

nance). Catholics such as Descartes and Galileo were not Aristotelians, and Aristotelians such as Girolamo Borro and Cesare Cremonini were not Counter-Reformation Catholics.

In drawing their conclusions, Renn and Darrow state that they were “interested in reconstructing the long-term learning and unlearning experiences connected with the historically changing capability to address this challenge [i.e., that of dealing with mechanical problems without modern concepts] and in the conditions on which this capability depended” and that, accordingly, in “order to describe these learning processes, we have referred to some of the core experiences underlying mechanical knowledge” (p. 260). Yet it is surprising that the authors do not discuss the empirical basis of the question of equilibrium that might have contributed to the historical developments they focus on (such as the experiments with balances carried out by del Monte and others). Also, their discussion of Archimedes’ proof of the law of the lever suffers from not being placed in the context of the debates that it has continually given rise to until recently (to be sure, the authors do quote some literature, but they miss important studies).

Having pointed out what I consider to be a few weaknesses of the book, let me turn to its strengths. In a nutshell, this book (which is also available on the Internet at no charge) will prove to be a very useful tool for teaching the history of early modern mechanics. The marginalia by del Monte are certainly important and deserve to be brought to the attention of scholars. Furthermore, the book will offer students a telling example of the dedication and painstaking effort required in order to produce reliable editions of early modern science manuscripts.

PAOLO PALMIERI

Steven Seegel. *Mapping Europe’s Borderlands: Russian Cartography in the Age of Empire.* xi + 368 pp., figs., illus., bibl., index. Chicago/London: University of Chicago Press, 2012. \$55 (cloth).

In 1795, three empires—the Russian, the Habsburg (Austrian), and the Prussian—finished the partition of East Central European territory they had started in August 1772. In common parlance, Poland was “wiped off the map.” In *Mapping Europe’s Borderlands*, the cartographic historian Steven Seegel explores what it actually took to “erase” a country from maps, developing his “core argument”: “the projection of power and rationalization of space through maps has to be understood in institutionally and in messy,

specific borderland contexts, relative to indeterminate outcomes of 19th-century modernization by empires and nations” (p. 4).

Seegel’s emphasis is Poland, but defining “Poland” seems always to have been a tricky matter. Even just focusing on the two centuries covered in this book—from Peter the Great’s forays into the region in the early eighteenth century until the Paris peace conference following World War I—the territory of this polity covered lands that are now part of the states of Lithuania, Belarus, Ukraine, and Russia, at a minimum. Seegel has scoured twenty-six libraries, archives, and museums in four countries, utilizing primary source materials in at least eleven languages, excluding English. (He includes a bibliography of primary texts and atlases consulted; the sources for the theoretical framework must be gleaned by careful reading of the end notes. The index is invaluable.) The result is a deftly argued, lavishly illustrated, and truly impressive analysis of the relationships between maps, territories, ideologies, and peoples.

Seegel carefully articulates the scope and argument of each of his chronologically arranged chapters at the outset and conclusion. The first two chapters describe the cartographic practices, institutions, and ideologies of eighteenth-century Russia and Poland, respectively, culminating in the seizure of the Kingdom of Poland’s maps by Empress Catherine the Great following the partitions. Now that Poland was “off the map,” Seegel’s subsequent chapters detail the countless ways in which its representation was handled by the respective empires in political, ethnological, and geological maps over the following century—through the Napoleonic period, the repression of uprisings in “Poland” in the 1830s and 1860s, debates over the status of Ukraine and the Grand Duchy of Lithuania, and into the Great War.

Since the bulk of Polish territory ended up within the Russian empire, Seegel’s attention is largely devoted to exploring Romanov understandings of the region. He discovers a parallel (and eventually convergent) development of *rossiskii* and *ruskii* approaches to formerly Polish territory. In English, both terms mean “Russian,” but the former refers to the Russian state, and for Seegel this was the administrative, bureaucratic, imperial cartography. The latter term refers to the Russian people as an ethnos and represents an assimilationist ideology (most clearly evident in maps of what is now Ukraine). To throw this dynamic into relief, Seegel narrates detailed reconstructions of Habsburg mapmaking ventures, especially of formerly Polish Galicia. (There is, regrettably, rather less about the view from Berlin.) The resulting narrative fulfills Seegel’s admirably well-articulated methodological views on con-

structivism versus realism, poststructuralist cartography, and critical skepticism toward nationalist historiographies—first laying out an approach to thinking through maps, and then showing concretely how it should be done.

