

The Copernicus of Antiquity (Aristarchus of Samos). By Sir Thomas Heath. London, Society for Promoting Christian Knowledge, and New York, The Macmillan Company, 1920. 59 pp.

It is always a matter for congratulation when a man of the highest scientific standing can be prevailed upon to give to the public a brief summary, in readable form, of results obtained in parts of his field. The little volume under review is such a contribution from the pen of the world's premier authority on Greek mathematics and mathematicians. Of the 56 pages of text, 37 are devoted to a short outline of the development of Greek astronomy before Aristarchus (that is, down to the 3d century B.C.), and it would be hard to find in so short a space an equally illuminating discussion of the subject.

The remainder of the text gives the 18 propositions of Aristarchus's only extant work, *On the sizes and distances of the sun and moon*, with a very brief indication of the methods of proof used. The most important of these propositions are the 7th, that the sun's distance from the earth is greater than 18, but less than 20, times that of the moon; and the 15th, that the diameter of the sun has to the diameter of the earth a ratio greater than $19 : 3$ but less than $43 : 6$. Although these results are wide of the mark, the methods used are entirely correct, and furnish a very interesting example of the way in which the Greeks used geometric inequalities to obtain numerical results which we now get from trigonometric tables.

Aristarchus's title, "The Copernicus of antiquity," rests upon the testimony of Archimedes and other ancient writers, who state explicitly that he taught the hypothesis of the double motion of the earth. It seems to have been the weight of Hipparchus's influence (2d century B.C.) which led to the rejection of this theory and the fixing of the geocentric theory in the position which it held unshaken for over 1500 years.

One who wishes fuller details as to Aristarchus and his work will of course turn to Sir Thomas Heath's *Aristarchus of Samos* (Oxford, 1913), which contains the complete Greek text and translation. For the general reader, however, the present work contains the gist of the matter (save for proofs). The one regrettable defect is the entire absence of figures. The two-page bibliography at the end is a useful addition.

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Éléments de la Théorie des Vecteurs et de la Géométrie Analytique. By Paul Appell. Paris, Payot et Cie, 1921. 147 pp.

This little volume in the Collection Payot gives in small space an introduction to the ideas of vectors. Coordinates are introduced as projections of a vector and vectors are represented throughout as a couple or a triple of coordinates. No attempt is made to bring in vector notation. It succeeds very well in setting forth the concepts of two and of three dimensions. No curve or surface is discussed at length. For those desiring a brief and very intelligible exposition of the elementary notions of vectors and analytic geometry it is recommended.

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