Book Reviews

A Figure in 19th-Century Science

The Papers of Joseph Henry. Vol. 1, December 1797–October 1832. The Albany Years. NATHAN REINGOLD, editor. STUART PIERSON and ARTHUR P. MOLELLA, assistant editors. With the assistance of James M. Hobbins and John R. Kerwood. Smithsonian Institution Press, Washington, D.C., 1972 (distributed by Braziller, New York). lx, 496 pp., illus. $15.

To many of today's scientists, Joseph Henry probably is known best as the man whose early researches on electromagnetic induction led to the unit of inductance being named the "henry." But there was another side to him, as recent historical scholarship has stressed. As a professor at the Albany Academy and at the College of New Jersey (later Princeton University) and, probably most important, as the first secretary of the Smithsonian Institution, Henry was one of the founders of and a major figure in the 19th-century American scientific community. Consequently, a documentary history of Henry's career should provide many insights not only into his own life and work but also into the development of science in 19th-century America and the growth of a group of men and women professionally interested in science. With the support of the National Science Foundation, and under the sponsorship of the American Philosophical Society, the National Academy of Sciences, and the Smithsonian Institution, Nathan Reingold in the late 1960's began the preparation of just such an edition of the Joseph Henry papers. A large undertaking, this project will produce a microfilm edition of all known unpublished documents relating to Henry and his career and a series of letterpress volumes forming "an interpretive select edition" of items judged to be especially important to an understanding of Henry and his work, with appropriate historical annotation. The volume reviewed here is the first fruit of Reingold's efforts.

In approaching the many problems of historical editing, specifically as related to this project, the editors began by adopting various "working resolutions": that the documentation of Henry's career should be made to reflect both the science and the scientific community of the period; that science is "integrally a part of," and not "a foreign body embedded in," the contemporary culture; that there are few, if any, "sharp edges between the 'internal' life of science and the 'external' milieu" within which scientists live; and that the "routine of daily activities" of historical actors does much to "define the texture of the past."

The results of this approach are excellent. Even to its endpapers, which are photographs of the original building of the Albany Academy, in which Henry performed much of his early research, this volume is a model of what such a collection of papers should be. All the documents are well annotated, and the importance of each with respect to Henry's career or to the milieu in which he worked, if not immediately clear, is sketched concisely in the notes. Persons mentioned in the documents are identified insofar as possible, and those who are especially important are treated in whatever detail is necessary to make their roles in Henry's history clear. Such notes demonstrate the historical skill of the editors and make it possible to read this volume through as a work of history, a compliment which cannot be paid often to collections of documents.

Among many other things, their "resolutions" have led Reingold and his associates to present a documentary history of the intellectual life of the Albany area in the early 19th century as it relates to Henry. The development of the Albany Academy, which Henry attended and where he later taught, is stressed, as is the growth of the Albany Institute, which was the forum before which he first presented many of his early ideas. Many of the early selections are from the minutes of the meetings of the trustees of the Academy, and these give an excellent picture of the institution at which Henry worked, of the material which he had to teach, and of the men with whom he was in daily contact. Perhaps most important, they illustrate what, in the views of the trustees, members of the cultural community of Albany, was expected from a formal education in early-19th-century America. In this connection Reingold and his associates here have contributed greatly to current scholarship in both the history of education and the history of science. Their selections illustrate the way in which science and mathematics "coexisted" in the Academy with the classical curriculum and how the Academy trustees stressed these subjects because of what they felt was their utilitarian value. As the editors note in a different context, "What happened in Albany was repeated in [other] American metropolitan centers," so this discussion can serve, and one hopes will serve, as a model for further studies of 19th-century American education in science and mathematics, particularly in regard to their relations with classical studies, and with the expectations of the layman.

Although the historian and the physicist will bemoan the fact that many documents relating to Henry's work on electromagnetic induction have not been found, the editors have managed to locate many documents relating to his more general experiments in this area. Of particular significance is an undated set of lecture notes on magnetism and electromagnetism prepared by Henry some time while teaching at the Albany Academy, presented here as an appendix. Also important are the many items relating to Henry's development of extremely powerful electromagnets, his means of constructing them and the way in which he built such magnets for such of his contemporaries as Benjamin Silliman, Sr., of Yale College and Parker Cleaveland of Bowdoin College. Not only do these documents provide insight into Henry's view of the science of electromagnetism, they well illustrate the development of a community of scholars interested in electromagnetic phenomena, thus reinforcing the "resolution" of the editors as to the essential continuity of the "internal" and "external" aspects of science.

