

Sheffield Steel and America: A Century of Commercial and Technological Interdependence, 1830-1930.

By Geoffrey Tweedale

(London: Cambridge University Press, 1987. Pp. xv, 296. Preface, appendix, notes, bibliography, tables, map and index. \$49.50.)

Few subjects are of more importance to the process of economic development than the transfer of technology, both within and between nations. Great Britain was the first nation to industrialize, with the United States following in the second half of the nineteenth century. While we have a general knowledge of the relationship between industrialization in the two countries, we know relatively little about the extent to which specific processes developed in Great Britain were adopted, modified, or even rejected in the United States. In this specialized monograph, Geoffrey Tweedale undertakes to examine the relationship between the crucible and specialized steel industry in Sheffield and the United States. The book is organized into three sections: special steel technology, the development of special steels, and Sheffield steelmakers and toolmakers in America. It will be of particular interest to Pittsburgh readers because of the complementary as well as competitive relationships that have existed between the two steel cities.

Tweedale notes that while bulk steel making utilizing the Bessemer and open hearth processes has attracted most of the attention of those interested in studying steel production, bulk steels could not have been machined or finished without tougher crucible steel. The process of making crucible or cast steel originated in Great Britain in the mid-eighteenth century and was developed in Sheffield. By 1850, Sheffield was producing 90 percent of all British steel, mainly from a multitude of small firms. For much of this period, the town's largest customer for steel was America, where the metal was used for a variety of manufacturing and agricultural needs. After 1850, however, Sheffield increasingly lost its American markets, as the domestic steel industry rapidly expanded. The center of this production was in Pittsburgh.

The making of blister and cast steel began in Pittsburgh in the 1830s, and by the 1850s had become one of the city's most important industries. Sheffield-trained steel workers were influential in the development of Pittsburgh's industry and Sheffield's methods were closely copied. But the fit between the two cities was not always comfortable. Sheffield steel workers, used to a more leisurely pace of work, disliked Pittsburgh's

hard-driving conditions and many supposedly returned to their home city after a relatively short stay. Sheffield technologies, also, were not necessarily fitted to American conditions and were increasingly modified. Labor was expensive in America compared to Great Britain, while the productive inputs of fuel and materials were relatively cheap, leading to more rapid mechanization. In the 1880s, for instance, when natural gas discoveries were made locally, Pittsburgh steel makers quickly adopted the Siemen's regenerative furnace (developed in Germany), while Sheffield industrialists were still debating the merits of coke versus gas. Further factors giving Pittsburgh an advantage included the supply of good quality Lake Superior ores, capital availability, and a protective tariff. Cheaper costs in regard to labor and crucibles were not enough to keep Sheffield competitive, and by the end of the century only the finer grades of Sheffield steel retained a share of the American market.

The picture of early Sheffield market domination followed increasingly by American success in capturing those markets was repeated in other specialty steel areas, such as cutlery and edge tools and saws and files. Typically, in the nineteenth century, Sheffield steel makers would make technological breakthroughs, such as the development of manganese and silicon steel, only to have American industrialists develop them to their fullest potential and make critical improvements. American specialty steel capabilities developed so rapidly that in the second half of the century the flow of machinery, labor and inventions reversed itself, as Sheffield "tardily and reluctantly" adopted American methods. In order to counter the potential loss of their major market, the largest Sheffield steel producers began establishing plants in America, including some in Pittsburgh. In several cases partnerships were established with American firms, but Sheffield interests remained limited. The portion of the American market that Sheffield continued to hold into the twentieth century related to products such as files, which were unsuited to machine production and to high quality steels.

The author concludes that the "distinctive character" of the U.S. market, with its preference for standardized goods, its orientation toward mass-production, and its rich natural resources, explains Sheffield's market loss. In addition, Sheffield's competitive position was hampered by poor management, labor inflexibility and the unorganized nature of the industry, which continued its pattern of many small firms while the American industry was consolidating. Thus, although the major Sheffield steel firms may have been, as the author maintains, as "technically advanced" as their competitors, other non-technical factors hindered their fortunes. From a broader perspective, Tweedale's study,

although narrowly presented, does make a convincing case for the importance of exploring technology transfer in regard to specific and specialized industries. ■

Joel A. Tarr *Carnegie Mellon University*
Pittsburgh

Pittsburgh-Sheffield Sister Cities Edited by Joel A. Tarr
(Pittsburgh: Carnegie Mellon University, 1986. Pp. v, 199. Introduction, notes. \$9.95 paper.)

The practice of city twinning is now well established between British and Continental cities; rather less common are such exchanges across the Atlantic. However, in 1981 officials from Sheffield and Pittsburgh met in Pittsburgh under the auspices of the World Affairs Council of the latter to sign a "sister cities" agreement. The decline of the steel industry has faced both cities with similar problems. Analysis of the effects of that decline and of the ways in which urban regeneration might be achieved provided the context for the conference, held to celebrate the agreement and to explore the histories of the two cities. Seven years later, as the British government looks increasingly to the United States for lessons in public policies which might stem the apparently inexorable decline of old industrial cities, the publication of the proceedings of that conference is a timely one.

The book is divided into four sections: images and architecture; economic development; urban politics; and planning and development; each section contains paired essays by practiced hands. With the exception of a quite bizarre exercise in "scissors and paste" history on "The Sheffield-Pittsburgh Utopian Axis," each essay contains at least some substance. The essay collection derived from an international conference has become one of the most regular types of publication on urban history in recent years. But all too often such collections lack focus, remaining disparate parts rather than forming a coherent whole. Unfortunately this volume conforms to type. I see two reasons for this. No matter how tough-minded the editor, there are very strict limits on how far one can impose coherence on distinguished contributors. It must be said that Professor Tarr has not been well-served by his contributors. Despite the avowed comparative intent, the essays are for the most part free standing