Mapping Europe's Borderlands is written for an intended audience of Russian and East Central European historians, not historians of science. That is not to say that “science” is omitted from Seegel’s account; on the contrary, he devotes significant attention to self-conscious attempts by cartographers to develop a science of mapmaking. Where it appears, science functions as an ideological frame: “Science, race, and religion interfaced in Russian maps of the 1870s. In the age of Darwinism and the biologization of identity, Russian maps applied tropes of European anthropological and ethnological essentialism to differentiate the empire’s populations according to racial and ethnic type” (p. 165). The reader is not, however, introduced to the changing practices of surveying and printing that animated these developments, and Seegel does not reconstruct the process of mapmaking from ground-level observations up—a topic that is likely better treated in a more micro-scale study than this one. The single greatest lesson for historians of science is likely one that has come to be appreciated in the case of colonial maps from the age of exploration but less often acknowledged within the bounds of Europe at the height of modernity: maps are complicated pieces of evidence that need to be read just as carefully as any other type of document. None of the representations of Poland we see in the dozens of grayscale reproductions or the seventeen color plates is straightforwardly “of” Poland, or zones where Polish is spoken, or the Polish ethnos (whatever that might be). Seegel offers a thoughtful framework by which historians can read maps against the grain, uncovering ideologies related to anthropology, geology, statistics, and numerous other domains of natural knowledge.

MICHAEL D. GORDIN

■ Modern (Nineteenth Century to 1950)

Margaret E. Derry. *Art and Science in Breeding: Creating Better Chickens.* viii + 281 pp., illus., bibl., index. Toronto/London: University of Toronto Press, 2012. \$65.

Margaret Derry’s broad and impressively researched history of chicken breeding in North America addresses how modern genetics impacted livestock breeding. More generally, and equally importantly, the book explores how livestock

breeding impacted modern genetics. In particular, Derry studies the “connection and non-connection of agricultural livestock breeding with academic biology.” The approach assesses “farm breeding and culture,” as well as genetics, and Derry notes that this “is not a particularly common way for historians to approach the relationship of genetics to farming” (p. 3). She studies this interface through chicken breeding, a sort of case study for the larger enterprise of breeding animals for agricultural purposes. However, the case study also reveals some of the particularities of chicken breeding as opposed to the breeding of larger agricultural animals.

Derry shows that eighteenth-century breeders—in particular Robert Bakewell, who helped to pioneer the innovation of breeding “in and in”—willingly sacrificed “hybrid vigor” to the goal of ongoing improvement of the stock. Bakewell and his successors understood the essential points of successful breeding. She also notes Sir John Sebright’s theory of inbreeding “as a quantitative and percentage issue” and its significance to nineteenth-century breeders and to twentieth-century geneticists (p. 22).

With this in mind, Derry argues that the science of genetics did little to change these foundational approaches to breeding. Thus, she asserts that the science of genetics contributed little to the practice of breeding until the second half of the twentieth century. Another important part of Derry’s account is the development of breed associations, record keeping, and scorecards for agricultural and club purposes. In the twentieth century, however, the entrance of big business—and the necessary capital for broad-based breeding programs—led to a more substantial integration of genetic thinking, especially the use of the progeny test and quantification, into poultry breeding. At about the same time, the poultry industry shifted from an emphasis on egg production to breeding for meat production.

A major point of *Art and Science in Breeding* is to show the level of complexity and sophistication in craft breeding and culture. This approach also helps Derry to differentiate science and art. In particular, she convincingly argues that agricultural colleges were somewhat dismissive of the “art” of breeding because they assumed that craft breeders were devoted exclusively to the ideal of producing purebreds and specific fancy traits—such as beautiful plumage. This persistent misconception in academia ignored Bakewell’s approach and led to a greater misunderstanding of craft breeding. Derry presents the “complicated breeding strategies” involved in the nineteenth century and shows that while they “were invented by professional fancy breeders,” these breeders neverthe-