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ESSAY REVIEW

AN INFURIATING GENIUS

by

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Anita McConnell, *Jesse Ramsden (1735–1800): London's leading scientific instrument maker*. Ashgate Publishing Limited, Aldershot, 2007. pp. 340, £60.00 (hardback). ISBN 978-0-7546-6136-8.

Scientific instrument makers are rarely afforded the limelight by historians. Yet, as Martin Rees's foreword to this, the first full biography of Jesse Ramsden, points out, 'the entire development of science has been driven by (and, in return, has driven) the invention of better instruments and novel techniques', and so 'those who design and make these instruments deserve more acclaim than they normally receive' (p. xvii). Jesse Ramsden can certainly claim to be a prime candidate for such acclaim, in particular as a maker who has remained relatively well known. Fortunately, he has now found an appropriate biographer in Anita McConnell, who is one of a small group of historians who have done much to reassert the historical importance of British instrument makers, both through her previous publications and her work for the recently revised *Oxford dictionary of national biography*.

Jesse Ramsden was something of a conundrum, as this book testifies. In his own lifetime he was repeatedly praised for the very high quality of the instruments produced in his London workshop, yet cursed in equal measure for the regularity with which he missed delivery deadlines. At times this drove his clients to despair. Ernst, Duke of Saxe-Gotha, for instance, pleaded, 'protect me from that sublime living artist', whom he considered an 'Arch-liar' (p. 127). In this case the venom was perhaps deserved, because the order was never delivered. McConnell also reveals that Ramsden resorted on occasion to showing dummy pieces to enraged customers to give the impression that progress was being made. Others were luckier, however, in that their instruments arrived, although often years late. Most dramatically, a mural circle for Dunsink observatory in Ireland took 23 years and was only completed some time after Ramsden's death.

Why, then, was Jesse Ramsden so sought-after, becoming, as the book's subtitle suggests, London's leading scientific instrument maker? As McConnell argues persuasively, his success stemmed from three things: the creation of a manufacturing workshop that was unique in London in terms of both its size and its organization; the technical advances he

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made in the design of large-scale astronomical instruments; and his development of the dividing engine, which in turn revolutionized the production of smaller instruments such as sextants and theodolites. Ramsden also moved in the right circles, corresponding widely with astronomers and scientists throughout Europe and becoming a Fellow of the Royal Society and the Imperial Academy of St Petersburg. He also seems to have been likeable, Louis Dutens writing some years after Ramsden's death that his 'countenance was a faithful index of his mind, full of intelligence and sweetness' (p. 20). These qualities won him both friends and loyal supporters.

Broadly speaking, McConnell's book treats its subject chronologically, although not rigidly so. The first chapters set the scene and begin to unpick some of the confusions and contradictions that have bedevilled previous accounts of Ramsden and his work, immediately highlighting the patchy nature of surviving sources. The heart of the book, however, draws more certainly on a rich range of surviving evidence, using this to organize the narrative. The next chapters detail two key developments, his invention of the dividing engine and his relocation to London's Piccadilly in 1773. It was here that Ramsden set up a large workshop with all the specialist workers required for the manufacture of large and complex instruments housed under one roof. This multi-skilled workshop set Ramsden's firm apart from other London makers, for whom extensive subcontracting to small workshops dispersed around the city was the norm. There is rich detail here on how the workshop was organized and on who Ramsden's workers were; these included a surprising number from other European countries. There are also intriguing stories of industrial espionage, for instance in the activities of Jean Hyacinth Magellan, a former priest from Portugal who regularly sent information on British technological progress, and occasionally even instruments, to the French minister of finances, as well accepting commissions from anyone else willing to pay.

The book then moves on to detail the large-scale commissions, both for observatories and for expeditions, which Ramsden was able to undertake from his Piccadilly premises. It was these that allowed Ramsden to establish a portfolio of impressive instruments throughout Europe, which in turn attracted further clients. The material here conveys very well the challenges faced in building large bespoke instruments, both the technical complexity of the instruments themselves and the difficulties workshops encountered in producing them. The engraving of the scales, on which each instrument's ultimate accuracy relied, could, for instance, take place only when both the light was adequate and the temperature was steady, thus prohibiting the use of lamps and restricting available working times considerably, even halting progress during extreme weather conditions.

