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978-0-521-10975-8 - Sheffield Steel and America: A Century of Commercial and Technological
Interdependence, 1830-1930

Geoffrey Tweedale

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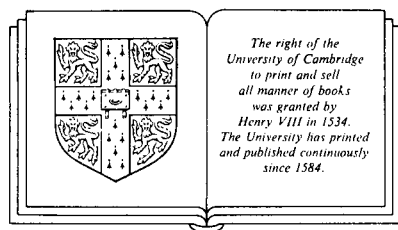
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For my parents

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PREFACE

In an analysis of the early nineteenth-century Atlantic economy, Jim Potter has written: 'The development of separate industries [in Britain and the US], especially from a technological point of view, needs to be examined in both countries with a view to discovering to what extent, for example, the lines of development were competitive and to what extent complementary. There are of course many excellent studies of the growth of separate industries on both sides of the Atlantic, but these generally provide only partial explanations of the trends.'^{*} In this book I have attempted to provide such a transatlantic study for the Sheffield steel industry's and allied trades' commercial and technological relationship with America during the period 1830–1930.

When I began my research in 1978 a survey of the published literature soon showed that there was plenty of room for such a work. Not only has very little been written on Sheffield's American connection, but also the history of the world's most famous steelmaking centre has been surprisingly neglected. For most economic historians the age of steelmaking dates from the activities of Sir Henry Bessemer and Andrew Carnegie, and reference to most of the standard texts on the steel industry would lead to the conclusion that very little steel was made before the arrival of Bessemer's converter. This viewpoint seems to stem from a fascination with the personalities involved and quantitative measurements of steel production. The Bessemer process, spouting showers of sparks and flames and producing prodigious tonnages of steel, was far more spectacular than Sheffield's crucible, and its achievements were fully advertised (with some exaggeration) by its illustrious inventor and the American entrepreneurs who made it work so successfully. The advance of crucible steelmaking, though equally hard won, was altogether less dramatic, being achieved over a century or more with almost no publicity. Economic historians'

^{*} The Potter article and the other works cited here are fully referenced in the endnotes and the bibliography

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concerns with quantification and growth have done little to correct this imbalance. The steel industry has been a firm favourite in debates over comparative Anglo-American growth, but in the work of Birch, Burn, Burnham and Hoskins, Habakkuk, McCloskey, and Warren, relatively little or no consideration has been given to Sheffield special steel. American authorities, such as Temin and Hogan, have also given high-grade steelmaking only a passing mention. The neglect, apparently, reflects a widely held view, shared by Temin, that crucible steel was of only 'limited' economic importance. Business historians have done little to revise this verdict. Of the published monographs on Sheffield steel firms, including those by Andrews and Brunner, Grant, Scott, and Trebilcock, only Pollard's study of Marsh Bros has focused on crucible steelmaking. Although an excellent unpublished study by J. G. Timmins exists, only very recently has the first full-length treatment of the Sheffield steel industry been published – the work of K. C. Barraclough, a trained metallurgist rather than a professional historian.

In terms of tonnage, few would argue with crucible steel's minor ranking: at the end of the nineteenth century when crucible steel was facing severe competition from both the Bessemer and open-hearth processes its share of total production in both England and America was a mere 1–2 percent. However, once it is accepted that most bulk steel was useless without tougher steel to machine it, and that crucible steel was never surpassed in the nineteenth century for the cutting edge of tools and the critical parts in machinery, then it becomes evident that the importance of special steel has never been properly appreciated. Certainly the technology of special steel manufacture has received far less attention than it deserves. Although a few historians, such as Rosenberg, have stressed the importance of special steels and their 'interdependence' to the general level of technological and inventive activity, as yet no attempt has been made to assess in detail the impact of such steels on the American economy.

Nor in the light trades of cutlery, saw, and file manufacture has any really detailed work appeared since the study by G. I. H. Lloyd. Again, much of the best research is unpublished and, although some of it relates to the US market, there has been no systematic attempt to analyse the interaction of the Sheffield and American industries.

