SONJA BRENTJES

Crossing Boundaries: New Approaches to the History of “Pre-Modern” Science and Technology

The four papers published here originated as contributions to a symposium at the Twentieth International Congress for the History of Science, Liège, 1997, organized by Nathan Sivin and me. The purpose of the symposium was to reconsider the types of boundaries claimed to have distinguished diverse Asian and European “pre-modern” scientific and technological cultures. Scholars of different disciplinary affiliations were invited to explore the ways in which boundaries between various kinds of scholarly disciplines in “pre-modern” cultures have been erected, transformed, or erased, and to analyze instances of boundary-crossings and their legitimization by members of “pre-modern” as well as “modern” scientific and technological cultures.

The participants were asked first to investigate the interdependence of “pre-modern,” “modern,” and current narratives about such boundaries which separated, or were perceived to separate, the various cultures from one another and to demarcate different scholarly communities within one culture. Secondly, they were asked to discuss those contextual elements that they thought contributed to erasing boundaries between different scholarly cultures by transforming local knowledge into cross-culturally accepted knowledge. Finally, they were asked to elucidate the impact of the different disciplinary methods applied to establish evidence and then to derive interpretation upon identifying which boundaries shaped the particular scholarly culture under study. The four papers published here address the first and the second questions with respect to Ming- and Qing-time China, the Ottoman and Safavid Empires, and early modern (Christian) Europe.

The four papers selected for publication here — while addressing different cultures, different aspects of cross-cultural interactions, and different scholarly disciplines — share a common concern for encounters between West European and Asian proponents of scholarly knowledge and practices, their perceptions by contemporaries, and their portrayals in current historiography of science. They illustrate the fact that different members of each of the two broader communities involved in these meetings have developed narratives of their own which often
tended to differ from the activities they carried out and sometimes obscured the various means employed to achieve their goals. With different degrees of emphasis, these papers document the fact that the current views of the relationship between early modern West European scholarly cultures and their Asian contemporaries not only duplicate West European forms of those earlier selective narratives, they even privilege certain West European histories over others. They show that a different process of integration of knowledge is necessary to achieve a richer and more complex texture of historical reconstruction — the integration of the ignored West European histories and the integration of the Asian selective stories about cross-cultural meetings.

Pingyi Chu studies the boundaries that have to be eradicated or at least substantially modified to permit the acceptance of an alien type of scientific knowledge which both foreign transmitters and current scholars perceive as scientifically superior. He shows that neither the transmitters nor the recipients judge a particular piece of knowledge solely in terms of its scientific value. For both groups of scholars, the meaning of this knowledge in a wider set of cosmological and philosophical theories and the implications of these theories for the perception of their respective religious, political, cultural, and social fabric is what is truly at stake. To this end, various challenges and ways of producing evidence are invented, classical texts and teachings are reinterpreted, and arguments familiar to one group are reshaped to appeal to the other group. Pingyi shows that this debate had no conclusive result and that differing opinions continued to be held and defended. The particular body of foreign knowledge that Pingyi studied was finally accepted, not through a process of adaptation and confrontation, but rather as a result of a wholesale acceptance of “modern” science which was caused by the radical change in internal and external conditions existing in Chinese society during the nineteenth century. The conclusion to be drawn from Pingyi’s analysis is that scientific superiority does not suffice to transform a particular piece of local knowledge into cross-culturally acceptable knowledge nor is it the most important value to be pursued in the process of transmission. Scientific knowledge apparently either will be successfully transformed from local into cross-cultural knowledge if cultural implications are addressed and its constituent norms, values, and images are successfully negotiated; or it will acquire a wider spatial and cultural acceptance if it is transported as part of a larger process of annihilation of norms, values, self-perceptions, and practices in the recipient culture.

Jami starts from the well-known fact that the claims of this historiography are the product of an interpretation of the different forms of integration constructed by the Jesuit agents of the transmission of Western knowledge. She shows that this Jesuit interpretation was shaped by their perception of themselves as teachers, which allowed their Chinese counterparts only the position of recipients and students. By demonstrating that the Chinese participants in these acts of integration thought of themselves not merely as students, but also as the ones who would determine which elements were acceptable, who would ascribe different social
roles and positions to the Jesuits, and who would direct the Jesuits’ participation in various stages of the process of integration, she critically illuminates the reductionist character of the inherited historiography. She proposes to reshape fundamentally the narrative by pointing out that, for instance, the activities of major Chinese proponents of integration can also be understood in terms of the Chinese scholarly, cultural, and imperial interests, norms, practices, and behaviors. Consequently, the participation of Chinese converts in the integration and propagation of Western scientific knowledge can no longer be portrayed as something they did for the sake of spreading Christianity in China. Rather they appear to have participated because they shared the fundamental aspirations, values, and goals of Chinese scholarly communities and of the courts as well as the ideas developed in these two milieus concerning reforms of the late Ming- and early Qing-Chinese societies.

