



"Inside the Unifiler House," from E. L. Moss's *Shores of the Polar Sea* [From *Science and the Canadian Arctic*; Fisher Library, University of Toronto]

Although Lindsay's narrative is worth reading just for its detail of field practice and life as of about 1860, her conclusions make this book. One reason the Mackenzie River project succeeded was that the collectors profited from it: "specimens were a commodity." The collectors earned books, alcohol, and social status. The Russian-American venture failed for lack of the institutional support given freely by the Hudson's Bay Company. Moreover, the socioeconomic system of the Hudson's Bay Company, well established along the Mackenzie, had no counterpart in Alaska.

Trevor Levere's book exceeds Lindsay's in historical scope. The century he has chosen is the formative one for arctic science in the Western Hemisphere, from John Ross's 1818 expedition in search of the Northwest Passage to Vilhjalmur Stefansson's search for new arctic lands in 1914–1918. Levere's vision, however, stretches from Francis Bacon to the recent past. This preserves perspective when he descends into the detail of British Admiralty expeditions like those of John Franklin. In history it is essential to tell the story, providing the opulent complexity that comes from extensive reading in the primary printed sources and in the manuscripts. Levere does this. Some readers may revel in these narrative particulars; others may get lost in them. All readers should remember the overarching themes of the book at these times.

One of these themes is the nature of a science dependent on fieldwork, expeditions, collecting networks, or observations

extended over both time and space. Most sciences of the Earth are of this type. Although zoology, geology, glaciology, and geomagnetism have differentiating characteristics, they share a reliance on extensive databases that separates them from, say, classical physics. Levere examines this theme from many angles. Debates among historians of science on the nature of field science often center on "Baconian" or "Humboldtian" methodologies, their perceived qualities, advantages, limitations.

Levere does not reify but instead recounts what Halley and Cook and others did. He repeatedly returns to what was done in hydrography, meteorology, and other "geophysical" sciences at different periods. Although it is 'anachronistic to speak of "geophysical" sciences for much of this period, it nevertheless provides a useful tool of historical analysis. These types of sciences require much more historical—and contemporary—attention.

The main theme unifying this book, however, is the relation of arctic science to arctic politics, specifically to questions of colonialism, sovereignty, and the national and international aspects of science. Science, as most historians now agree, cannot be separated from its social context.

The prosecution of science in places requiring extensive logistical support is not possible without backing from big institutions, big money, or big government. These sociopolitical agendas, for better or worse, are part of science's story. This is certainly true of science in the Canadian Arctic. Nevertheless, as Levere states, science also has an "inner dynamic, directed through its institutions and applied through instruments and concepts to an uncompromising natural world" (p. 2). This dialectic also shapes this book.

Lindsay and Levere will edify you and engage you.

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A Technological Economy

Profits of Science. The American Marriage of Business and Technology. ROBERT TEITELMAN. BasicBooks, New York, 1994. xiv, 258 pp. \$23.

Specialization of function has been changing society for many centuries, but the pace of this social transformation has quickened dramatically in the last hundred years. Specialists everyone (or so it seems), we all have our particular bodies of knowledge, our distinct forms of communication, our communities, status systems, and acknowledged leaders. So immense is the flow of information that few can expect to control the knowledge in more than one area of expertise, and indeed, we frequently find it necessary to narrow the definition of our special interest to keep any measure of control over the things we are supposed to know.

This relentless process of subdivision has created the need for intellectual brokers, for authors who can speak the languages of more than one community of specialists and help all of us understand developments beyond the boundaries of our expertise. Robert Teitelman, senior editor at *Institutional Investor*, is a very skillful intellectual broker. In *Profits of Science*, he blends ideas and literature from the history of technology, of business, of political economy, and of science to provide us with a synthetic interpretation of the "technological economy" of post-World War II America. He looks in particular at the television, transistor, computer, and pharmaceutical industries (drawing heavily in the last case on his earlier book *Gene Dreams: Wall Street, Academia, and the Rise of Biotechnology* [Basic Books, 1989]).

In each of his case studies, Teitelman describes the personalities of the leading entrepreneurs, the nature of their organizations, their relationships with the federal government, and the impact their industries or subindustries had on the U.S. economy. Joseph A. Schumpeter, the great theoretician of entrepreneurship, would be pleased to see how extensively this author has used his ideas. Schumpeter would not be entirely satisfied with this book's conclusions, if only because Teitelman is not as positive as he was about the long-term ability of capitalistic markets to clean out inefficient organizations, regardless of their size or degree of market power. But the father of entrepreneurial analysis would have to be happy with a book that applauds "creative destruction" and locates the sources of innovation in clever individuals, rather than groups.

