

DAVID DUNGWORTH, *Glassworking in England from the 14th to the 20th century*. Swindon: Historic England, 2019. 162pp., 63 illus. £70. ISBN 978-1-84802-285-0.

Historic England has a long-established and enviable reputation for producing high-quality publications on current research in the historic environment in an informative and engaging format. This is exemplified by David Dungworth's latest volume, which presents a detailed examination of glass-manufacturing in England from the medieval period to recent times. David's renown as a preeminent specialist on historic glass-making is cemented by this impressive book, which is essentially his magnum opus on the subject. It draws together the cutting-edge research he carried out during his 18 years' tenure as a materials scientist and subsequently Head of Archaeological Conservation and Technology for English Heritage (and latterly Historic England), and whilst the emphasis is drawn from scientific analysis of historical glass, the book provides a carefully balanced combination of documentary, chemical and archaeological evidence.

The opening two chapters provide an illuminating explanation of glass, elucidating the range of raw materials used and the evolution of the technology employed. This includes a non-technical explanation of glass-melting furnaces, charting their adaptation and the dramatic changes in design that were demanded in the 17th century to enable a shift from wood to coal as a fuel. The text is illustrated by the conservative use of drawings reproduced from 18th- and 19th-century accounts, together with some extracts from historic maps. These give way to a series of graphs depicting the chemical composition of glass-melting crucibles and adhering glass recovered from archaeological excavations, highlighting the value of a detailed examination of crucibles and the scientific analysis of glass and glassworking waste. The chapter concludes with a brief overview of the skilled labour that was essential to the industry, and the key products of its three main branches (tableware, bottles and window glass) are introduced, although without any accompanying images.

Having set the scene, the third chapter provides a critical examination of the archaeological evidence for glass manufacturing, with lavish illustrations of waste materials found during excavations. The production waste generated from glassworking can be more informative than that from almost any other historic industry, especially in the light of advances in scientific techniques that have been achieved in recent decades. The combination of archaeological evidence with the application of scientific analysis has, in several instances, provided a greatly enriched understanding of the raw materials and technologies employed in glass manufacture, and this section of the book demonstrates the importance of taking a considered approach to investigating glassworking sites and the benefit of effective dialogue between the various specialists involved in all stages of a project.

The following chapter provides a fascinating overview of the medieval glass industry in England, when glass was a scarce, luxury material used to furnish the tables of the wealthiest members of society and to glaze buildings only of the highest status, such as churches and palaces. Often referred to as 'forest glass', its production was located

primarily in rural areas with easy access to wood for fuel and bracken as a source of alkali. A useful precis of the historical evidence for medieval glassworking is coupled with an account of the key production sites of the period that have been excavated. The narrative benefits from the inclusion of plans of furnaces and images of the glass products and crucibles uncovered during the fieldwork, and the resultant scientific analysis of the glassworking debris.

The transformation of the industry in the 16th century, attributable in no small part to the influence of immigrant glass makers from mainland Europe and technological development, enabled the scale of production to increase whilst simultaneously encouraging a reduction in the cost of glass objects that helped to increase the demand. By the 18th century, glass was routinely used to glaze houses even for the less wealthy members of society, to store wine and beer, and to serve drinks, and an account of the tableware, bottle and window glass branches of the industry that developed as distinct sectors is provided in the succeeding three chapters. The final chapter draws these separate threads together, and compares and contrasts the different sectors of the glass industry and attempts to set them into a wider context.

Whilst the book gathers together material that has been published previously as journal articles or grey literature, some of these are not easily accessible, and thus the book engenders a high level of 'discoverability' for the glass industry by placing an invaluable synthesis of this work, including some new material, in context. The comprehensive bibliography is also of considerable value to researchers, and there is little doubt that the book will gain acclaim amongst the archaeological community and special interest groups, whilst the engaging style of writing and logical structure makes it accessible and 'easy to navigate' for a wider audience.

With a retail cost of £70, the book is not cheap, but this reflects the high quality of the content and production, and is ultimately a small price to pay for anyone with research interests in the archaeology of the English glass industry; it is difficult to see how this book could fail to become an essential reference work on the subject.

Since the publication of this volume, Historic England has entered into a strategic partnership with Liverpool University Press (LUP) for the long-term running of the Historic England imprint, and all existing and future books will be managed and published by LUP under licence to use the Historic England brand for books. It is to be hoped that the established high standard that is personified by this volume on glassworking can be maintained.

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