Ramsden's early large-scale commissions included work for the observatories of Padua, Vilnius, Paris and Palermo, for which he built the first astronomical apparatus incorporating a full circle that had ever been constructed. It was also during these first commissions that Ramsden developed a reputation for slow delivery. By 1784, for example, Thomas Hornsby was deriding Ramsden as a 'shatter-pated fellow' in his frustration over work for the Duke of Marlborough's observatory at Blenheim (p. 88). Yet the quality of Ramsden's work was also soon evident, with Blenheim's astronomical instruments becoming essential viewing for astronomers touring the observatories of Europe to see the latest and best equipment available. Nevertheless, there were clients who were critical of the quality of Ramsden's instruments. Sextants brought back from the third of Captain Cook's great expeditions, for example, were reported to be consistently in error, an accusation Ramsden at once vehemently denied.

Ramsden's work was not confined to astronomical devices, therefore, and the range of instruments his workshop produced comes through very clearly in the book, which discusses a bewildering range of other instruments: electrical machines, barometers, thermometers, theodolites, surveying levels, telescopes, dynameters, long-beam balances, microtomes, prisms, optigraphs, ship's compasses, coin balances and Atwood's Fall Machine, to name just a few. Two important chapters also investigate Ramsden's work on surveying instruments, notably those created for General William Roy's survey to remeasure the longitude difference between the Greenwich and Paris observatories (work from which the Ordnance Survey developed). For these, Ramsden devised not only the sophisticated surveying apparatus but also the physical standards on which the measurements were based, largely as a result of which he was awarded the Royal Society's Copley Medal in 1795. General Roy, however, proved to be critical of Ramsden's work, beginning a dispute that was mediated through meetings of the Royal Society and its Council. Indeed, the discussion in these chapters is very revealing about the processes of dispute and resolution (or, sometimes, partial resolution) that took place in the confines of the Royal Society.

The last chapters look at Ramsden's final years, which included an interesting foray into medico-optics with the surgeon Everard Home, and Ramsden's well-known involvement in a dispute with Peter Dollond concerning the invention of the achromatic lens. There is also a useful analysis of Ramsden's legacy, literally in terms of his will and also through his successors at Piccadilly. The work of the first of these, Matthew Berge, included the completion of several outstanding orders for the firm, including the long-overdue Dunsink mural quadrant.

There is a huge amount of information packed into this biography of a key figure in the development of Britain as a scientific, technological and imperial power in the late Georgian period. The book is also something of a hostage to fortune, however, in that documentary evidence survives only for some aspects of Ramsden's life and works, so it is on these that McConnell rightly concentrates. As she freely admits, this results in some frustrating gaps, notably the absence of substantial details about the man himself and his marriage to Sarah Dollond (from the famous Dollond family of opticians). Nevertheless, McConnell has been able to glean a tremendous amount of information from archives around the world and put it to good use to provide a detailed account in other areas. It is fascinating, for example, to be able to draw on the plans for Ramsden's expanded workshop at Piccadilly, which was such a key to his success.

As a result of these vagaries of documentary survival, the book's emphasis is on Ramsden's bigger commissions. It feels somewhat indulgent to want more, but one area that still warrants further treatment, perhaps, is the widespread supply of smaller instruments such as sextants, many of which survive and are highly valued. As the author indicates, however, the evidence that remains does not allow these other tales to be told with any assurance—a frustration all historians face at some time. This is minor quibbling, however, for what has resulted is full of revealing detail. Above all, what this account highlights is how the very process of scientific instrument manufacture underpins scientific activity and progress, in this case placing Ramsden at the very heart of Enlightenment Europe. What also comes through is the tremendous diversity of Ramsden's interests and activities, not to mention his extraordinary personal inventiveness in response to scientific and technical problems. At times this diversity creates challenges for the narrative because it can be hard to maintain a coherent thread through the widely dispersed set of activities that Ramsden's life encapsulated, yet there is much here that fascinates and surprises.

McConnell herself sums up her subject's life well (p. 227):

> his customers…driven to despair by his endless delays, a sin made worse by unreliable promises, admitted that they had little alternative. At the end of the day, his workshop was always busy, the waiting list of eager customers always a long one. His instruments continue to command a high price in the saleroom, and his reputation as England's leading scientific instrument maker of that period is undiminished.

Jesse Ramsden is a figure who deserves to take a prominent place in the history of eighteenth-century Europe. This biography goes a long way towards ensuring that this will be recognized more widely.