products. Excessive wages, a decline in product quality, a low rate of technological innovation, and changes in the dollar-yen exchange rate are largely ignored in this chapter, which thus gives the reader an unbalanced perspective.

Finally, a provocative piece by Piore and Sabel discusses the development of small-scale, entrepreneurial firms using flexible production techniques in Italy. These firms are a response to the rigid, unionized system of production that has developed elsewhere in Italy and are taken to be a model of future revival of industrialized regions in the United States. Whether workers displaced from declining basic industries can be saved by economic organization on this model is unclear. The authors' recounting of the successes of new ventures in the eastern Massachusetts area cannot support a view that the former auto and steelworkers in Michigan, Indiana, and Ohio will find happiness and productive employment in new small-scale firms. The skills and work ethic of these displaced workers may not lend themselves readily to higher-technology operations in which the workers must be more malleable, exercise more judgment, and utilize more highly polished skills than they have been accustomed to in large-scale, low-skill, unionized jobs.

All in all, this is a useful book for the student of trade and industry. It is not, however, a definitive study of the differences between U.S. and Japanese industries, nor does it explain fully the malaise in basic U.S. manufacturing. Many of the economic forces that have created the depression in the industrial heartland of the United States are ignored. And the description of the carefully nurtured Japanese industry is far from convincing even if it is consistent with the widely held view. The editors' closing plea for a limited set of "sector-specific" policies will appear limp to many readers, but given the U.S. government's "successes" in subsidizing and protecting declining industries it would be difficult to make a stronger case for more intervention.

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Health and Welfare in an Industrial Era

Endangered Lives. Public Health in Victorian Britain. ANTHONY S. WOHL. Harvard University Press, Cambridge, Mass., 1983. viii, 440 pp., illus. $20.

Most studies of public health in Victorian Britain are either administrative histories or histories of disease. Although certain figures, reforming administrators like Edwin Chadwick and John Simon, or certain episodes, like cholera epidemics, have been well studied, there is, to my knowledge, no other work of the scope of Anthony Wohl's latest book. Wohl brings the perspective and the skills of the social historian to the tasks of describing the health of the people, of explaining the collective actions Victorians took to protect public health, and of analyzing the motives for and the consequences of those actions. It is a very large order, and he handles it remarkably well.

The first three chapters explore the dependence of health on circumstances of life. Here and throughout his study Wohl quite properly insists that widespread poverty, especially in the rapidly expanding industrial cities, was the most important social and economic reality in the public health movement. It was the predominant force in creating the health problems Victorians faced; it frustrated many of their reform efforts, and it outlived them to confound their successors. Despite considerable economic growth and the recent advent of revolutionary welfare programs, one-third of the wage-earning population of England and Wales lived below Rowntree's poverty line when the First World War began.

Wohl measures the health of the people in the usual manner by employing mortality rates for the nation and for separate age groups and occupations. He devotes an entire chapter to infant mortality. His arguments are not, however, primarily statistical. In a stimulating departure, he shows not only that the poor died with greater frequency and at younger ages than their social superiors, differences that can be measured statistically, but also that the diet, hygiene, and labor of the poor marked them with physical deformity, offensive odor, and characteristic industrial diseases, thus reinforcing class differences and prejudices. The latter effects can be illustrated much more easily than measured.

Succeeding chapters deal with more familiar topics: the incidence of the major infectious diseases and the Victorian engineering achievements with respect to water supply and sewage. Next we encounter useful chapters on the public health administrative apparatus of central and local government. Finally there are four chapters on environmental hazards with which Victorians dealt only inadequately or belatedly: atmospheric pollution, water pollution, industrial toxins, and inadequate housing.

This is a major work of synthesis. Its mastery of sources is impressive. Wohl makes good use of previous historical studies and of the mountains of material the Victorians themselves generated in response to these problems in professional journals, newspapers, fiction, and especially the *Parliamentary Papers*. He also makes limited use of recent scientific studies of mortality and epidemiology. His sources are used with imagination and care. Wohl relies, as one must, on the statistics Victorian propagandists and administrators collected, while warning repeatedly of ways in which they can mislead and offering correcting or balancing evidence. In his three chapters on air and water pollution and on industrial disease, Wohl mines the reports of parliamentary investigators and of governmental inspectors to bring us accounts of important topics usually ignored by historians.

The book is well crafted and makes fascinating reading. The human costs of social change are presented in both quantitative and descriptive ways. Though clearly enthusiastic about his topic and sympathetic to his subjects, Wohl stays clear of the sensationalism that mars some histories of disease. His judgments are careful and non-doctrinaire. Although he sees economic forces at the root of public health problems, Wohl abjures simple economic determinism. Economic growth is viewed as part of both the problem and the solution.