Perhaps the most interesting theme to be found in this volume pertains to the relationships between science and technology during this period. Although hints as to Henry's ideas about this subject are scattered throughout the documents, particularly as he was involved with the application of electromagnetism to the practical problems of ore separation, it is treated explicitly in three im-

portant items: Henry's 1826 Inaugural Address as Professor of Mathematics and Natural Philosophy at the Albany Academy; an 1831 letter to a Mr. Rogers (one of the very few unidentifiable individuals to appear in this volume) on his understanding of the patent laws; and the Introductory Lecture to a course on chemistry he taught at the Academy early in 1832. Throughout these documents, Henry shows his "deep-rooted belief [in the words of the editors] that the useful arts should and actually do depend wholly on discoveries in pure science," and, as the editors note, such "intense but naive beliefs were embraced by a number of [Henry's] contemporaries," including apparently the trustees of the Academy. These beliefs led Henry to a state of confusion and a total misunderstanding of the patent laws. In his letter to Mr. Rogers, he argued that if a scientist publishes the results of his investigations such results immediately become public knowledge, and any application of them therefore is not patentable. Henry apparently was led to this view because he felt that inventions should be, and in general were, totally dependent upon and derived from what is today called pure research. The nature of the relationships between science and technology, as the editors note, "promises to become a major historical issue," and their annotations cite the work of A. E. Musson and Eric Robinson, Charles C. Gillispie, Robert P. Multhauf, Kendall Birr, and Edwin Layton. At the 1971 meetings of the History of Science Society, Reingold and Arthur P. Molella, his assistant editor at that time presented a major paper on this topic, giving Henry's views in detail, and their talk was followed by comments by Layton and Robinson. With the publication of this volume, including the substance of this paper, interest among historians in this question should continue to grow.

An aspect of the project missing in this volume is a discussion of the problems Reingold and his associates must have faced in collecting the documents and in identifying the many individuals referred to in them. Much of the manuscript material included is now part of the Joseph Henry papers at the Smithsonian Institution, but some items probably required much archival skill to locate. One letter from Henry to Benjamin Silliman, Sr., for example, was found in two parts, the first page among the Daniel Coit Gilman papers at the Johns Hopkins University and the second—cut into three pieces!—with the Silliman papers at the Historical Society of Pennsylvania. It is possible to speculate how the pages of this letter were separated—perhaps Gilman, who was librarian of Yale College for a number of years, acquired part of it from Silliman there—but how one of the editors, or another individual, brought them back together is unknown. Perhaps the final volume of the letterpress edition will contain a discussion of such archival problems.

The book concludes with a complete and well-organized index, and the Smithsonian Institution Press is to be congratulated for producing a beautiful and well-made book at a relatively low price. The illustrations, too, are excellent, well chosen and well reproduced. For example—though it would have been even better had a yardstick been positioned next to the apparatus—the photograph of the electromagnet (now at the Smithsonian) which Henry constructed in 1831 for Benjamin Silliman, Sr., contributes greatly to an understanding of how Henry made his equipment. In all, this volume shows that the editing of the Joseph Henry papers is in good hands, and it fulfills all the high hopes many historians of science have expressed for this edition. The future volumes of the series now have a high standard to live up to, and there is every reason to believe that they will do so.

MICHAEL M. SOKAL
Department of History,
Worcester Polytechnic Institute,
Worcester, Massachusetts

Socialist Resource Control

The Spoils of Progress. Environmental Pollution in the Soviet Union. MARSHALL I. GOLDMAN. M.I.T. Press, Cambridge, Mass., 1972. xii, 372 pp., illus. $7.95.

Conservation in the Soviet Union. PHILIP R. PRYDE. Cambridge University Press, New York, 1972. xvi, 302 pp., illus. $12.50.

Despite the fundamental differences between the Soviet Union and the United States in social organization and political structure, the two giants appear to reflect disconcertingly similar attitudes toward nature and their respective resource endowments. With allowances for variations in policy emphasis, timing, and funding, this conclusion is perhaps the first that an American may derive from reading two new, eminently scholarly publications on the consequences of economic progress in the Soviet Union. *The Spoils of Progress* by Goldman, an economist, and *Conservation in the Soviet Union* by Pryde, a geographer, effectively complement each other and make a substantial contribution to our understanding of the nature of the problems that have arisen in the Soviet Union relative to the "natural" environment.

The Western attitude toward nature and the manner in which Western man has exercised his environmentally destructive powers have been attributed by Ian McHarg, Lynn White, and several other Western writers to a consciousness of "supremacy over nature" derived from his Judeo-Christian heritage. Whether or not the Soviet notion that "Communism elevates man to a tremendous level of supremacy over nature" (as stated in the new program of the Communist Party of the Soviet Union in 1961) may be associated with the same—or an aberration of the same—heritage is for philosophers and polemicists to argue. In any case, whatever the origins of the man-apart-from-nature syllogism, the net result measured in terms of resource despoliation, waste, pollution, and environmental degradation is the same.

In the United States no less than in the Soviet Union, industrialization and the accompanying transformation of the landscape—the rise of cities, the migrations of people, the pushing back of the frontier, and so forth—have been regarded generally as good. The process has been called modernization. Science, which has made possible the most far-reaching revolutions in the lives of men, has been enthroned, tolerating no authority other than the authority of proof. Whatever has succeeded in the immediate context has been desirable and for the good of all; failure is not to be accepted and, like death, is pushed out of the collective consciousness. As John Dewey wrote in *Experience and Nature*, the validity of ideas "is measured by their capacity to effect the transformations which they propose. There is no *a priori* test as to their validity. They originate in human action and must be tested and improved in the course of that action." Marxist-Leninists, not to mention the present members of the Soviet regime, would in all likelihood agree.

Nevertheless, there is an unease abroad in the lands of the earth. In the United States that unease has prompted the enactment of some significant legislation designed to impose controls and alleviate some of the more