mension to his genius—and to his strangeness.

After nodding disapprovingly at Newton's inclination to systematize history, Manuel unfortunately allows himself to be infected with the same disease, and he sets out boldly to interpret all of Newton's nonscientific writings through his historical categories. As far as the *Observations on the Prophecies* are concerned, his point must be conceded; one of the contributions of Manuel's book is to place the *Observations* firmly beside the *Chronology* and to demonstrate their prosaic nature, however arcane the title now sounds. But when Manuel attempts to force the theological manuscripts into the same mold, he loses their essential meaning, and the book as a whole fails in its interpretation of Newton's religious outlook. Although he explicitly denies Newton's alleged mysticism and demonstrates its impossibility by further revealing the poverty of Newton's spiritual insight, Manuel persists in recalling it with references, unjustified by the discussion, to Newton's belief in correspondences between the historical and the astronomical worlds. In stressing the fundamental religious purpose of Newton's historical writings and in suggesting their traditional nature in this respect, Manuel ignores the radical character of Newton's religion. Newton wanted to dispense with all of the supernatural elements of Christianity and to equate it with natural religion. Even his chronology cannot be explained as Puritan Biblicism, since astronomical data was given final authority to confirm the Scriptures. Whatever its shortcomings, Manuel's work is a major contribution to Newtonian scholarship; its exposition of Newton's historical writings stands entirely alone, without any rival.

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Philosophy of Science

Conjectures and Refutations. The growth of scientific knowledge. Karl R. Popper. Basic Books, New York, 1962. xii + 412 pp. Illus. $10.

This book is a collection of 21 of Karl Popper's more important papers on topics related to the philosophy of science, which have been published during the past 20 years. The title is perhaps misleading in that these papers do not merely represent Popper's own conjectures and his refutations of his critics, but rather they develop a common thesis with respect to the nature of scientific method and knowledge, the now well-established "falsifiability" thesis that scientific knowledge develops by the method of framing "conjectures" (that is, hypotheses) and attempting to refute them by observation or experiment. This thesis first appeared in Popper's *Logic of Scientific Discovery* (*Logik der Forschung*, 1934), and the present volume is important if only because it annotates and extends in some novel ways the major contributions of that work to the philosophy of science.

Popper refrains here as always from that favorite pastime of philosophers since Kant: refuting Hume's arguments on induction. Since Hume most philosophers have tended to assume that acceptance of his conclusions leads to skepticism, and hence they have devoted their time to attempts to refute him and to establish a sound basis for induction. However, no one has been able to develop a refutation of Hume's arguments which satisfies anyone else. Popper adopts the alternative of accepting Hume's analysis of induction and denying that skepticism must result. He argues instead that scientific knowledge is independent of both induction and probability. This does not mean that he is an apriorist or intuitionist in the theory of knowledge. On the contrary, he is an empiricist and fallibilist. He argues that observation can be utilized to test theories precisely because it can validly falsify though it cannot validly verify or even confirm them. Theories that survive such systematic attempts at falsification by the method of deducing their consequences and forming testable predictions on this basis are said to be corroborated, while those that fail are falsified. Corroboration is as close as a scientific theory as a whole can get to truth. What distinguishes a scientific theory from a nonscientific one is not that the former is more probable, which may well be false, but that it is refutable. Theories which are not refutable are not necessarily meaningless, they are just not scientific, not capable of growth.

In the present volume these characteristic themes are developed, elaborated, extended, criticized, and applied to diverse contexts ranging from physical theory to sociology and history to pure philosophy. Popper's comments on social theory are not among his least important contributions. Scientists whose interests in the logical and philosophical foundations of their subject are in danger of becoming extinguished by certain linguistic inundations in this field might well find in Popper's writings just what they have been looking for: a coherent philosophy of science based firmly on a mastery of the technical details relevant to both fields but not lacking in that breadth of vision and sweep of interest characteristic of the traditional conception of philosophy.

The publishers are to be congratulated for producing a volume attractive in format, free of error, and of a quality that matches the price.

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Notes

Selected Readings

Archaeology, edited by Samuel Rapport and Helen Wright (New York University Press, New York, 1963. xvi + 365 pp. $4.95) is a volume of readings published in the New York University Library of Science Series. It is intended primarily for the student and layman and the 28 selections are generally highly readable and well chosen. After an initial section on the aims and methods of archeology, the arrangement is geographical; the connective tissue that appears as introductory comment for each item is brief, informative, and competent.

In scope and treatment this book falls neatly between the two with which it most nearly invites comparison: *Gods, Graves and Scholars* by C. W. Ceram, a one-man popularization of events in the history of archeology, and *The Archaeologist at Work, a Sourcebook in Archaeological Method and Interpretation* edited by R. F. Heizer. This last is geared to the needs of the advanced student and draws mainly from highly professional writings, organized to illustrate archeological procedures, techniques, and interpretations. The readings in *Archaeology* provide excellent fare for the general reader and for the student with an awakening interest in the field.

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