As this suggests, Teitelman is not con-



Vignettes: A Human Activity

Scientific thinking, which is analytic and objective, goes against the grain of traditional human thinking, which is associative and subjective. Far from being a natural part of human development, science arose from unique historical factors.

—Alan Cromer, in *Uncommon Sense: The Heretical Nature of Science* (Oxford University Press)

If humans exist on earth for a purpose, it is likely to be for scientific research. It is the one urge that is exclusively human and distinctive of the race.

—Cinna Lomnitz, in *Fundamentals of Earthquake Prediction* (Wiley)

vinced by the research of Alfred D. Chandler, the dean of business historians around the world, that large enterprise has been the primary source of our relative prosperity during the last century. Instead, Teitelman balances the disadvantages stemming from bureaucracy and monopoly power against the competitive advantages achieved by corporate scale and scope. "Balance" is the operative word here. Teitelman swings back and forth as he debates this issue with himself, now finding evidence that small is better, then finding oligopoly again triumphant. To his credit, he is sincerely interested in the evidence. In the end, he opts for a cyclical explanation in which individuals and small units launch the process of innovation and then give way to the large corporation and the concentrated industry. "In this ecology of technology," he says, "evolution, not revolution, predominates; cycles proceed within cycles within cycles" (p. 223).

This scenario fits some U.S. industries rather well, but it conflicts with much of what we know about pharmaceuticals, one of Teitelman's case studies. Merck and Company became the industry leader by way of innovation, first in medicinal chemistry and then in biochemistry. Teitelman downplays the accomplishments of that first phase of corporate entrepreneurship, one that involved important innovations in process as well as product by Merck and other large firms in the industry. In dealing with biochemistry, he focuses rather narrowly on the new organizations that frequently failed, rather than on the large firms that used the new science and the new technology to develop a wide range of important cardiovasculars, antihypertensives, and vaccines. Animal health innovations have also had some important macro-economic effects of the sort that would make Schumpeter smile, but Teitelman categorizes these developments with drug company diversification and discounts them.

As you must have sensed, however, these are the complaints of a specialist, and we are not in fact the primary audience for whom this book is intended. *Profits of Science* is an extremely well-written history for the nonspecialist. The sciences and technologies are explained with clarity and economy. The author places the company histories in a context that includes the financial markets from which they obtained and sometimes failed to obtain capital. Though he finds in these several histories less progress than a Schumpeter or a Chandler or this reviewer would like, he achieves his major objective, providing what should be a broad readership with a new and interesting view of America's "technological economy." Along the way, he provides the Clinton Administration with a critique that deserves the attention of the White House.

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Books Received

The Aging Clock. The Pineal Gland and Other Pacemakers in the Progression of Aging and Carcinogenesis. Walter Pierpaoli, William Regelson, and Nicola Fabris, Eds. New York Academy of Sciences, New York, 1994. xvi, 588 pp., illus. Paper, \$135. Annals of the New York Academy of Sciences, vol. 719. From a conference, Stromboli, Sicily, June 1993.

Algebra. A Graduate Course. I. Martin Isaacs. Brooks/Cole (Wadsworth), Pacific Grove, CA, 1994. xii, 516 pp., illus. \$67.50.

Analysis of Numerical Methods. Eugene Isaacson and Herbert Bishop Keller. Dover, New York, 1994. xvi, 541 pp., illus. Paper, \$13.95. Augmented corrected reprint, 1966 ed.

Analysis of Phenolic Plant Metabolites. Peter G. Waterman and Simon Mole. Blackwell Scientific, Cambridge, MA, 1994. viii, 238 pp., illus. Paper, \$35. Methods in Ecology.

The Animal Mind. James L. Gould and Carol Grant Gould. Scientific American Library (HPHLP), New York, 1994 (distributor, Freeman, New York). x, 236 pp., illus. \$32.95.

Ayahuasca Analogues. Pangæan Entheogens.

Jonathan Ott. Natural Products, Kennewick, WA, 1994 (distributor, agAccess, Davis, CA). 127 pp., illus. \$30; paper, \$15.

Before and After an Oil Spill. The Arthur Kill. Joanna Burger, Ed. Rutgers University Press, New Brunswick, NJ, 1994. xvi, 305 pp., illus. \$50.

