

kende multifunctionaliteit verdwijnt op deze wijze. In plaats van de verzorgingsstad, de hygiënische stad, de geplande stad en de bewogen stad, die de auteurs ten tonele voeren, bestond er ook een werkstad, een winkelstad, een flaneerstad, een lichtstad, een cultuurstad en een parkstad, om een paar voorbeelden te noemen, met elk eigen technische connotaties.

Het deel 'bouw' lijkt completer maar bij nader inzien komt dat omdat door de tijd heen consequent één aspect wordt behandeld: de volkswoningbouw. Geen woord is er bij voorbeeld over de, ook technisch, vernieuwende Art Nouveau architectuur, die aan het begin van de twintigste eeuw bij uitstek in een stedelijke omgeving tot ontwikkeling kwam.

Ter afsluiting wil ik nogmaals benadrukken dat mijn aanmerkingen kanttelingen bij een topprestatie behelzen. Schitterend is bij voorbeeld de manier waarop in de stad, bij de evolutie van het stoplicht, techniek in een maatschappelijke context – het complexer worden van de mobiliteit – is geplaatst. Heel goed gelukt is ook het verhaal over de introductie van de betonbouw door E.M.L. Bervoets en E.A.M. Berkers, terwijl ook het betoog van R. Vermij over de automatisering van de industriële productie uitermate leesbaar is. Aan kwaliteit is dus geen gebrek, maar er is wel genoeg onbehandeld gebleven om een nieuwe serie te rechtvaardigen.

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J.W. Schot e.a. (eds.), *Techniek in Nederland in de Twintigste Eeuw, deel VII, Techniek en Modernisering: Balans van de Twintigste Eeuw* (Zutphen: Walburg Pers, 2003) 372 pp. ISBN 90-5730-070-2

Scholarly books are rarely a feast for the eye. Yet in the final volume of this monumental series, the editors and producers of this series have produced a magnificent volume of learned essays, lavishly illustrated, beautifully produced, clearly written, yet well-documented, and up to snuff on the latest theories and interpretations of science and technology studies. In many ways, this volume is a summing up of the previous six, a bird's eye's view of what Dutch technology was and meant for the country over the past century, and how technology fits in with the development of Dutch culture, society and economy.

The development of Dutch technology in the twentieth century reflects the special characteristics of the country. Three of them stand out. First, the Netherlands was a small open economy, whose options were by and large dominated by its larger neighbors Germany, Britain, and France, and after 1945 increasingly the United States. Technical and scientific knowledge in the twentieth century became increasingly international and 'globalized.' At the same time, geography dictated that the Dutch had special needs and demands, above all of course the ones associated with drainage and hydraulic engineering, but in recent decades also the ecological and environmental issues of high population density and the dearth of space and raw materials. Finally, Dutch technology and the Dutch institutional structure co-evolved, reinforcing and at the same time constraining one another. In such models, there is a deep contingency and multiplicity of feasible outcomes, and it is not surprising that the choices made by Europe's small developed economies differed quite a bit.

The chapters included in this volume reflect the ‘Dutch-ness’ of this experience. They are well-informed of the state of the art of scholarship in the various aspects of the study of technology. On the one hand, there is the emphasis on the social and political ‘construction’ of technology and how technical choices are shaped by economic interests and political power. On the other hand, especially in a sophisticated and well-informed chapter by J.P. Smits, there is an excellent analysis of what technological progress actually does to national income, living standards, and economic welfare. Yet clearly this is a book on the Netherlands, *not* on technological development in Western Europe. Throughout the many pages and illustrations, we see the omnipresence of water, the high rate of urbanization coupled to a high reliance on a high-tech agricultural sector, and the peculiar interaction between the public and private spheres in the typical Dutch ‘pillarized’ society. Like other small economies, the Netherlands developed some special niches, and the authors make clear that factor endowments can only go so far in explaining why these niches come about. The vast Dutch multinationals we associate with these niches such as Philips, Royal Shell, and Unilever did not owe their success to physical endowments, as much as to a certain entrepreneurial and technological inertia. In particular, as Smits points out, the Dutch tradition of processing imported raw material goes back to the ‘traffieken’ of the Golden Age. Dutch farming, always a high-efficiency and technologically sophisticated sector, survived the twentieth century in tact, in part through riding modern technology, in part through organizational change, and in part thanks to government supports. At the same time, Schot and van Lente in their chapter on industrialization note that the Netherlands went from a resource-poor economy in the beginning of the century to become a resource-rich economy by its end.

