MR1710148 (2000h:01011) 01A45 00A30

Bird, Alexander (4-EDIN)

Squaring the circle: Hobbes on philosophy and geometry.

J. Hist. Ideas **57** (1996), *no.* 2, 217–231.

The work in geometry of the seventeenth-century English philosopher Thomas Hobbes has always been the subject of skepticism. The author of the paper under review affirms (p. 231) that "Hobbes contributed little or nothing to the history of geometry". Alexander Bird nevertheless wishes to show that Hobbes' writings on geometry are of interest for understanding his views on metaphysics, logic and philosophy of science. His paper is a contribution to the history of philosophy, covering a range of issues, only some of which can be summarized here. Hobbes held that the things we have scientific knowledge of are generated: to know a line is to understand its generation by a moving point (a body regarded without magnitude). The proper definition of a circle is a line generated by a compass or some equivalent means. Thus Hobbes rejected Euclid's definition of a circle as a plane figure bounded by a circumference that is equidistant from an interior point. "If a definition does not give the generation of the definiendum, it fails to be a principle of science" (Bird, p. 226). Hobbes' dismissal of algebra was based on his generative principle of knowledge: in analytic geometry one defines curves by means of equations, without specifying how the curves are generated. Hobbes also observed that the symbols of algebras could denote different things (e.g. lines, surfaces or volumes), and therefore were unreliable in mathematical demonstration.

Bird maintains that Hobbes' defence of his solutions to the quadrature of the circle and the duplication of the cube reflected his commitment to a generative theory of definition. John Wallis' criticisms of his constructions involved algebra and were therefore unacceptable; to accept them would have been to abandon a fundamental principle of knowledge, a principle that was essential to Hobbes' larger work on man, society and government.

In their book *Higher superstition: the academic left and its quarrels with science* [Johns Hopkins, Baltimore, MD, 1994 (Chapter 3)] P. R. Gross and N. Levitt discussed Hobbes' apparent mathematical incompetence, and used this fact to criticize social-constructivist historical accounts that place a high value on the English philosopher's scientific views. Bird's article would appear to show that there is more of value in Hobbes' mathematics than Gross and Levitt would allow, and confirms the interest of his geometry for an understanding of early modern philosophy. *Craig G. Fraser*