

his stature. In including information on such matters Harrison has raised the usefulness of the catalogue to a wholly new level.

As an introduction to the catalogue, Harrison provides an informative essay on the library and its history since Newton's death. The first chapter of the essay carries the title "Isaac Newton: User of books." Newton did not buy books for the pleasure of owning them; he bought them to study. Not only did he frequently write notes on the endpapers and in the margins, he also developed a peculiar method of dog-eared pages in which he folded the corner so that it pointed directly to the passage in which he was interested. The catalogue mentions what books have dog-eared pages (even giving specific pages when they are not too numerous) as a further indication of the books for which there is evidence of Newton's careful study.

Harrison argues that with a person like Newton, for whom the content of a book mattered more than possession, we must keep in mind other sources available to him as we attempt to interpret his personal holdings. We know from letters that Newton had access to Isaac Barrow's collection by 1670, and while he remained in Cambridge he could also use the college and university libraries. The large number of alchemical works in his personal library, for example, may have been due in part to their paucity in the other libraries. I might add, and Harrison would agree, that we cannot in this way reason away the fact that roughly 10 percent of Newton's collection consisted of alchemical titles, especially since their percentage among the books with signs of use (dog-eared pages and notations) is much higher. With respect to theological works, when we keep in mind Barrow's collection and the institutional libraries, all heavy in such works, the very high percentage of theological titles in Newton's own collection is even more impressive, though many of them apparently date from his London years. In both cases, alchemy and theology, the catalogue only reinforces what Newton's own papers have to tell.

Harrison's introduction concludes with a perceptive analysis of the library which includes several tables that list its contents by categories. His volume is consistently understated and unpretentious. It behooves the reviewer in such a case to insist on its merit.

RICHARD S. WESTFALL

Department of History and
Philosophy of Science,
Indiana University,
Bloomington 47401

Flaws in a Hero

A Streak of Luck. ROBERT CONOT. Seaview, New York, 1979 (distributor, Simon and Schuster, New York). xviii, 566 pp. + plates. \$15.95.

That 1979 is the centennial of Thomas Edison's incandescent light is a fact widely known and marked with appropriate hoopla. That this year is also the 100th anniversary of Edison biographies is a somewhat more obscure fact, but hardly less remarkable. Robert Conot takes his place in the long line of biographers with the same qualifications of many of his predecessors, those of a journalist. But there the similarity stops. Two features of Conot's work make it stand apart from the rest. The first is Conot's research in the "scientific King Tut's tomb," as he puts it, that is the vault of Edison papers and records kept at the old Edison laboratory in West Orange, New Jersey. The second is Conot's personal reaction to the Edison his research uncovers. Instead of feeling the usual affection for America's most heroic inventor, Conot seems most impressed by the flaws he finds in Edison's character—flaws that threaten to overshadow the Edisonian achievement.

Conot's own achievement in mining the letters and notebooks at West Orange is prodigious. For the scholar the primary value of *A Streak of Luck* lies in the glimpse it affords of the wealth of

records Edison and his associates left behind them. Conot is not the first biographer to make extensive use of these sources—Matthew Josephson relied on them for the well-received *Edison* that he wrote 20 years ago—but he is the first person to attempt to piece together Edison's life and career bit by bit from the Edison archives. The extent to which he succeeds is remarkable. Many of the myths simply fall away, for Conot scrupulously avoids repeating the stories other biographers picked up from dubious sources, including Edison in his more imaginative moods.

The Edison that emerges from Conot's descriptions is not an attractive man. Opportunistic, often ruthless, he seems driven by a passion for invention combined with a hunger for wealth. His disregard for financial and contractual obligations often overshadowed an innate honesty. Sometimes an abominable businessman despite a lifelong concern about money, Edison was apparently an even worse husband and father. He did not hesitate to exploit those who worked under him, and his egotism and crudeness often drove away the best of them. The persistence that Edison himself said was the key to his success frequently turned into stubbornness and even bullheadedness, as in his pursuit of magnetic ore enrichment, his unbending opposition to alternating current, or his refusal to keep up with changes in the phonograph industry.

A Streak of Luck is not a sympathetic biography. Extraordinary attention is devoted to such things as the miseries of Edison's children, his uncouth and unclean personal habits, and, most oddly, his sleepiness. Conot is offended by the picture of Edison as a human dynamo requiring only a few hours' sleep and an occasional catnap. This "most persistent legend" is dismissed as "a smokescreen to divert attention from his habit of nodding off" (p. 467). Page after page is devoted to the intricacies of Edison's business dealings, frequently resulting in a picture of him as a conniver or a bumbler. Edison's capacity for almost unthinkingly spending money—often large sums—is illustrated in sometimes mind-numbing detail. Cynical, willful, and self-centered, Conot's Edison is neither the kindly, humble, white-haired old man



Thomas Edison in his laboratory library, 1903. [From *A Streak of Luck*, courtesy of Edison National Historic Site]

revered by the 20th-century news media nor the Olympian genius the self-appointed guardians of his image made him out to be.

Unfortunately, the portrait that does emerge is not a complete one. Conot does not piece together a satisfying picture of the most prolific inventor in history. The mastery of detail that he displays in dealing with the data from Edison archives deserts him when he leaves those sources. Conot is clearly not at home with the technology that is at the heart of understanding Edison's work. The efforts to master technical details result in explanations that are sometimes laborious, sometimes incomplete, and sometimes just plain wrong. A botched attempt to show how Joule's law is applied to parallel circuits (p. 132) and a misunderstanding of the light ratings of incandescent bulbs (p. 141) are signals to the reader that Conot is not to be trusted on technical matters. This is no trivial fault in an account of a life as thoroughly immersed in technology as Edison's was.

