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The New Era in American Mathematics, 1920-1950 (Book Review)

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The New Era in American Mathematics, 1920-1950 (Book Review)

Abstract

Reviewed Title: *The New Era in American Mathematics, 1920-1950* by Karen Hunger Parshall. Princeton University Press, 2022. 640 pages. ISBN: 9780691197555.

Keywords

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The New Era in American Mathematics, 1920–1950

Karen Hunger Parshall

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Monograph

Karen Hunger Parshall's *The New Era in American Mathematics, 1920 – 1950* (hereafter *New Era*) is, as its back-cover asserts, "A meticulously researched history on the development of American mathematics in the three decades following World War I." It therefore begs to be reviewed by someone closely familiar with the many people, institutions, and topics that dominated mathematics during this time period. That reviewer is not me. In fact, probably not many people besides the author fit such a description, and her ability to produce such a work is the result of having actively and deeply researched this and related topics over the span of a forty-year career. So I'll survey *New Era* instead as someone with a garden-variety knowledge of graduate-level topics in algebra, analysis, topology, and foundations, and with a broad interest in the history of mathematics.

Parshall's 1994 book, *The Emergence of the American Mathematical Research Community, 1876 – 1900: J. J. Sylvester, Felix Klein, and E. H. Moore*, coauthored with David Rowe, focused mainly on the last quarter of the nineteenth century when American mathematics took shape as a distinguishable entity. Its sequel, which *New Era* can be considered to be, picks up the narrative at 1920 and ends at 1950. As Parshall explains, "the years from 1900 to 1920 [were] ... a period of consolidation and growth, [while] ... those from 1920 to 1950 were distinct from it in representing a "new era" in which the American mathematical research community emerged as a world player on the international stage." (xxi) While there is not just one event or mathematical development that marks this period as a "new era," several institutional and socio-political factors in play tend to make it such.

The three decades following the end of World War I, corresponding roughly to the book's three parts, were years in which the maturing American mathematical research community encountered a number of significant societal challenges—the residual impact of the great war, a depression caused by the stock market crash of 1929, the rise of nationalistic forces in Europe in the 1930s, and the conflict of the second world war from 1939 to 1945. Addressing these trends and assorted professional matters with initiative and resolve, American mathematicians evolved into a vigorous community that came to be recognized as first rank. Membership in the AMS grew significantly, along with expanding support for its publications; original research progressed in various areas and was becoming increasingly expected as a primary qualification by university mathematics departments of its professors; students no longer flocked to Europe for graduate study but found strong home-grown programs for attaining a doctorate; and outside funding became available for underwriting basic mathematical research—from the Rockefeller Foundation in the 1920s, but by 1950 from the Office of Naval Research and the National Science Foundation. While Parshall's earlier work conjectured that the arrival and assimilation of European émigrés was instrumental in American mathematics achieving world leadership, *New Era* argues that this had been mostly accomplished by time that influx occurred, due to the coordinated efforts and achievements of American

mathematicians themselves. By 1950 it was therefore appropriate that the U. S. mathematical community would host the post-war International Congress of Mathematicians with its four conferences in algebra, analysis, topology, and applied mathematics and its seven sections in several other fields.

While an exposition of the mathematics being produced during this time period is not the principal focus of *New Era*, Parshall identifies and describes those fields where American research was primarily concentrated: geometry—differential and algebraic; topology—point set and algebraic; algebra itself; analysis; as well as some lesser fields such as logic, probability, and (what was to become more central over time) applied mathematics. Three of the ten chapters explicate in broad strokes the key research developments, connections, and rivalries within these areas for each decade. Of course, not all significant mathematical developments in this time period can be cataloged, even in a book as long as this one. For instance, though a few developments in computer science, logic, and foundations are taken up, no mention is made of Shannon's ground-breaking 1938 work on Boolean algebra and switching circuits or his foundational work in the late 1940s on information theory, and Gödel's landmark 1940 proof demonstrating the consistency of the axiom of choice and the generalized continuum hypothesis with the standard axioms of set theory is also overlooked.

The main goal of Parshall's history, however, is not to provide a comprehensive history of the mathematical results and techniques being created but to exhibit the professional development of the American mathematical community in their many research programs, official activities, and personal interactions with one another and with the mathematics community at large, as constrained by and responding to various geopolitical and cultural challenges. Parshall skillfully analyzes such things using a wealth of publications, private correspondence, and organizational archival materials. The book discusses the work and roles of hundreds of mathematicians; it contains about two dozen photos and a dozen tables; some 1500 footnotes, appearing on nearly every page, document and expands on what is said in the body of the text; the book's list of References extends to 56 pages, including more than one page referencing Parshall's own works; and the subsequent Index of relevant terms runs to almost 40 additional pages.

Parshall's *New Era* is an impressive synthesis of a vast amount of source material. It is clearly the definitive treatment of the ascendancy of the American research mathematics community to international prominence during the first half of the twentieth century. As such, it will serve as the point of departure for anyone wanting to delve further into the mathematics being produced in the United States in this time period.