By bringing together material from a diverse range of sources – including business records (some of which are used here for the first time), technical journals and newspapers, company histories, scholarly monographs, and official publications – this study seeks to redress the balance. After an introduction which outlines the origins of Sheffield's

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American trade, the crucible steel sector of the steel industry is considered both in Sheffield and American centres such as Pittsburgh. A second section discusses the development of special steels – manganese, silicon, vanadium, tool, and stainless – in which Sheffield played such a notable part. Finally, the involvement of Sheffield steelmakers and toolmakers in the US is extensively documented and the Sheffield entrepreneur's approach to the American market and his attitudes to advertising and selling are investigated. In summary, the light and heavy steel trades are contrasted and the conclusions are set against current historical debates concerning English and American technology diffusion. It will be evident from the material presented here that, although the American economy became increasingly independent in the late nineteenth century, especially in the hardware trades, this did not bring technological autonomy. In fact, the evolution of special steels shows the Atlantic economy operating far beyond its recognised confines, so that Sheffield continued to provide vital technological inputs for American industry even in the twentieth century.

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This is a revised and expanded version of a thesis which was accepted for the degree of Doctor of Philosophy at London University in January 1984.

The study began in 1974–75 when I was introduced to the subject of American economic history by Mr Jim Potter and Professor Charlotte J. Erickson at the London School of Economics. Mr Potter welcomed my return to the LSE in 1978 and secured for me a two-year Social Science Research Council award (supplemented by an American travel grant in 1980), which enabled me to complete the first part of the research. Professor Erickson supervised me for a further year and gave me the benefit of her own expertise on the Sheffield steel industry and on immigration. She also found part-time employment for me with the University of Massachusetts – an invaluable support when SSRC funding ceased. Professor Leslie Hannah and Dr David Jeremy, in the Business History Unit at LSE, were also helpful in providing extra sources of income in the final stages of my work. Dr Jeremy, whose own study on textile technologies was a source of inspiration for this book, gave me many helpful suggestions and first directed me to the materials at the Eleutherian Mills Historical Library. Finally, a grant from the Central Research Fund of London University allowed me to complete my work in the US in 1982.

I am indebted to a number of libraries and research institutions on both sides of the Atlantic. The following deserve a special mention: the British Library of Political and Economic Science (especially Inter-Library Loans); the Institute of Metals (Miss Wendy Todd); Baker Library, Harvard University; Butler Library, Columbia University; the Carnegie Library of Pittsburgh; the Historical Society of Pennsylvania; and the National Archives, Washington, DC. Much of the work was conducted in Sheffield Central Library's superb local studies collection, where Richard Childs, Dr David Postles and the members of the Library staff were invariably courteous and helpful. In Delaware my research opportunities were further extended by the marvellous resources of the Eleutherian

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ABBREVIATIONS

| | |
|-------|---|
| ACAB | <i>Appleton's Cyclopaedia of American Biography</i> |
| AGM | <i>Annual General Meeting</i> |
| BAISA | <i>Bulletin of the American Iron and Steel Association</i> |
| BL | Baker Library, Harvard University, Boston, Mass. |
| BLCU | Butler Library, Columbia University, New York City |
| CEAIA | <i>Chronicle of the Early American Industries Association</i> |
| DAB | <i>Dictionary of American Biography</i> |
| DBB | <i>Dictionary of Business Biography</i> |
| DNB | <i>Dictionary of National Biography</i> |
| EMHL | Eleutherian Mills Historical Library |
| HSP | Historical Society of Pennsylvania, Philadelphia, Pa. |
| ICTR | <i>Iron and Coal Trades Review</i> |
| JISI | <i>Journal of the Iron and Steel Institute</i> |
| MPICE | <i>Minutes of the Proceedings of the Institution of Civil Engineers</i> |
| NCAB | <i>National Cyclopaedia of American Biography</i> |
| NFISM | National Federation of Iron and Steel Manufacturers |
| PASTM | <i>Proceedings of the American Society for Testing Materials</i> |
| PIME | <i>Proceedings of the Institution of Mechanical Engineers</i> |
| PP | <i>Parliamentary Papers</i> |
| PRO | Public Record Office, Kew |
| RC | Royal Commission |
| SC | Special Committee |
| SCL | Sheffield City Library, Archives Division |
| SUA | Sheffield University Archives |
| TAES | <i>Transactions of the American Electrochemical Society</i> |
| TASCE | <i>Transactions of the American Society of Civil Engineers</i> |
| TASME | <i>Transactions of the American Society of Mechanical Engineers</i> |
| TASST | <i>Transactions of the American Society for Steel Treating</i> |
| USNA | United States National Archives, Washington, DC |