In my paper, I set out to question the boundaries drawn by medieval Muslim scholars between various disciplines, their institutional settings, and their cultural values that lent legitimacy to their practitioners. At the same time, I question the perceptions of these boundaries in current evaluations of the history of science in Muslim societies. To this end, I studied foreign perceptions of the state of the sciences and arts in early modern Muslim states, the Ottoman and the Safavid Empires. Applying the perspective of foreigners, there emerges a different picture of the boundaries between scholarly communities and their respective disciplines and value systems.

West European travelers perceived dervishes (Sufis) as possessors of scientific knowledge, while astrologers were often portrayed as charlatans. I demonstrate that the studied sources help to modify substantially current perceptions of the relation between Western European scholarly cultures and the Ottoman and Safavid Empires which by and large are thought of as non-existent. Establishing that early modern West European scholars were fascinated particularly by the Ottoman Empire and that they developed various cooperative ways to acquire its treasures for early modern scholarly enterprises — establishing these facts contributes to a reconsideration of current notions of the place and fate of the so-called rational sciences within the larger scholarly communities of Muslim societies.

Since this picture results from the perspective of foreigners, it is bound to include distortions. One way of determining and questioning such distortions is to investigate the foreigners’ activities in the Middle East and the responses received from local authorities, scholars, and commoners and to contrast these stories with what foreigners wrote, for example, about the state of the arts and the sciences in the Middle East. Such an approach permits the identification of some major features of the current perception of the boundaries demarcating the sciences in Muslim societies as a continuation of early modern depictions of the same theme with regard to the Ottoman Empire. I demonstrate that these features were derived, among other components, from ancient Greek, medieval, and early
modern West European theoretical concepts of politics, history, nobility, and civilization. I conclude that early modern West European sciences relied profoundly upon early modern Muslim scholarly and material cultures while they increasingly portrayed themselves as self-contained, superior, and singularly valid.

Ann Moyer addresses the question of the interdependence of "pre-modern," "modern," and current historiography of science by analyzing the biographies of mathematicians written by the late-sixteenth-century Italian scholar Bernardino Baldi. She shows that Baldi's approach to history is formed by his reliance upon ancient Greek and Latin models of historical biographical writing; by his zeal to illustrate the importance of mathematics through emphasizing the commendable activities of its practitioners; and by his wish to emulate contemporary works on biographies of other intellectual communities in Italy. She demonstrates that the specificity of Baldi's approach to history is the result of his perception of mathematics as a universal field of knowledge and of mathematical activity as discovery. This enabled Baldi to incorporate biographies of mathematicians of former Muslim societies into the main body of his work and to appreciate them on the same epistemic base as the ancient Greek, Latin, medieval European, or early modern West European mathematical writers. Thus, Baldi's concept of a universal mathematics leads him to present the history of mathematics as a universal process with no cultural boundaries. It also enabled him to portray the mathematicians from Muslim societies as inventors in their own right, not confined to the role of mere transmitters of ancient Greek knowledge. Moyer shows that Baldi's approach is conceptual, not empirically based, which she explains with the specific local isolation of Baldi when writing the biographies. She concludes that Baldi's concept extends Nancy Siraisi's questioning of early modern West European rejection of Arabo-Latin medicine into other domains of early modern scholarly cultures. She points out that certain parts of the widespread current evaluation of early modern history of science and the place ascribed by it to "the Arabic sciences" have been shaped by sixteenth-century historical writers such as Baldi. But she also emphasizes that other features of the current image were not shared by those sixteenth-century historians. She suggests that they are the product of later generations of West European scholars, scientists as well as historians.

Taken together, these papers show the limitations of modern/pre-modern disjunctions. Cultural domains are not exclusive domains. For centuries they have crisscrossed each other and an understanding of how this happened, without ignoring the specificity of both time and locale, is crucial for historical reconstruction. The travelers, the Jesuits, the Sufis, the local elite, all played a part in fertilizing the intellectual landscape. The canvas was huge: it included theology, mathematics, medicine, superstition, conversion, etc. It is hoped that the papers presented here demonstrate the relevance of treating cultural interactions as multifaceted events with no one-sided, fixed boundaries.