significantly revised and expanded in the second edition of 1803. James notes that the difference between editions is so great that "one's general impression is that the two books are the work of two different men, and in a sense I think this impression is a true one." Reverend Malthus, who had been the curate of a remote church at Okewood, moved to London in 1800, "when the poor of England were near starvation." James attributes Malthus's intellectual growth to travel and to his friends—"And what friends they were!"

In 1803 Reverend Malthus was appointed rector of Walesby "and held the living without residing there until his death." This income was augmented with his appointment in 1805, upon the founding of the East India College, as Professor of History and Political Oeconomy. In 1804 Malthus married, and within three years there were three children. The third edition of the *Essay* was completed in 1806 amid controversies about his population theory, and a fourth edition was published in 1807. In addition, Professor Malthus was involved in protecting East India College from external pressures and then, for the rest of his academic career, helping protect the college from the students. James does an excellent job in describing the role played by Professor Malthus in the founding and the development of the East India College.

Malthus, as the first professor of political economy, began publishing papers and pamphlets in economics. In 1807 he published two editions of a pamphlet on the Poor Laws arguing that increased subsidies to the poor would lead to increased population and greater misery. With the debates over bullion and paper currency Malthus and David Ricardo met in 1811 and began "the controversies which were to occupy the two men so happily for the twelve years before Ricardo's untimely death in 1823." The quill-pen correspondence between these two great men, fortunately preserved, is quite large. Malthus also corresponded extensively with family, publishers, scholars, and friends. In 1814 he published two editions of a pamphlet on the Corn Laws. In 1815 he published an important pamphlet on rent and an unfortunate pamphlet supporting a restriction on the import of corn. This argument against free trade damaged his reputation as an economist. Malthus was arguing the need for England's self-sufficiency (this in the year that Napoleon escaped from Elba and was defeated at Waterloo). In 1817 the fifth edition of the *Essay* was published, with the *Principles of Political Economy* following in 1820. Malthus's lack of success as an economist is attributed to his "flickering torch of intuition which could throw spotlights, but not illuminate a whole scene." Ricardo's simple, complete, logical system triumphed over Malthus's more demand-oriented and incomplete analysis. Further, "it was surely inconsistent of Economist Malthus to say there were too few demanders for the products available, when Population Malthus had insisted that there were too many." James concludes that "in the economic debates of 1815–25 Malthus's was no longer the paramount name, just as he himself was no longer a pioneer with a single message." Malthus continued to write, continually revising, disconcertingly changing his mind, as he searched for truth.

The biography by James relates the lifetime of Malthus's intellectual search to the historical events of the period. Relying heavily on Malthus's correspondence, James provides a portrait of a kind, sensitive, rather unbusinesslike man. A great deal of Malthus's correspondence is quoted by James (there are 39 pages of notes and references) and is selected and arranged in a manner that allows a reader to get to know Malthus. With regard to the correspondence, James provides a brief interpretation that summarizes Malthus's character:

> One cannot but smile at the contrast between his private style of writing, for those with practical responsibilities, and his anonymous propagandist journalism; yet in neither case do I think he was acting a part: he operated with different sides of his nature as circumstances required, and whatsoever he did, he did heartily. This made him occasionally rather absurd, sometimes inconsistent, often incomprehensible, but never insincere.

Although the book is long, detailed, and technical, it is not dull reading. A 25-page index enhances its usefulness as a reference.

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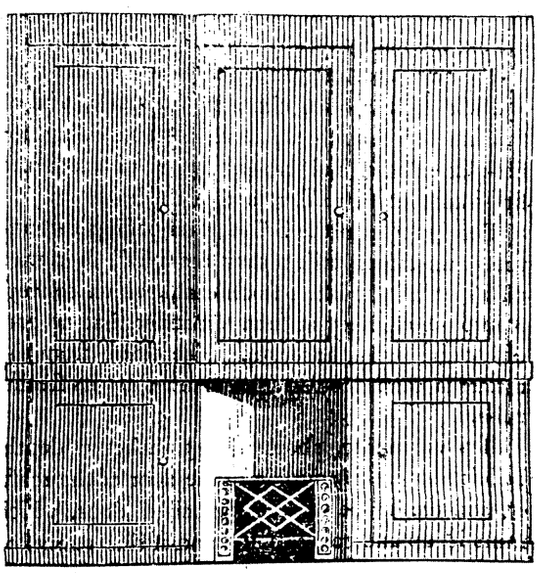
A Varied and Colorful Career

Benjamin Thompson, Count Rumford. SANBORN C. BROWN. MIT Press, Cambridge, Mass., 1979. xiv, 362 pp., illus. $19.95.

Depending upon educational background or perhaps geography, Count Rumford is probably best remembered today for his experimental refutation of the caloric theory of heat or for the revolutionary fireplace design that for 150 years made English homes tolerable if not altogether comfortable. He is also sometimes recalled for what was probably his greatest contribution to science, the founding of the Royal Institution, the professional home of Davy, Faraday, and a distinguished research tradition lasting until the present day. But Benjamin Thompson, Count Rumford, lived a far more varied and colorful life than these well-known accomplishments would suggest. Soldier of fortune, spy, courtier, social reformer, minister of state, philanthropist, scientist, and inventor, he rose from the obscurity of rural colonial Massachusetts to positions



Rumford's design for a "concealed Kitchen," recommended for a large family. According to Thomas Thomson, one of Rumford's contemporary biographers, "numbers of people . . . fitted up their kitchens according to his models; but I have not heard that his scheme was found to answer in a single instance." On visiting Rumford's own kitchen on this design, Thomson reports, he found that "not one of the utensils had ever been put to use." [From *Benjamin Thompson, Count Rumford*]

of power and influence in the courts of England, Bavaria, and France. A colonial country schoolmaster at 18, he was a fellow of the Royal Society at 27, a knight at 30, and a count of the Holy Roman Empire at 39. From major of the American colonial militia he climbed to lieutenant general and chief of the Bavarian general staff with a permanent British colonelcy and nearly a dozen civilian offices taken in along the way. All the while he pursued the scientific and technical researches that brought him membership in most of the scientific societies of Europe and led ultimately to his spending his final years among the savants and intellectual salons of Napoleonic Paris.