Even Conot's use of the material in the Edison archives is not above suspicion, as one already well-publicized example will illustrate. Supporters of Joseph Swan's claims to have preceded Edison in the invention of the incandescent light have seized on Conot to back their arguments (as reported in *Science* 6 April 1979, p. 32). But does the evidence really support such claims? The *Scientific American* article in which Edison read of Swan's experiments reports not the success of the Englishman's lamp but rather its utter failure. The laboratory notebook in which Edison refers to the Swan report is not dated immediately before Edison's successful experiments with carbon in October 1879 (as Conot implies and *Science's* reporter appears to have assumed) but was probably written several months earlier, in July (when the article appeared). There is simply no evidence—certainly none cited by Conot—that suggests that Swan's results had a direct influence on the course of Edison's experiments.

Nor is Conot able to describe fully the social and economic milieu in which Edison worked and of which he was such an important part. The judgmental tone with which Conot attempts to describe the "real" Edison would be more persuasive if he could make clear the historical standards against which he is measuring Edison's conduct. These standards do not emerge, however, so we are left largely with a sense of cynicism rather than dispassion.

What Conot has given us, therefore, is

a provocative insight into the character of a unique man, backed by the most complete and probably the most reliable descriptions of Edison's work ever offered. *A Streak of Luck* is not the final word on Thomas Edison, but it is an important corrective for the adulatory treatments of the past. Even more important, however, it can also be a guide to how much there is yet to know and understand, even after a hundred years.

ROBERT FRIEDEL

National Museum of History and Technology, Smithsonian Institution, Washington, D.C. 20560

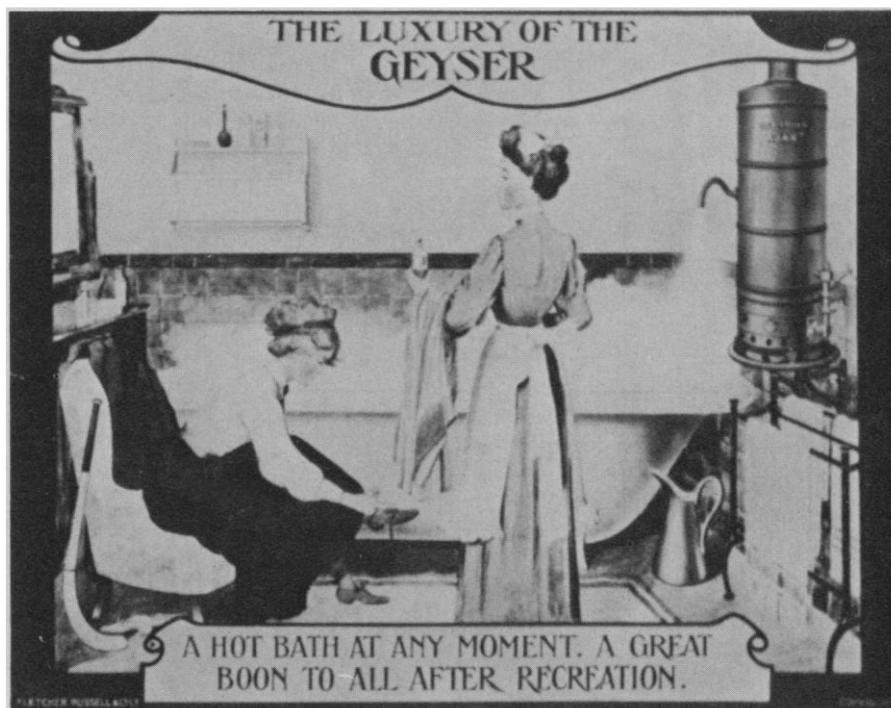
Singer's Work Continued

A History of Technology. Vols. 6 and 7. TREVOR I. WILLIAMS, Ed. Clarendon (Oxford University Press), New York, 1978. Vol. 6, *The Twentieth Century, c. 1900 to c. 1950*, part 1. xxvi pp. + pp. 1-690, illus. \$39.50. Vol. 7, *The Twentieth Century, c. 1900 to c. 1950*, part 2. xx pp. + pp. 691-1530, illus. \$47.50. The two volumes, \$82.

As a field of systematic professional study, the history of technology is relatively new. About 20 years ago a professional society was organized and a journal, *Technology and Culture*, was started. Since then a small number of

journals have informed the scholarship of a small but growing group of specialists. Growing largely from the fields of history of science, economic and business history, and engineering, the field often continues to bear the marks of its birth.

As in the history of science and business history, the early work in the history of technology was largely descriptive chronologies of inventions and developments, often whiggishly emphasizing contemporary interests, definitions, and trends. Nearly 30 years ago Charles Singer, a historian of science, medicine, and technology, conceived of an encyclopedic survey of the history of technology from antiquity to 1900: *A History of Technology*. Between 1954 and 1958 the five volumes of the survey appeared under the editorship of Singer and three associates, with the articles written by specialists in each of the various kinds of technology. Singer chose the terminating date of 1900 believing that it was impossible to present the modern period in nontechnical language, that the amount of space required would be excessive, and that it would be difficult to select the significant events. Although Singer thought that science and technology needed to be integrated into cultural history, he argued that a precondition for this was the detailed ex-



"A geyser by Fletcher Russell and Co., 1914. The gas-fired instantaneous water heater in polished copper has been a serviceable and popular method of heating bath water ever since Maughan invented it (and the title 'geyser') in 1868. This illustration from a contemporary catalogue is a social document, with its unruffled long-skirted girl, just back from hockey, being attended by her maid." [From G. B. L. Wilson, "Domestic technology," in *A History of Technology*, vol. 7, part 2]