

antebellum Virginia through two well-chosen case studies—John Hartwell Cocke and William Fanning Wickham. Both were slaveholding planters keen on improvement. Both participated in local agricultural societies, and both managed their lands according to the most up-to-date methods: they rotated crops (tobacco, wheat, corn, clover, oats, barley), fertilized fields (manure, marl), and studied soils (qualitatively, quantitatively, chemically). Both Cocke and Wickham also worked their slaves. In an excellent but all-too-brief section, Cohen examines some of the hard labor of farming—digging, carting, and spreading marl, although not planting or harvesting. Over five decades (1810s–1850s), Cocke and Wickham incorporated more and more science (particularly chemistry) within their agricultural practices and thereby changed the ways in which they worked and understood their lands.

Working the land as a way of knowing the land is what Cohen calls the georgic ethic, a kind of relationship inspired by the Roman poet Virgil's *Georgics*. In contrast to the passive and idyllic pastoral, the georgic approach values labor over leisure, farming over frolicking. More important, the georgic ethic reflects and reinforces a tradition of moral and material improvement. Beginning in the eighteenth century, the georgic ethic was exemplified by prosperous and proper planters like Jefferson. Cohen, however, chooses not to explain what such improvement-minded planters did (unlike his later treatment of Cocke and Wickham); rather, he focuses his first three chapters on what agricultural writers said they should do. In taking this textual turn, Cohen sometimes wanders off the farm—away from practice and toward “philosophy of praxis.” In his chapter on book farming, for instance, Cohen studies the guidance on land management found in the rural press and unpacks, rather skillfully, the multiple meanings of the “science of agriculture.” But he might devote too much attention to contests of authority and credibility (who can talk about growing wheat) and too little to practice (how they grew it). Likewise, in his chapter on agricultural chemistry Cohen provides a finely detailed reading of treatises by the leading theorists of the day, like Edmund Ruffin, in order to show that the transition from Humphry Davy's organic, humus theory of soil fertility (1810s) to Justus von Liebig's inorganic, mineral theory (1850s) was neither straightforward nor smooth among American farmers imbued with a georgic ethic. But if Cohen wants to demonstrate how chemistry increasingly became the “prism” through which farmers viewed their land, he might need

some more well-grounded examples like those of Cocke and Wickham.

The emphasis on chemistry is carried over to the last substantial chapter, on the geological survey of Virginia. Cohen recounts how the director, William Barton Rogers, his assistants, and a network of correspondents collected and analyzed marl samples, using special laboratory apparatus, and then publicized the results. Cohen uses the survey as a vehicle for studying the circulation of “a conceptualization of science as a practice useful to agricultural improvement” (p. 168). He scolds readers who might ask whether Rogers's survey had a measurable impact on farm production—“the wrong issues . . . the wrong questions” (p. 193). But if the survey truly had “far-reaching conceptual and philosophical legacies,” then surely some farmers changed their practices along with their world-views (see Cocke and Wickham). In the end, Cohen asserts that his book is about food, but to the extent that the place he is studying is antebellum Virginia, the cash crop is tobacco; that staple depleted soils and prodded planters toward improvement, particularly chemical analyses. It is understandable that Cohen wants to broaden his compass to the entire American countryside, but he might have harvested more from that peculiar southern hybrid of antebellum science, progress, and slavery.

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Olga Elina. *From the Tsar's Gardens to Soviet Fields: A History of Agricultural Experimental Institutions, Eighteenth Century to the 1920s.* [In Russian.] 2 volumes. 479 + 488 pp., illus., tables, bibl., index. Moscow: Egmont-Russia, 2008. (Cloth.)

For two centuries, from Peter the Great to Stalin's industrialization, the Russian economy depended on the export of grain as heavily as it does on oil today. Russia's entry into the international market via the Baltic and Black Sea ports fed British industrialization while slowing the development of her own industry. Existing power relations adapted to market conditions by making peasants a commodity, bought and sold together with the land they tilled. In parallel to the system of Portuguese, Spanish, British, Dutch, and French colonial slavery, the system of serfdom developed in Austria-Hungary, Prussia, Poland, and Russia. Grain profits supported the leisured noble class from which modern Russian culture sprung during the nineteenth century, with its literature, music, and, eventually, science. By the century's end, developing

Russian science turned its attention toward improving the country's economic foundation, the agricultural sector.

