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perspective *per se*, but mostly as an important "part of the history of the rise of modeling in the natural sciences" (p. 239). Indeed, this work should be of great interest to the growing number of historians, sociologists and philosophers of science interested in modeling.

The importance of numerical weather prediction in the evolution of meteorology is well known, but Harper's work provides crucial new insight into how this came about, taking apart the programs to reveal complex bureaucratic structures, rich—and, according to Harper, extremely successful—military-civilian dynamics and strong personalities that played defining roles. Charismatic figures such as that of the ambitious Philip Thompson contribute to a rich narrative in which intrigue is interwoven with the more mundane—but perhaps more significant in terms of the ultimate outcomes—human resource, technical and logistical issues that characterized the early years of numerical weather prediction. It becomes increasingly clear that closely following these key actors and their institutions leads to a better grasp of the interfaces (theoretical/computational, military/civilian, etc.) that characterized the genesis of this new type of meteorology.

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***Measuring the New World: Enlightenment Science and South America*. By Neil Safier**. (Chicago: The University of Chicago Press, 2009. xviii + 387 p., ill., notes, bibl., index. ISBN 978-0-226-73355-5 $49.00).

Enlightenment naturalists aspired to produce knowledge about nature that was universal and definitive, that would transcend personalities, politics, and other vulgar local concerns. In practice, they seldom—if ever—achieved those aspirations. Neil Safier focuses in particular on the scientific work of the French/Spanish geodetic expedition to the Spanish province of Quito (modern-day Ecuador) in the 1730s and 1740s. *Measuring the New World* is not, however, primarily a history of this expedition; rather, it is a history of this expedition's findings; about how knowledge was produced and reproduced, and critically received, both in the Americas and in Europe. Safier explores the rhetorical strategies that European naturalists used to construct this putatively authoritative knowledge about the New World. This authority was always tenuous: Safier shows the many compromises and contingencies that shaped the production of texts, maps, and monuments. Nor did critics in Europe ever accept these texts as authoritative. *Measuring the New World* is also an innovative history of science and imperialism. Rather than taking political

empires as his framework, Safier explores the workings of the European "empire of science" and the "empire of letters" in the eighteenth century (p.262). In this, he joins other scholars who are studying the production and circulation of knowledge across political boundaries.

Enlightenment scientists such as La Condamine presented themselves as rational observers, as eyewitnesses who saw things with their own eyes and made observations with their own instruments. But La Condamine and his fellow naturalists also depended (often silently) on the work of others. Here and elsewhere, Safier seeks to recover the social and material conditions in which scientific knowledge about the New World was made (and sometimes unmade). For example, Safier notes that La Condamine carried several trunks of books with him on his travels, which shaped much of what he saw. Through close textual analysis, both of published and unpublished sources, Safier also recovers the voices of people who contributed to the production of knowledge, but whose contributions were often silenced or suppressed, either accidentally or (more commonly) on purpose. La Condamine, for example, supplemented his own observations with others from manuscript sources—from a Cuzco-based Creole, and from the manuscript accounts of a Jesuit missionary in Amazonia, among others.

La Condamine's narrative was published to great—but not universal—acclaim. Safier shows that while La Condamine was able to suppress or mute many published criticisms of his work in France, scholarly across Europe privately disputed many of his findings. Surprisingly, Safier finds broad parallels how scholars across Europe responded the text. Critiques of the text did not simply break down upon national or imperial lines. Few Europeans—either then or later—accepted his work as definitive. In particularly, readers criticized La Condamine (and also Juan and Ulloa, the Spanish members of the expedition) for making inadequately-supported claims about the supposed barbarity of indigenous cultures, especially when the travelers spoke no indigenous languages, and had only brief encounters with indigenous groups.

The process of knowledge production—editing and filtering—continued in Europe itself. One of the great intellectual productions of the expedition was the Map of the Province of Quito, produced in Paris at the request of the Spanish Ambassador to France. Safier takes his readers into the cartographic atelier where this map was produced, and reveals the complex editorial process that went into producing the map—involving negotiations between the Creole intellectual Pedro Maldonado, the French mapmaker Bourgignon d'Anville, and La Condamine himself. Safier uses annotated drafts of the map to explore the negotiations and compromises through which definitive version of the map was produced. The process involved

hundreds of changes, large and small, important and unimportant. Among other things, Maldonado sought to suppress parts of the map that spoke about significant natural resources, which were of strategic interest to the Spanish empire. Ultimately, three versions of the map were produced—one explicitly for the Spanish sponsors; a second 'universal' version for the European scientific community. The third version appeared in La Condamine's narrative; here, he began subsume Maldonado's role in producing the map, and representing it as his own work.

Finally, Safier explores the innovative editorial practices Europeans developed to assert their intellectual authority. In 1744, French naturalists published an updated, abridged, and revised translation of Garcilaso de la Vega's *History of the Incas*. This edition included botanical information not contained in la Vega's original work, based on plants collected by the expedition and brought to the Jardin du Roi in Paris. Safier shows how the organization and structure of the revised text, particularly the use of hierarchies of footnotes and brackets reflected, in turn, a hierarchy of knowledge that privileged Enlightenment French thinkers. Finally, Safier explores the editorial practices by which the monumental *Encyclopédie*, supposedly one of the authoritative, definitive expressions of human knowledge, incorporated and presented knowledge about the New World. The editorial process was, in fact, quite haphazard. The *Encyclopedie*'s editors appear to have based many of their entries on whatever texts were most accessible and convenient, even if these texts disagreed with one another. This led, in Safier's words, to a measure of 'bibliographic dissonance' among the entries. This dissonance was not obvious at first glance, since the *Encyclopédie* silenced both the provenance and the authorship of its articles.

Safier has produced an innovative and nuanced exploration on the construction of scientific knowledge in the Enlightenment science. Although it focuses on a comparatively narrow topic, *Measuring the New World* addresses large themes, of interest to historians of science and imperialism, historians of Enlightenment science, and historians of the field sciences. It shows, forcefully, just how contingent and contested Enlightenment knowledge was, in spite of its claims to universality. It is rich with methodological discussions and lavishly illustrated with images of the documents and texts Safier has used; it is also historiographically sophisticated without being dense. These make it ideal for use in advanced undergraduate or graduate courses, as well as for anyone interested in understanding the construction of scientific knowledge.

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