

industries supplying the scientific discipline. The authors' views here, as elsewhere recently, have only looked at the large firms and have ignored the small innovative companies, their critical role and frequent ignominious fates. The appearance of small firms headed by scientists or engineers with special skills and knowledge to market very specialized technologies to other scientists, is an untouched topic that scientists or engineers with a humanistic bent must record. Interactions between scientist, engineer, technologist and industry in the late-twentieth century are complex and occasionally obscured by state-imposed secrecy. A case in point is the appearance in the late-'70s of the CCD camera described by Edge. The computer-controlled, light-sensitive chips had been developed and supplied to the military for several years before being declassified. How does one record such stories? Even those with access to secret technology, with a few exceptions, have insufficient knowledge to record the historical evolution of classified technologies.

My first impression of *Invisible Connections* was negative, but on closer inspection, I found a few gems among the papers, though

they account for only a small percentage of the text, while the commentaries by Bud and Cozzens hold the contributions together. But when it comes down to a final assessment, I am again left with the question "For whom are we trying to write the history of science?" Today the majority of historians of science and of scientific instruments are historians talking and writing to other historians, few of whom have detailed knowledge or understanding of twentieth-century science. Yet histories written by working or retired scientists are frequently too detailed and too technical to be easily understood by non-specialists. But with their personal involvement, special knowledge and unique insights, the history recorded by scientists can be more revealing and in fifty or one hundred years will be the papers sought by historians. We are in a position to leave a legacy to future historians which we do not enjoy because of the youth of the discipline. However, by focussing attention on topics of modern science history, Bud and Cozzens may have provided a sorely needed stimulus to studies of twentieth-century science and its technology.

## Peter Freund and George Martin, *The Ecology of the Automobile*

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Freund, Peter and Martin, George. *The Ecology of the Automobile*, Montreal: Black Rose Books, 1993. 213 pp. Cloth \$38.95, ISBN 1-895431-83-2, paper \$19.95, ISBN 1-895431-82-4.

This reviewer enjoyed Freund and Martin's *The Ecology of the Automobile*, even though much of what was written is familiar information. The novelty of their arguments stems from the different perspective on issues related to motor vehicle transport. Both authors are sociologists; Freund with an interest in health and Martin with a focus on social policies and urban issues.

The assumption that the automobile is creating havoc on the environment is dominant throughout the book. A sentence from the back cover makes the authors' position clear. "For today we are possessed by a mindless monster which threatens the planet itself." The text is not nearly as strident as that quote but nevertheless paints a picture that our environment, not to mention society, is in deep trouble because of the automobile. Fortunately, solu-

tions are described that could eliminate, or at least mitigate, ecological disaster.

Although *The Ecology of the Automobile* purports to be a global analysis, it focusses primarily on the current ills of American society. Given the diversity of global automobile experiences, the authors' focus on the United States is logical. Insightful examples are given of other countries' experiences to place the United States situation in relief.

Technically, the contents are organized into three roughly equal parts. Part One is a description of the problems of auto transport and deals with many well-known issues such as environmental concerns, health, social impacts and inequalities, and visual impacts. Part Two — Deconstructing Auto Hegemony — is an analysis of "the ideological assumptions shared by auto drivers and transport planners." Part Three examines the politics of automobility and identifies some potential solutions to the identified ills. The text is followed by an immense and useful 17-page bibliography.

Part Three, discussing ways of making the automobile more ecologically friendly, was the most interesting section. Some observations were quite striking. For example, auto regulations in the United States are relatively moderate and pertain primarily to vehicle air quality, fuel economy and safety (p. 145). Much could be done to use regulations to help modify people's use of automobiles. However, no comment is made on the challenge of introducing such regulations into the United States — a country which seems to view private auto transport as virtually a right of citizenship. One is left to speculate on the difficulty of implementing the efficient traffic controls of Singapore's highly regulated society within the United States (p. 165).

Another suggestion, to "increase proximity" of urban resources, would make cities denser and hence easier to supply with public transit. Such cities would reduce the need for auto-based transport since people would live and work in close juxtaposition (pp. 149–53). The concept of denser cities, popular with many planners is, however, a reversal of a trend that began last century, to migrate from crowded cities into leafy, bucolic suburbs; a trend that began with commuter railways and street railways and has continued, albeit with far greater vigour, with the automobile. Denser cities of the 1990s would be (or at least could be) more humane than those of the 1880s. But nowhere is there a discussion of how planners could effectively reverse this societal desire for living in low density suburbs.

The section on "technological fixes" — although only a minor theme — is illustrative of the authors' weakness in addressing the complexity of North America's dependency on the automobile. "Smart highways," re-engineering street and sidewalks, and mass transit auto transport are indeed ways of reducing automobile use and Freund and Martin correctly see mass transit as capable of providing permanent solutions. Yet they ignore American transit planners' (or perhaps politicians') propensity to use mass transit as a "technological fix" and a belief that introducing good public transit alone will wipe away all other ills. The failure of heavy rail transit in Miami and the "people mover" in Detroit (neither of which are described in the text), show that the provision of mass transit is, in itself, not sufficient to ensure success and only one component of North America's complex societal and economic environment.