Olga Elina's fundamental study surveys the history of institutions for experimentation with plants on Russian soil. Early monastic and court gardens combined pragmatic functions with spiritual and entertaining ones: they offered symbolic representations of Eden, supplies of medicinal plants and luxury fruits generally unavailable in northern climes, aesthetic replicas of exotic landscapes, and natural historical collections in newly acquired territories. In the eighteenth century, the academically trained botanist could experiment with cultivation and acclimatization, sometimes occasioning a scientific publication. Interest focused mainly on rare and exotic plants rather than on staple agricultural varieties.

Once a military career became voluntary for Russian noblemen in 1762, the twenty-four-year-old Andrei Bolotov retired to improve agriculture on his private estate and to spread his acquired expertise in print. The Free Economic Society in St. Petersburg encouraged the tradition of similarly minded "exemplary landowners," amateur agriculturalists experimenting with "rational" and "scientific" methods of ploughing, seeding, fertilizing, and crop rotation. The emancipation of the serfs in 1861 deprived nobles of free peasant labor and forced many more of them to pay attention to the efficiency of their land. The nineteenth-century state established educational courses related to agriculture at universities and, starting in the 1830s, special schools of agronomy, with experimental land plots. Some professors, including the famous chemists Alexander Engelgardt and Dmitri Mendeleev, performed agricultural tests on their private estates.

For centuries, crop failures occurred periodically in Russia's risky climate, but the famine of 1891 proved exceptional. Arguably, railroads made famines preventable in principle, thus shifting the burden of guilt onto society and the state. The enormous public outcry forced both to act. A reformed government ministry took responsibility for national agriculture and started establishing a network of regional stations to help farmers with scientifically based advice. Even more experimental stations and fields were organized by local communities (*zemstvo*), learned societies, and private individuals, pushing the combined total of agricultural research institutions in the empire to about 370 by 1915. Wars, revolutions, and territorial losses brought inevitable damage, but also new opportunities. The fertilizer industry developed alongside the

chemical production of military explosives. The revolutionary government became an enthusiastic rather than reluctant patron of agricultural research. With the end of noble landownership, some "model estates" were turned into new experimental stations, thereby expanding the existing network.

Elina's richly documented study prompts us to rethink some widespread assumptions about the history of science and society in Russia. The state has too often been seen as the chief promoter of science in both the imperial and the Soviet periods, but Elina demonstrates the leading role of private patronage, noble amateurs, and *zemstvo* society in launching important research agendas. She describes the separate branch of "*zemstvo* science," with its own *esprit de corps*, approaches, local roots, and nonstate sources of support (besides agriculture, one can also speak of *zemstvo* medicine, pedagogy, statistics, and social science). Where traditional approaches to Russian history would have seen the Revolution of 1917 as either the beginning or the end of the story, Elina interprets the revolutionary period as both accelerating and significantly modifying the ongoing institutionalization of agricultural research.

The book does not challenge some other aspects of the traditional discourse entrenched since the nineteenth century, when serfdom was described as "medieval" and as peculiarly Russian or "Oriental," rather than a broader European and early modern institution, and when agricultural experts proclaimed themselves transmitters of invariably "advanced" European and American science to peasants stereotypically labeled "backward." These powerful stereotypes leave little room for stories of local varieties obtained by "unenlightened" practical selection before coming to the attention of new scientific institutions or of Russian drought-adapted grain types planted on American prairies. Only occasional indications scattered throughout the book hint that the transfer of knowledge was not as simple and unidirectional as the dominant narrative would have us believe.

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Paul Farber; Hamilton Cravens (Editors). *Race and Science: Scientific Challenges to Racism in Modern America*. 256 pp., index. Corvallis: Oregon State University Press, 2009. \$29.95 (paper).

In *Race and Science*, Paul Farber and Hamilton Cravens bring together nine brief essays that originated in a 2006 conference at Oregon State