A central theme, inevitably, is the question of ‘modernization.’ The concept’s meaning has been transformed in recent years, but it remains central to the ambiguities of technical change. Has technological progress truly improved the ‘human condition’? It is hard to look at the Netherlands today and conclude otherwise: the Dutch, relative to their forebears and to almost any other country in the world, live a blissful life free of poverty, toil, and fear. Few societies in the past have enjoyed their current levels of material comfort and leisure. Yet advanced technology does create costs, and equating technological progress with welfare without worrying about environmental effects or the impact on labor conditions is unwarranted. As the very useful chapter by Schot and van Lente on ‘controversial modernization’ and industrialization makes clear, whatever the term may exactly mean, the Dutch have embraced modernization, become an advanced and sophisticated technological market economy, and reaped the fruits in terms of income and comforts, as well as paid the price. Like most other nations, they feel somewhat ambivalent about it, but wouldn’t go back to the ‘good old days’ even if they could.

The volume contains some outstanding chapters. I need to single out the introductory chapter by the editors, an apt and highly readable summary of the issues at stake, and the excellent chapter by R. Vermij on economies of scale which brilliantly discusses not only the physical and economic dimensions of scale effects but also the importance of what economists call ‘network externalities’ and the associated need for coordination and standardization, and the ideological components of ‘big is good’ and the historical interpretations based on them (associated with Alfred Chandler). Also very impressive is a chapter on the ‘integration’ of the Netherlands by Van der Vleuten, which emphasizes the interaction of infrastructural investments and the creation of a truly ‘Dutch’ economy in the twentieth century. Interesting is the chapter on the emer-

gence of the 'knowledge society,' although this chapter could have benefitted from some more careful economic analysis on the role of human capital and the connection between R&D and economic change. This chapter fails to note the importance of knowledge at the household level (in addition to that of engineers and technical experts), a crucial point made by Schot and van Lente. Much is made, indeed, in this volume, of household behavior, but consumers also had to be educated if they were to absorb the new techniques: bicycles and washing machines (to say nothing of computers) required a fair amount of learning on the part of their users. In an elegant closing chapter, Irene Cieraad deftly analyzes the cultural implications of the increased consumption that technological progress made possible, while steering clear of both the triumphalism of economists or the gloom and doom condemnation of mass-consumption often promulgated by left-leaning sociologists.

If there is some room to dispute the emphasis of this volume it is that, at least to the taste of this reviewer, many of the authors spend too much time agonizing over continuity and discontinuity, worrying when exactly did the breakage points occur if at all, and whether whatever came before them can be properly regarded as a 'prelude' to future growth. Instead, more could have been made from comparisons with other economies and especially the other rich small economies of Europe, such as Belgium, Switzerland, and Denmark. The Netherlands was, what the authors call a *diffusieland*, which mostly received rather than generated technology. But what parts of modern technology were absorbed depended on the economic and political parameters of the nation, and how small open economies make such choices remains one of the more intriguing questions of the twentieth century. At least we now know far more about the Netherlands than we do about any of these other economies.

The editors should be congratulated on this outstanding volume, a true *coda* to end seven volumes of detailed research. This series will constitute the standard work on modern Dutch technological change for generations to come. Let us hope that other countries can produce similar academic entrepreneurs who will follow the model that Johan Schot and his collaborators have produced here.

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## De emancipatie van de techniekgeschiedenis\*

In november 2003 is het project *Techniek in Nederland in de Twintigste Eeuw* (TIN20 in de wandelgangen) afgesloten met de overhandiging van het laatste deel aan de Koningin. Tevens is op die voor alle bij TIN20 betrokken onderzoekers zo gedenkwaardige dag bekend gemaakt dat enkele grote multinationals in Nederland hebben besloten de hele serie cadeau te doen aan alle middelbare scholen in Nederland. Is met dit majestueuze einde de emancipatie van de techniekgeschiedenis voltooid? Enerzijds zou dat moeilijk kunnen worden ontkend omdat de techniekgeschiedenis in

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