Sanborn Brown has spent several decades tracking down the documentary records of Rumford's career, and now after many articles and an edition of Rumford's collected works he has chosen to concentrate here upon the man rather than the scientist. The result is a detailed chronological narrative that retraces much of the ground covered by George Ellis a century ago. Many of the same letters and diary notes are quoted—but more selectively—and many of the same well-worn anecdotes are repeated. Nonetheless, this book is far from a mere rehash of Ellis's very Victorian biography. Brown has searched out and reexamined the original sources and has found much to add to the file. But more to the point, Brown's "warts and all" portrait of Rumford is often sharply at odds with Ellis's Victorian apologia. As Brown notes early on, "Count Rumford was a man with more faults and failures as well as more successes than most" (p. vii), and faults rather than successes tend to dominate this biography. Rumford was certainly a man of obstinate self-assurance, and he combined a compulsion to succeed with a ruthless opportunism. But he was also greatly talented, and, though Brown makes this latter fact apparent, it is often obscured by a relentless scrutiny of motives as well as actions. Thus at the end we are left wondering just what was the attraction that drew attention and support to Rumford throughout his life.

Science and technological innovation were, of course, an intimate part of Rumford's life, and Brown introduces them at the appropriate chronological moments in his narrative. Unfortunately, this approach results in the least satisfactory part of the book. Present-mindedness and passages that read uncomfortably like extracts from an elementary general science lecture detract from the already skimpy and sometimes logically disconnected discussion of Rumford's science. His inventions, particularly those dealing with the efficient utilization of heat and fuel, fare better. They are treated in more detail and with greater clarity than the purely scientific work, and numerous illustrations complement Brown's discussion.

On balance, this is a rather uneven but valuable and interesting book. Certainly it is not the final word on Rumford's scientific work, nor is it intended to be, but it will provide a useful context for such an assessment. And if, as I suspect, Brown is a bit hard on Rumford's character, he no doubt comes nearer the truth than did Ellis. At all events, this is a refreshing change from scientific heroes and hero worship.

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Formative Efforts in American Science

The Sciences in the American Context. New Perspectives. Papers from a meeting, Boston, Feb. 1976. NATHAN REINGOLD, Ed. Smithsonian Institution Press, Washington, D.C., 1979. iv, 400 pp. Cloth, $19.95; paper, $9.95.

In 1838, Joseph Henry wrote from Princeton to a friend: "We will not now be so remote a province of Great Britain in reference to literature and science as we have been." Henry was both wise in his assessment of America's status in world science and prescient. If the American Revolution had broken the colonial status of the former British dependencies, the young American nation still remained in some measure a cultural colony. This state of affairs is particularly noticeable in science and medicine, for scientific institutions and communities after the Revolution were in most states relatively meager, nonexistent, or pale images of British models. Early-19th-century America had other priorities; the building of the infrastructure of American science remained sluggish while nation-forming proceeded apace in other sectors. It was not until after the Civil War and the turmoil of reconstruction that the rapid development of science and scientific institutions became highly visible. It required a new America—urbanizing, industrializing, modernizing—and a new conception of science. Looking forward to the 20th century, Americans began to see science and the scientific community as organizable, constructible, and producible. America began to march in double time to scientific and technological pre-eminence.

For the 1976 bicentennial celebration Nathan Reingold, editor of the Joseph Henry Papers, organized a session for the AAAS meeting to highlight what he calls "a notable upsurge in research in the history of the sciences in the United States." The papers included in this volume are wide-ranging, differing in style and substance and (as always in such collections) in quality. The result, however, is a sensible, useful, and sometimes provocative volume that both scientists and historians can read with profit.

What unites the papers (some of which have been published elsewhere) is their common attention to the institutions and communities of science from the post-revolutionary era on, reaching, just a bit, toward the period after the Second World War. Reingold opens the book with a sweeping overview of the past two centuries, describing what he sees as a tension between the scientific elite and the "mass community" resulting in a research ideal that remained, "despite all the exertions of many generations of scientists," a blend of theory and practice. The first group of authors describe the nature and growth of the scientific-technical infrastructure during the 19th and early 20th centuries in certain special areas. William Goetzmann calls attention to the "second great age of discovery" and the role of American scientists and others within it; Stanley Guralnick argues against undervaluing the role of the college (both ante- and postbellum) in fostering science; Charles Rosenberg underscores the importance of agriculture in the growth of science in America; and Kendall Birr provides a useful review of the rise of industrial research. Robert Post, Deborah Warner, Bruce Sinclair, and Steve Pyne all contribute interesting essays on the earlier period.

The changing basis for support for scientific work commands the attention of several contributors. Stanley Coben documents the post-World-War-I ways and means of large foundation support for research and teaching, without entering the deep waters of their effects upon science or upon American life. Robert Kohler, on the other hand, treats Warren Weaver and the Rockefeller Foundation as an active force in the formation of a scientific subdiscipline, molecular biology. Spencer Weart's interesting essay, "The physics business in America, 1919–1940," provides a statistical recon-