Translocations of Science

Scientific Colonialism. A Cross-Cultural Comparison. NATHAN REINGOLD and MARC ROTHENBERG, Eds. Smithsonian Institution Press, Washington, DC, 1987. xiv, 398 pp. Paper, $29.95. From a conference, Melbourne, Australia, May 1981.

It is just over 20 years since George Basalla published in *Science* his important article "The spread of Western science." He presented a three-stage model for that process by which nations outside the cradle of the Scientific Revolution in Europe moved from being subject to European scientific exploration to a colonial phase and finally to the status of independent scientific nation. Basalla's model appealed to social historians of science because of the importance it attached to scientific institution-building and to the establishment of conditions conducive to the pursuit of the scientific career. Colonial scientific status in Basalla's model did not necessarily imply colonial political and economic status but frequently meant cultural dependence in which indigenous means of scientific production had yet to be established. Real as this kind of cultural dependence was (and is), consideration of it to the exclusion of how science relates to the exercise of economic and political power would clearly be remiss. Development economists have often taken the general thrust of Basalla's work to encourage such neglect.

The work under review is a collection of papers presented as a "controlled" Australo-American cross-cultural comparison—controlled in the sense that 6 of the 15 contributions concern themselves with colonial or imperial developments more broadly or with other specific cases (Western Samoa, Mexico, Quebec, Ireland, New Zealand). One overall message of the papers is that Basalla's model "did not capture the richness and complexity of the diffusion of Western scientific culture . . . . In both large ways and small, the particular political, intellectual, social, and economic environments acted upon institutions and scientists, molding them into different, albeit related forms" (pp. xi, xiii).

The comparison of the development of science in the United States and Australia is an interesting one, particularly from the point of view of historians of Australian science who have been striving to establish their subject. *Prima facie* similarities between the two countries are considerable: both are large continental land masses, colonized from Europe without lasting resistance from indigenous peoples; both were British colonies. And yet the contrasts are perhaps greater, the most notable being the inhospitality to life of most of the Australian continent and the consequent limitation upon the sustainable population. This cautions us against too much enthusiasm in seeing the United States as a model for development of a historiography of Australian scientific development. R. W. Home's account of the development of the Australian physics community points out that well into this century its dependence upon Britain had no negative connotations but was seen as an entirely natural and positive feature of the imperial system. The concentration of resources upon the improvement of agriculture gave early-20th-century Australian biology a strongly utilitarian caste, once again in the service of Empire, as the biological novelties of Australia, the preoccupation of colonial collectors and European theorists of the 19th century, faded from the center of attention.

By contrast, the papers on the United States are able to show how various institutions (the universities, natural history museums, engineering style) acquired a distinctive, mature "Americanness" through the interplay of local conditions and selective responses to European models. By 1900 political independence and economic self-sufficiency had generated distinctive institutions and, perhaps more important, the ability to assert them as such.

Some of the best papers fall into the "other perspectives" basket. Roy MacLeod offers a valuable survey of imperial science and an elaborate, politically informed developmental model. Lewis Pyenson forcefully demonstrates the interweaving of cultural imperialism and scientific internationalism within the enterprise of geophysics in Western Samoa. Susan Sheets-Pyenson, in looking at colonial museums of natural history, reminds us almost incidentally that the Australian looking for apposite cross-cultural comparisons might best look to Canada and Argentina. But the final word must go to David Wade Chambers, who, in his study of Mexico, states a truth that studies of the spread of science often avoid: "A colonial scientific institution becomes national not just when it is financed by the national treasury and staffed by its own citizens, but rather when it is economically and politically integrated into the national interest" (pp. 4–315).

This volume adds considerably to our knowledge of the processes of scientific development. But it also illustrates the limitations of a sociohistorical perspective that skirts economic and political realities.

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Physiology Institutionalized

The Development of American Physiology. Scientific Medicine in the Nineteenth Century. W. BRUCE FYE. Johns Hopkins University Press, Baltimore, 1987. xii, 308 pp. $35. Henry E. Sigerist Series in the History of Medicine.

The author of this book is a physician practicing cardiology, the medical specialty that probably owes the most to the concern with organ systems, electrical measurement, and graphic recording that marked the 19th-century "golden age" of experimental physiology. The book is not, however, an antiquarian examination of the beginnings of modern instruments and textbook concepts. Building on historians' and sociologists' work on professionalization and educational reform, Fye outlines the emergence of the discipline of physiology in America within the framework of the late 19th-century medical reform movement.

Physiology was one of the great success stories of disciplinary entrepreneurship. Between 1850 and 1890 a handful of young American physicians studied the subject in France and Germany, and they returned home to establish their science and themselves at the few medical schools that would provide support. By World War I they not only had found patrons for a substantial number of academic chairs and laboratories but were well on their way to constructing a national medical system in which authority derived from the scientific image of experimental physiology and the promise of constant progress through research.

Professional physiologists were full-time university employees who pursued research, largely on living vertebrates, in laboratories stocked with precision instruments. Most of the book describes the struggles to create positions of this sort in four important centers of medical education. At New York's College of Physicians and Surgeons, John Call Dalton, Jr., became a full-time physiology professor in 1855; he promoted the