

Unfortunately, the book is not easy to read, partly because the level of sophistication fluctuates at high frequency between remote extremes and partly because of convoluted English prose style and devilish terminology. Almost all of the minor but troublesome technical errata in the first printing have been corrected [see reviews, e.g., the reviewer, *Philos. Sci.* **39** (1972), no. 1, 97–99]. In the opinion of the reviewer the book is not suitable for undergraduate instruction, and without external motivation few mathematicians are likely to have the patience to appreciate it. Nevertheless, a careful study of the book will more than repay the effort and one should expect to find frequent references to this book in coming years.

Reviewed by *J. Corcoran*

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