REYMOND ON SCIENCE IN ANTIQUITY

History of the Sciences in Greco-Roman Antiquity. By Arnold Reymond. Translated from the French by Ruth Gheury de Bray, with preface by Léon Brunschvicg. New York, E. P. Dutton. x+246 pp. $2.50.

In his preface to this work M. Brunschvicg calls attention to the fact that Professor Reymond has for many years given lectures on the history of science in the University of Neuchatel. These lectures have been attended both by the students of the Faculté des Lettres and by those of the Faculté des Sciences, and similar provision has of late been made in the University of Lausanne. These facts, while having little to do with the merits of the book under review, are significant as regards the interest being shown in European universities in the history of science as a culture subject.

The work treats of the mathematical, astronomical, physical, and natural sciences, and what will here be said concerning the treatment of the first of these will probably allow for a fair estimate of the treatment of the others.

It is apparent from the first chapter that M. Reymond writes as a philosopher rather than as a scientist or a historian. He has gone to few original sources but has depended chiefly upon Zeuthen, Loria, Tannery, and Ball, with four references to Cantor and two to Heath and a like number to Montucla's work of more than a century and a quarter ago. Ball, who is hidden in the index under "Rouse Ball," is referred to more often than Zeuthen or Loria, while Tropfke is unknown. Even the frequent references to such men as Euclid and Archimedes show that the author's knowledge comes rather from writers like Boyer and Ball than from any study of the classics which these men wrote.

As a result of this dependence upon secondary sources, often of a rather inferior type, the work has many errors that will at once occur to anyone who is at all familiar with the history of mathematics. For example, it is not likely that any historian of the subject would care to subscribe to statements such as these:

"As to the information furnished by hieroglyphics and cuneiforms, it amounts to little." To be sure M. Reymond could assert that the Rhind Papyrus is in hieratic and not hieroglyphic, but the impression given by the statement is unfortunate, particularly in view of what the cuneiform tablets are revealing as to the mathematics of Babylon.

"We are reduced for the most part to conjectures concerning the scientific knowledge of the Egyptians and Chaldeans." On the contrary, we have very positive acquaintance with a considerable range of such knowledge as witness, in the case of Egypt, Professor Archibald's extensive bibliography in Dr. Chace's edition of the Rhind Papyrus, now in press.

"In practice and for reckoning they (the Egyptians and Chaldeans) made use of abacuses the arrangement of which calls to mind the ballframe formerly used in infants' schools." Aside from a single reference in Herodotus we have no direct reference to the Egyptian use of the abacus, and that goes back only to the fifth century B.C., more than a thousand years after Ahmes wrote—and as to the Chaldeans we have no direct evidence whatever.

"It would appear also that the Egyptians, as well as the Hindoos, had discovered, before Pythagoras, the relation between the surfaces of squares constructed on the sides of a right-angled triangle." It would be most interesting to have some proof for such a sweeping assertion as this.

These statements are merely typical. In the space allowed to this review it is not feasible to mention others.

As to dates, if the reader places any dependence upon those given, he will be led into difficulties. When M. Reymond states that Thales lived "about 624–528 B.C.," he is on safe ground; that is, he asserts that the dates are merely approximate. On the other hand there is no satisfactory evidence for saying that Pythagoras "died in the year 500 B.C.," that Zeno was "twenty-five years younger than his master" (Parmenides), the dates for neither being known with any degree of precision; that Hippocrates was born in 470 B.C., or Eudoxus in 408 B.C., or Euclid in 330 B.C., and so for various other such positive assertions. One of the most certain dates of this kind in Greek history is that of the birth of Archimedes, but this is here given as 257 B.C., when it should be 287.

There are various other types of error. For example, the assertion that Bryson contributed notably to the method of exhaustion (p. 56) is now considered very uncertain; that "the quadrature of the circle is, as we know, an insoluble geometrical problem" (p. 58) is a misleading assertion unless "geometrical" is defined before this statement is made; that the *Method* of Archimedes was discovered on a palimpsest "of Jerusalem" (pp. 75, 76) instead of "in Constantinople"; that the "writings" of Diophantus "became known" to the scientific world through Regiomontanus (p. 98), especially as M. Reymond himself says later (pp. 126, 127) that "it was only in the year 1575 that he (Diophantus) became known to the western world."

The bibliography will be helpful to students of the history of science in spite of such misprints as *uber* for *über*, "Kultur *de* Gegenwart," and J. H. Heiberg for J. L. Heiberg.

The index contains merely names. It is of no value to anyone wishing to look up topics. Even under names the reader will look in vain for Peet, Rhind, Pistelli, Festa, Friedlein, Hoche, Ilberg, and various others mentioned in the text or bibliography. He will, however, find both men bearing the name of Diocles listed under the same item and, as elsewhere stated, he will look unsuccessfully for Ball unless he happens to think of W. W. Rouse Ball.

On the whole the work has merits as a philosophical dissertation but none as a source of accurate historical information in the field of mathematics.

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