Wohl's book is least successful in dealing with specific infectious diseases. He does not discuss the Contagious Diseases Acts and the campaign against venereal diseases, and the brief discussion in chapter 5 ("Fever! Fever!") of the changing pattern of acute infectious disease seems, as Wohl would probably concede, to strain the boundaries of social history. On the other hand, the strengths of Wohl's approach are clear. He offers us many valuable insights. Perhaps the most useful of these is the suggestion that the revolution in Victorian public health be dated some three decades later than is customary, to the 1870's rather than to the 1840's. Wohl shows repeatedly how effective action against one hazard after another was

"The 'Cattle Nuisance' was, as in this London scene, an integral part of Victorian urban life and contributed to the excitement and odour of the city as well as to the traffic congestion." [Reproduced in *Endangered Lives* from *The Graphic*, 27 Jan. 1877; Guildhall Library]

delayed until the last quarter of the century. To implement preventive measures the Victorians relied on the initiative of hundreds of local authorities, who all too often reflected the interests of slum landlords and of polluting industries, as well as of small rate payers. Serious efforts in public health began only when the local authority appointed a medical officer of health. Although the first of these officers were appointed in 1847 and 1848, only about 50 had been appointed by 1872, when their appointment was made compulsory. By the end of 1877 there were 1206 such appointees. Widespread local administrative effort, then, only began in the 1870's. Even then, low salaries meant that most medical officers of health were part-time, and their positions were not secure.

Consider also the way in which the Victorians' major achievement in public health, regional drainage schemes, was effected. In the early and middle 1840's reformers like Chadwick had demanded water-suspended, comprehensive sewage systems as essential to the public health enterprise. By the end of that decade legislation was passed that enabled towns to construct such systems. Although bold and vastly expensive drainage works were constructed in some places, most towns lacked the capital, the experience, the technical advice, the abundant supply of water, and, most important, the will to adopt such costly and untried methods. Such towns were content to drain cesspools and to rely on dry conservancy, the pail system, for the removal of human excrement from most of their homes. It was not the sewer system but the pail system, an offensive half-measure, that dominated municipal health activity throughout most of the second half of the 19th century. As late as 1911, two-thirds of working-class homes in Manchester were still without water closets. A painfully long period of time was required to effectively apply preventive measures on a great scale. This is a fact relevant to current historical debates about whether conscious human effort had much to do with the fall in mortality during the 19th century.

In conclusion this is a welcome book: stimulating, intelligent, balanced. By emphasizing ordinary conditions of life rather than the exceptional circumstances of epidemics, by considering the provinces as well as London, by studying routine services and administration as well as innovative ideas and ideal solutions, and finally by undertaking a genuinely comprehensive synthesis, Wohl has enriched our understanding of Victorian public health.

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Geomagnetism

The Earth's Core. Its Structure, Evolution and Magnetic Field. Proceedings of a meeting, Jan. 1982. S. K. RUNCORN, K. M. CREER, and J. A. JACOBS, Eds. The Royal Society, London, 1982. viii, 290 pp., illus. £37.50. First published in *Philosophical Transactions of the Royal Society of London*, series A, vol. 306.

The existence of a dense fluid core in the earth has been established for over 50 years. The core remains one of the foremost subjects the earth scientist must tackle in order to understand the behavior of our planet.

This book is a collection of papers presented at a conference in honor of the sesquicentenary of Gauss's first measurement of the geomagnetic field intensity. Perhaps as a consequence the papers are heavily biased toward geomagnetism, though other fields are represented.

Some important information has been accumulated during the last five years. Observations of melting iron in shock-wave experiments have constrained the phase diagram of iron, the dominant constituent of the core. (The consequences of these observations for our understanding of the thermal structure of the core are discussed in this volume by O. L. Anderson.) The density of the liquid outer core is, however, significantly less than that of pure iron, and the nature of the light alloying components is tackled in an excellent review by T. J. Ahrens. Ahrens reports that there is mounting evidence that there are not significant amounts of potassium in the core. This removes a possible source of energy for the driving of convective motions in the fluid (and thus for the maintenance of a magnetic field by dynamo action). An alternative energy source must be found; gravitational energy release due to the evolution of a solid inner core is a possibility.

Our knowledge of the morphology of the geomagnetic field in historical and prehistorical times has improved, and there are contributions in the book on the secular variation of the field, the chronology of reversals, and the detailed structure of the field during reversals. I was surprised to find that the evidence for geomagnetic excursions (aborted reversals) is under scrutiny and that reexamination suggests that the excursions may be local, rather than global, variations of the field. Papers by K. A. Whaler and D. Gubbins describe progress in delineating fluid flow near the top of the core as inferred from the present-day field. Clearly all these observations pro-