Moreover, the "technological fix" can suck funds away from other, more cost-efficient mass transit schemes. The authors approvingly note the construction of a new personal rapid transit (PRT) system in Chicago (p. 154). Not mentioned, however, is that this very expensive and sophisticated concept was first tried as a demonstration project about twenty years ago in Morgantown, West Virginia. The main advantage of PRT is that individuals by-pass all other stops on the system, proceeding directly from origin to destination — something like a horizontal elevator. No subsequent large scale installation was ever attempted in North America. Apart from its cost, the system has a relatively low capacity suitable for only a few transit conditions.

The authors' slight socialist leaning seems to have caused them to ignore some aspects of market economics as possible tools to regulate auto use. They rightly comment on the problems of hidden subsidies (pp. 130–133) and the need to increase the cost of auto transport to more closely reflect the actual cost of infrastructure and services. Removal of free parking, for example, was observed to provide a vast increase in car pooling (p. 166). They also note the contradiction that passing on increased automobile expenses to consumers has a far greater social cost to the poor than to the rich (p. 165). When unable to operate a car, the poor may be confronted with intolerably long commutes on rickety transit systems and are effectively denied permanent or well paid jobs. On the other hand, Freund and Martin seem less comfortable with the good old capitalistic concept of charging what the market can bear. Toll roads have been used in Singapore and Hong Kong to control road use (p. 165) but in the United States tolls have been used to pay only for new infrastructure. This will likely change as evidence continues to pile up on the value of road pricing as a way of reducing traffic congestion. Tolls will be charged on the new Highway 407 in Toronto both to pay for infrastructure and regulate traffic. In a few European cities, driving in some core areas is no longer free.

A surprising omission was any substantial analysis of the automobile as a consumer product — a feature unique among transport services. A decision to consume (buy) a car is often as much dictated by consumer desires for status, freedom or material comfort as it is for getting from A to B. If automobiles provided only a service, the mass of individual users

would make rational choices to use public or private transit. Instead auto owners also factor in physical ownership of their transportation (the car) and its attendant comfort, prestige and privacy. Given the choice between public and private commuting, Americans — perhaps encouraged by the auto industrial complex (p. 135) — abandoned public transit systems in the mid-twentieth century.

The consumer character of automobiles is introduced early in the book (pp. 7, 11), and pops up in various guises throughout the text (e.g. pp. 122, 154, 164). All of Chapter Ten is devoted to social change. The discussion, however, focusses on how to change people's transportation — not their consumer — habits. In the

end, ecologically sound changes in automobile use will not occur (at least according to this reviewer) until society changes its attitude about the consumer value of the auto. Cigarettes were a once widely esteemed consumer product in North America; could something similar happen to the motor vehicle?

*The Ecology of the Automobile* is a thoughtful book that raises many troubling questions about the role of the automobile in North America. While this reviewer does not agree with all the authors' observations and conclusions, the book certainly sheds light on the complex relationship among economics, human behaviour, and technology associated with the use of motor vehicles.

## National Archives of Canada, *Treasures of the National Archives of Canada*

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National Archives of Canada. *Treasures of the National Archives of Canada*. Toronto: University of Toronto Press, 1992. 365 pp., \$50.00, ISBN 0-8020-5022-0.

The present volume is not a guide to the institution's stock of archives in general. Neither is it an inventory of some archives in particular. It is rather to be read and reviewed as a *boasting-book* or an archival thesaurus in which the National Archives of Canada proudly presents its treasures of information. The institution has abundantly demonstrated that it keeps plenty to boast of.

Such a presentation can be organized in different ways. The survey may follow the outline of archives and collections in question, and simply conform to the cherished principle of *provenance*, like a comprehensive inventory or guide. Alternatively, it may reproduce precious items of historical records, irrespective of their provenance. The latter presentation may also arrange the examples in chapters devoted to various themes and enlightened by relevant records.

The book at hand has combined the two latter solutions, and this method is perfectly legitimate. The bulk of the text is divided into eight chapters, and readers are introduced to just as many themes. We find descriptions of cartographic, architectural and engineering records; documentary art, philately, and gov-

ernment records; manuscript, private, and genealogical records; moving image and sound records; and photographic records. Finally, there is a chapter on preserving the records of the past. In this way, the National Archives hopes "to give readers a glimpse into our holdings and perhaps also to help them understand what archives are and the role they play in society" (p. 11).

The institution has certainly succeeded. The book is lavishly illustrated, and text and illustrations are closely interconnected, so as to support each other. The chapters consist of a general introduction, followed by relevant examples, rendered in facsimile and briefly discussed on the opposite pages.

This calvacade of "treasures" is impressive because numerous full colour illustrations reproduce the documents so sharply and vividly that the printing quality enhances the impression of authenticity. However, several presentations may invite the reader to some criticism. In general, the comments seem often too brief. In particular, private records of Canada's past include some items in facsimile which the general public can hardly be expected to read in the original. Take for example the tantalizing extract from Agnes Macdonald's diary, reproduced on pages 169 and 194; no transcription is given, although the page opposite 169 is almost empty. A complete