MR0919944 (89e:01026) 01A55 00A25

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★**Martin Ohm (1792–1872): Universitäts- und Schulmathematik in der neuhumanistischen Bildungsreform. (German)** [[**Martin Ohm (1792–1872): University and school mathematics in the new humanistic educational reform**]]
With a foreword by M. Otte.
Studien zur Wissenschafts-, Sozial- und Bildungsgeschichte der Mathematik [Studies on the Scientific, Social and Educational History of Mathematics], 4.
Vandenhoeck & Ruprecht, *Göttingen*, 1987. xxiv+326 *pp.* DM 84.00.
ISBN 3-525-40311-9

Martin Ohmwas celebrated in his time as the author of the compendium *Versuch eines vollkommen konsequenten Systems der Mathematik* ("Attempt at a complete consistent system of mathematics"), a two-volume work that appeared in successive revised editions in 1822, 1828–29, and 1853–55. A professor at the University of Berlin and brother of the physicist Georg Ohm, he was engaged in mathematical didactics during a period of educational change. The book under review is a detailed and solidly researched study of his mathematical and pedagogical philosophy, centered on an examination of the *System der Mathematik*. It is divided into four chapters: (I) Ohm's biography; (II) Das vollkommen konsequente System der Mathematik; (III) Ohm's philosophy of mathematics; (IV) Ohm's "System" within the context of 19th-century mathematics. The appendices present selected excerpts from Ohm's early writings, an index of his publications and a list of published and unpublished reviews of his work.

Ohm's treatise was part of a tradition that rejected geometry and the concept of magnitude as the basis of mathematics, wishing to replace it by a formal arithmetically based algebra that was regarded as more general and more fundamental to thought. Ohm was impressed by the analytical calculus of Euler and Lagrange and by the enormous expansion of mathematics evident in their work. While rejecting geometry, he nevertheless accepted Euclid's *Elements* as a model of systematic, rigourous development and tried to incorporate these qualities into his own system. His work possessed strong affinities with the contemporary English algebraical school of Peacock, Babbage and De Morgan. He divided mathematics into the theory of numbers (arithmetic, algebra and calculus) and the theory of magnitude (geometry and mechanics). The former was regarded as more fundamental and was developed using principles that governed the formation of literal expressions.

The early 19th-century tradition to which Ohm belongs is usually seen as a dead-end in the history of mathematics. Ohm's peculiar literal approach, inflexible and barren in its application to higher mathematics, was superseded by later developments, including the invention of new algebras by Hamilton and Grassmann, the analysis of arithmetical continuity by Dedekind and Cantor and the researches of Frege in mathematical logic. The author nevertheless insists on the historical interest of his subject: "If one is concerned on the contrary with the history of mathematical foundations and places philosophical, theoretical or didactic aspects of mathematical history in the foreground, where the development of theory in strong measure from the viewpoint of an external theoretical context is to be considered, then Ohm was not at all an insignificant figure; his reflections on the development of the number concept combined with the meta-theoretical implications that he anticipated were to a large degree influential and important for future research" (p. 7).

The author emphasizes Ohm's conception of mathematics as a symbolic formalism, a mechanism involving the formal manipulation of signs based on a principle of generality. This understanding was from the beginning of his career closely tied to his views on how mathematics should be logically organized and taught. He regarded his role as

a professional mathematician to establish mathematics on a "scientific" basis so that it might become a "formal means of learning" ("formales Bildungsmittel") for general use in the schools. In communications with the Prussian educational ministry and in his teaching and writing he vigorously espoused his mathematical philosophy. His ideas were adopted by teachers in secondary education, a notable example being K. Koppe's*Anfangsgründe der reinen Mathematik für den Schulunterricht* [first edition, Essen, 1836–1838, eleventh edition, Essen, 1876; per bibl.], a textbook widely used in German Gymnasien in the second half of the 19th century.

Various subjects of interest in the book under review include the early formation of Ohm's mathematical philosophy while an Oberlehrer in Thorn (pp. 23–45); Ohm's "System" and Cauchy's *Cours d'analyse*, with Ohm's review of the 1828 German translation of this work (pp. 151–166); Kummer's criticism of Ohm's "System" for being too philosophical and Ohm's response; and Ohm's influence on German mathematical pedagogy (pp. 252–270). The author defends Ohm against several critical assessments of his life and work that have appeared in the literature. *Craig G. Fraser*