

imperial project of tsars and commissars. Engel covers Muslim areas well and gives some attention to Baltic Germans, Finns, and Jews. She contends that the Soviet effort to emancipate non-Russian women was received as an alien import and a threat to national identity. It was accordingly resisted by men and most women in the national republics.

The chapter on World War II and its aftermath foregrounds the participation of women as combatants and more briefly notes their role in industry, medicine, and troop support. Interestingly, Engel suggests that gendered representation of German atrocities in Russia (rape and other abuses of women were prominent) may account for the high incidence of rape of German women by Soviet forces. After the war the Communist Party shifted emphasis back to prewar gender roles and asked women to aid injured men and replenish the population by increasing their fertility. Engel's treatment of the following period, post-Stalin Russia, is a bit contradictory because she uses both the polemical literature about the double burden of women, suggesting a deterioration of their condition, and economic and social statistics that show a gradual improvement. She ends with a brief section on the "new Russians" and the 1990s. Here the emphasis is mainly on the economic losses women suffered, but it is also on the opening of space for fresh debates on the condition of women and an array of new images of female roles. She observes the continuing power, nonetheless, of essentialist thinking about women.

Engel has done a great service in synthesizing the scholarly literature on women in Russia. Her account is well balanced and gives a remarkable amount of space to village and working women, despite the heavy emphasis in monographic studies on the educated women. The book is also well balanced in its presentation of the periods both before and after the Revolution. The treatment is more descriptive than analytical, but where Engel offers analyses, her judgments are thoughtful and fair. Her work provides a good measure of the distance researchers of women's history have come since the 1970s and can serve as a guide to terrain that still needs to be examined and elucidated.

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Pavlov's Physiology Factory: Experiment, Interpretation, Laboratory

Enterprise. By *Daniel P. Todes*.

Baltimore: Johns Hopkins University Press, 2002. Pp. xix + 488. \$59.00.

The public image of Ivan Petrovich Pavlov (1849–1936) rests upon his discovery of the conditional reflex in salivating dogs and the ensuing program of objective, scientific study of the psyche. The announcement of this program in his Nobel Prize speech of 1904, and the anticipation of finding along these lines the elusive solution to the metaphysical mind-body problem, ensured Pavlov's cult status in twentieth-century science, not least among American behaviorists and Stalinist ideologists. Yet there was also another Pavlov, the one whose physiological research on digestion, appreciated by specialists rather than the general public, actually brought him the Nobel Prize. This earlier, much lesser-known Pavlov is the subject of Daniel Todes's book.

Pavlov's work on digestion took place mainly during the 1890s in his physiological laboratory at the Imperial Institute of Experimental Medicine in St. Petersburg. Todes conducts his investigation in the genre of "laboratory studies," a popular approach among contemporary historians of science that encompasses such classics as Bruno

Latour and Steve Woolgar's *Laboratory Life* (Beverly Hills, CA, 1979) and Robert Kohler's *Lords of the Fly* (Chicago, 1994). The analysis focuses on detailed reconstruction of how, inside the walls of a laboratory, new scientific claims about solid and reproducible "experimental facts" are forged from much more complex and protean experimental objects and how the social culture of laboratory collectives, scientists' rituals, and rhetorical strategies allow such research to proceed.

Following this approach, Todes arrives at a novel, strikingly different representation of Pavlov and his lab. Earlier studies were mostly preoccupied with the great scientist himself and his groundbreaking thoughts, showered on and followed by numerous disciples. Todes uncovers Pavlov as an innovative research manager, one of those responsible for the "laboratory revolution" in modern science. He also reveals the important role of Pavlov's collaborators in the development of some of the master's key concepts. The majority of these collaborators were *praktikanty*, practicing physicians who, at a rate of about a dozen annually, came to the laboratory for temporary work. A yearlong term of research under the distinguished scientist provided them with a thesis necessary for the doctorate degree in medicine, thus furthering their careers, while for Pavlov the *praktikanty* system meant an abundant supply of qualified and inexpensive labor. Pavlov typically assigned to a *praktikant* a topic and research methodology, but some of them brought with them special skills acquired elsewhere and, in the course of their investigations, often contributed insights, discoveries, or problems that could change the course of work by the entire laboratory and its chief. Todes discovers such key episodes by analyzing the laboratory's doctoral theses and how Pavlov reworked their individual findings into his synthetic, generalized master narrative, *Lectures on the Work of the Main Digestive Glands* (1897).