Biodiversity and Ecosystem Function. Ernst-Detlef Schulze and Harold A. Mooney, Eds. Springer-Verlag, New York, 1994. xxviii, 525 pp., illus. Paper, \$49. Springer Study Edition.

Bioethics for the People by the People. Darryl Macer. Eubios Ethics Institute, Christchurch, New Zealand, 1994. vi, 452 pp., illus. Paper, \$35 or £15.

The Cell Cycle. Regulators, Targets, and Clinical Applications. Valerie W. Hu, Ed. Plenum, New York, 1994. xii, 430 pp., illus. \$115. GWJMC Department of Biochemistry Annual Spring Symposia Series. From a symposium, Washington, DC, May 1993.

Central Cancer Registries. Design, Management, and Use. Herman Menck and Charles Smart, Eds. Harwood, Langhorne, PA, 1994 (distributor, International Publishers Distributor, Langhorne, PA). viii, 315 pp., illus. \$45 or £29; paper, \$20 or £13.

Chaos Under Control. The Art and Science of Complexity. David Peak and Michael Frame. Freeman, New York, 1994. xiv, 408 pp., illus., + plates. Paper, \$24.95.

Conversing with the Planets. How Science and Myth Invented the Cosmos. Anthony Aveni. Kodansha, New York, 1994. xiv, 255 pp., illus. Paper, \$14. Reprint, 1992 ed.

The Cosmological Milkshake. A Semi-Serious Look at the Size of Things. Robert Ehrlich. Gary Ehrlich, illustrator. Rutgers University Press, New Brunswick, NJ, 1994. xx, 259 pp. \$24.95.

Crop Protection and Sustainable Agriculture. Derek J. Chadwick and Joan Marsh, Eds. Wiley, New York, 1994. x, 285 pp., illus. \$72. Ciba Foundation Symposium, 177. From a symposium, Madras, India, Nov. 1992.

Designs for a Global Plant Species Information System. F. A. Bisby, G. F. Russell, and R. J. Pankhurst, Eds. Published for the Systematics Association by Clarendon (Oxford University Press), New York, 1994. xvi, 350 pp., illus. \$90. Systematics Association Special Volume no. 48. From a symposium, Delphi, Greece, Oct. 1990.

Development, Aging, and Disease. A New Rationale for an Intervention Strategy. Vladimir M. Dilman. Harwood, Langhorne, PA, 1994 (distributor, International Publishers Distributor, Langhorne, PA). xviii, 387 pp., illus. \$95 or £62. Translated from the Russian edition (Leningrad, 1987) by John K. Young.

Diet and Cancer. Markers, Prevention, and Treatment. Maryce M. Jacobs, Ed. Plenum, New York, 1994. xviii, 256 pp., illus. \$79.50. Advances in Experimental Medicine and Biology, vol. 354. From a conference, McLean, VA, Oct. 1992.

Digital Mantras. The Languages of Abstract and Virtual Worlds. Steven R. Holtzman. MIT Press, Cambridge, MA, 1994. xii, 321 pp., illus., + plates. \$29.95.

Directory of Electronic Journals, Newsletters, and Academic Discussion Lists. Lisabeth A. King, Diane Kovacs, and the Directory Team. Ann Okerson, Ed. 4th ed. Association of Research Libraries, Washington, DC, 1994. vi, 575 pp. Paper, \$54; to ARL members, \$36. Diskette, \$36.

The Endocrine Pancreas, Insulin Action, and Diabetes. Louis E. Underwood, Ed. Endocrine Society, Bethesda, MD, 1994. vi, 216 pp., illus. Paper, \$55; to ES members, \$45. Augmented reprints of articles from *Endocrine Reviews*.

The Enjoyment of Math. Hans Rademacher and Otto Toeplitz. Princeton University Press, Princeton, NJ, 1994. vi, 205 pp., illus. Paper, \$12.95 or £10.95. Princeton Science Library. Translated from the German edition (Berlin, 1933) by Herbert Zuckerman. Reprint, 1957 ed.

Environmental Oxidants. Jerome O. Nriagu and Milagros S. Simmons, Eds. Wiley, New York, 1994. xviii, 630 pp., illus. \$100. Advances in Environmental Science and Technology, vol. 28.

The Eocene-Oligocene Transition. Paradise Lost. Donald R. Prothero. Columbia University Press, New York, 1994. xviii, 291 pp., illus. \$65; paper, \$24.