

Curtis, Charles W. *Pioneers of Representation theory: Frobenius, Burnside, Schur, and Brauer* (History of Mathematics, 15.) xvi + 287 pp., illus., apps., bibl., index. Providence, R.I.: American Mathematical Society, London Mathematical Society, 1999. \$49.00

Reviewed by Leo Corry - *Isis* 2001

Charles W. Curtis is a prominent mathematician with important contributions to the field of representation theory. His textbooks in this field (written in collaboration with the late Irving Reiner, to whose memory the present book is dedicated) have been classical for a long time now. In *Pioneers of Representation Theory* he has set to present the historical development of the main ideas of the discipline, starting in the 1890s with the work of Georg Ferdinand Frobenius and up until 1960. On the way, the book focuses mainly on the works of three other "Pioneers" of the field: William Burnside, Issai Schur, and Richard Brauer.

The author states that his interest in the history of the field aroused gradually, and jointly with Reiner, in the process of jointly writing their textbooks. Thus, a main aim of the book is to show how the Pioneers reached their important results while using only the mathematics then available to them. In order to do so, Curtis presents successive and thorough accounts of the works where the new and seminal ideas of the Pioneers were originally introduced and then further developed. At the same time, however, Curtis does not hesitate to simplify some of the original arguments by translating them into modern terminology.

In an attempt to make the book appealing and accessible to a somewhat wider circle of potential readers, some of the necessary mathematics is explained throughout. Thus chapter I presents an introduction to the basic idea and problems of 19th century algebra and number theory, and later on, as the need arises, additional mathematical sections meant for the non-experts are added along the way. Of course, even a very clear presentation, such as the one provided here, will be relevant only to readers with at least a graduate-level knowledge of algebra.

Curtis also attempts to provide some amount of historical context. One point of special importance for him is to clarify what was the main problem that the work of each of the mathematicians discussed here was originally meant to provide solutions for. From the point of view of a book of this kind (i.e.: a technically detailed historical overview of a particular mathematical discipline) this would seem to be among the major gains that the reader may expect to obtain.

There are also biographical sketches of the major figures involved, as well as additional information about other participants in the history. Some illuminating documents are also quoted, and brief accounts are included of the mathematical traditions within which each of the Pioneers was educated and worked. However, the author himself acknowledges the relatively limited bearing of his account as a truly work of historical research. He thus provides references to works of a much more definite historical character that the interested readers can consult. In particular he mentions sev-

eral articles previously published by Tom Hawkins on the subject. It should be stressed that meanwhile much of Hawkins work has been published in the form of book not yet referred to by Curtis: *Emergence of the Theory of Lie Groups. An Essay in the History of Mathematics, 1869-1926* (Springer, 2000). Curtis' and Hawkins' books complement each other in many important ways that will be appealing to any reader of either of them.

Charles Curtis has no doubt written an impressive, authoritative, and well-informed book on a difficult subject. Mathematicians and historians of twentieth-century mathematics with the relevant background will find it a hard, but rewarding reading. Along the way, many historiographical questions may arise. For instance: to what extent is it possible to translate, as Curtis does, the original proofs of the Pioneers into more modern terminology and yet to remain faithful to the source? In most cases, however, it takes the technical expertise of the author himself to be able to properly answer questions like this one, and one can only wish that the very firm starting point provided by the book in the research of this specific discipline will yield additional, future historical research in this and related fields.