In 1893, in collaboration with Pavel Khizhin, Pavlov achieved a crucial breakthrough by creating a special "dog-technology"—laboratory animal *Druzhok* with a surgically isolated part of the stomach, which could secrete gastric juice without receiving any portion of food. For the discipline of physiology, this accomplishment marked an important methodological advance from acute experiments to chronic ones. The former used vivisection, violent destruction of the animal's body resulting in its quick death, while the latter, if successful, allowed observation of experimental effects and physiological processes in a laboratory animal that continued to live relatively "normally" long after the operation. Relying on this technology, Pavlov guided a series of *praktikanty* to investigate the processes of gastric secretion in response to varying stimuli. These studies revealed, in particular, the important role played by the central nervous system in the regulation of the digestive glands. Thus demonstrating the influence of the "psyche" on physiological secretion also allowed Pavlov to explain away some irregularities in experiments on different dogs, while emphasizing regular patterns and stable effects as principal knowledge claims of his laboratory.

Pavlov described the complexity of gastric processes as the work of an entire "digestive factory." Todes's extension of the factory metaphor to characterize the structure and functions of Pavlov's laboratory probably stretches the concept a little too far, especially if Pavlov, as Todes suggests, relied on Dmitrii Mendeleev's carefully defined distinction between manufactory (*fabrika*) and factory (*zavod*). Only in the 1930s, supported by the Soviet government, would Pavlov build up his institutional empire to the complexity and dimensions comparable with systems of industrial production. Before the Revolution, his laboratory, housing some twenty coworkers at a time, each individually involved with the master, could be characterized much more appropriately as a "workshop."

My other reservation concerns the fundamental transition in 1901–4 from Pavlov

the physiologist to the more canonical Pavlov of conditional reflexes and the study of higher nervous activity. Todes revises the traditional account given by Pavlov himself, demonstrating very convincingly the role of the laboratory and new coworkers, especially Ivan Tolochinov, who brought in a new expertise in psychology, which Pavlov himself lacked. The link with a similar and rival approach to mental activities developed by Vladimir Bekhterev's school is thus acknowledged but hardly pursued in the book, for this would have led the study outside the walls of Pavlov's laboratory per se. Equally little attention is paid to the larger world outside, with its political and social concerns, except when Todes describes Pavlov's student years. Physiology in the late nineteenth century, particularly in Russia, had strong ideological meanings, especially when it touched upon the contentious relationship between the soul and the body. Pavlov's pre-1904 demonstrations of the regulating role of the psyche could be widely seen as pleasing the religious establishment, while his later approach to mental processes as reflexes was often associated with revolutionary materialism; Pavlov himself rejected any ideological connections of this sort and insisted that his approach, including the dramatic reversal, was consistently driven purely by the experiments. "[Pavlov's] account of [his] conversion by force of laboratory experience is obviously true," David Joravsky once remarked, but only "as long as we refrain from probing below the surface" (*Russian Psychology* [Oxford, 1989], 136, 138). The "laboratory studies" approach by itself does not pursue the question much deeper either, because of its built-in tendency to concentrate on the inside of the laboratory space and look away from whatever happens outside its walls. But it can deliver many other discoveries—and Todes's book is particularly rich in them—that will provide the necessary background for and will help to address the issue in a different kind of study.

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Beyond the Pale: The Jewish Encounter with Late Imperial Russia. By

Benjamin Nathans. Studies on the History of Society and Culture, volume 45.

Edited by *Victoria E. Bonnell* and *Lynn Hunt.*

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In *Beyond the Pale*, Benjamin Nathans sets out to describe the history of some groups of Jews in Russia that have not just never really fully been investigated so far but that are often even ignored by historians. These groups are not part of the "heroic" history of the Jews in Russia, not part of the great struggles connected with the history of the Bund or of the Zionist narrative. Contemporary polemics labeled them, mostly unjustly, "assimilationist." It is therefore all the more commendable that the author turns to them, making extensive and really good use of Russian archives. The groups we are talking about are those privileged Jews who because of their educational achievement (a university degree) or because of their wealth (as merchants of the First Guild) were allowed to leave the Pale of Settlement. Their emergence was, in Nathans's words, the result of "selective integration"—which, at least for these groups, removed most of the legal disabilities that applied to Jews. Nathans centers on their encounters in different social spheres; he tries to describe how Jews fit into selective segments of Imperial Russian society. The encounter and the fit were often painful and extremely difficult, but these groups were at least partially emancipated, and the passage to this sort of integration and emancipation was never closed. It was, however, the eye of the needle, which the