Review: William Thomas. Rational Action: The Sciences of Policy in Britain and America, 1940–1960. xi + 399 pp., figs., bibl., index. Cambridge, Mass./London: MIT Press, 2015. $38(cloth)$

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William Thomas. *Rational Action: The Sciences of Policy in Britain and America, 1940–1960.* xi + 399 pp., figs., bibl., index. Cambridge, Mass./London: MIT Press, 2015. $38 (cloth).

Rational Action: The Sciences of Policy in Britain and America, 1940–1960, offers a comprehensive account of the rise of the "postwar sciences of policy." The label refers to a set of practical, empirical, and theoretical endeavors—game and decision theory, operations research (OR), and systems analysis—originating in the war involvements of Britain and the United States and further developing from an interest in relating scientific ideas and academic inquiry to practical war efforts and military decision making. William Thomas traces this history through thirty short, chronological chapters by revealing the links between scientific methodologies, new technologies, and military concerns. These developments, as highlighted by the author, are accompanied by discussion of discourses inside and outside of academia, the emergence of and relationship between the research areas involved, and reasons for the successes and failures of those developments. One major goal is showing what people meant when asserting that "it would henceforth be possible to act more rationally" (p. 3). Thus *Rational Action* contributes to the recent literature on the history of Cold War social science and the applications of rational choice theories beyond the social sciences.

The sciences of policy were rooted in the theoretical developments of antiaircraft gunnery techniques and ballistics during World War I and of military planning and strategies in the 1930s and 1940s. Approaches like the mathematical theory of combat by the British military statistician L. B. C. Cunningham led to the systematic generation of combat data and informed choices for engineering designs. Furthermore, core British military personnel played a crucial role in introducing and giving meaning to the term "operational research," as military advisors, such as the British chemist Henry Thomas Tizard, were debating, coordinating, and integrating scientific research with concrete military needs to develop effective techniques and tactics for equipment use, planning, and management.

Through new OR sections in the Royal Air Force and the Ministry of Supply, the ideas of British bureaucratic reformers and scientific activists expanded and quickly spilled over to the United States, paralleled by discussions about the organization of collaborative efforts between scientists, the military, and politicians. As a field emerging out of a called-for coordination of science with the war effort, OR quickly began to occupy an intermediary role. Mathematical analysis, technology, and military problems complemented each other to ensure OR's practical usefulness, while its status as a purely scientific endeavor was debated. To ensure the close relationship between theory and reality crucial for successful war operations, OR researchers adapted their abstract models to military needs, and—on the basis of actual data, practical experience, and intuitions of military personnel—they translated theoretical results into usable manuals for officers and field staff.

During the postwar professionalization of OR, its legitimacy increasingly depended on its practical relevance for future military planning and decision making. Past field experiences and intuition were complemented by speculations and staged combat operations. While its scope, problems, and methods were debated by the late 1940s, OR developed into a field that facilitated the liaison between scientists and military decision makers and the improvement of decision making more generally, extending toward economic, industrial, and civilian activities; conferences, journals, and societies emerged in the 1950s, followed by educational programs in the 1960s. OR researchers also became more interested in theoretical and conceptual issues in decision and game theory, linear programming, and systems analysis. While it was debated to what extent such approaches should be informed by realistic scenarios, striving for precision in articulating problems was as valuable as obtaining numerical results.

Thomas concludes by reconstructing parts of the public debates about the relationship between science, industry, and policy during the 1950s and 1960s, shedding light on the nature of discourse in the public sphere and science circles. To motivate some conclusions about how historiography of twentieth-century science should be written, he questions its role in justifying a particular understanding of the relation between science and society. He warns against committing to idealistic interpretations of key

concepts, such as "science" or "rationality," that are frequently informed by particular ideologies and influence the historian's reading of the relation between science and society. He calls for a cautious approach that acknowledges stability rather than change in interpretations of such key concepts over time. *Rational Action* shows that rationality entailed conformity to rules *and* conscious judgment to offer case-based solutions for complex problems.

As much of the existing historiography focuses on the United States, one of the contributions of this book is that it reveals the influences of both the United States and Britain on the development of the sciences of policy. Another contribution is the novel methodology. In combining macro- and microhistorical approaches with detailed attention to protagonists' biographies, key debates, conferences, and institutional changes, a multilayered picture emerges that admirably captures the collaborative and discursive efforts among scientific experts, engineers, military figures, and politicians. Major debates and their outcomes were strongly shaped by the diverging goals and epistemic commitments of these groups, not always resulting in successful integration and application of new methods. *Rational Action* covers much ground on the history of OR, business and management science, and the wartime organization of science. It will thus interest historians of science and technology and science studies scholars.

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Laura Micheletti Puaca. *Searching for Scientific Womanpower: Technocratic Feminism and the Politics of National Security, 1940–1980.* xiii + 261 pp., illus., bibl., index. Chapel Hill: University of North Carolina Press, 2014. $34.95 (paper).

Women's employment history in the United States and elsewhere consists of different phases. While wartime generally gave women new opportunities, the positions were temporary, and women rarely received the same terms and conditions as their male counterparts. In *Searching for Scientific Womanpower*, Laura Micheletti Puaca presents and explores a new strategy to employ women in science and engineering and to achieve equity, rooted in World War II and the early Cold War era. Using this strategy, which Puaca calls "technocratic feminism," the inhomogeneous group of feminist reformers invoked national security rhetoric and anxiety for sufficient manpower rather than explicitly fighting for women's rights in society. Whether successful or not, technocratic feminism, Puaca argues, paved the way for future reforms.

The book consists of an introduction, four main chapters, and an epilogue. The four chapters proceed chronologically, starting with World War II (Ch. 1) and the advocation for "scientific womanpower" to keep up government-sponsored defense research. This period saw an increase in women's enrollment in engineering, special courses for women were established, and wartime programs made women feel accepted for a while—only to be set aside soon after the male veterans returned. Nevertheless, during the war, scientific womanpower was brought to the attention of government, industry, and education, and the efforts laid some groundwork for continued activity.

Chapters 2 and 3 examine the challenges and opportunities of the emerging Cold War era and the period following the launch of the Soviet *Sputnik* in 1957, respectively. Scientific manpower and womanpower initiatives continued. More women studied engineering and were employed in science-related fields, but women were still marginalized. Puaca shows how women's scientific societies, such as the women's chemistry society Sigma Delta Epsilon and, in particular, the Society of Women Engineers, played an important part in technocratic feminism breaking down formal barriers to women's education and employment.