

LIVING THE ENLIGHTENMENT AND THE FRENCH REVOLUTION: JAMES WATT, MATTHEW BOULTON, AND THEIR SONS

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ABSTRACT. *This article is a contribution to the cultural history of English Enlightenment. It examines the formation of a discrete ‘family’ of philosophes in the West Midlands who maintained close links with their counterparts on the continent. Birmingham’s role as a magnet for ‘industrial tourists’ in the second half of the eighteenth century helped to propagate the influence of this local intelligentsia who were mostly members of the Lunar Society. None the less, it is argued that the activities of the Society correspond more closely to an Enlightenment than to a proto-industrial pattern of inquiry. The events of 1789 in France disrupted this philosophic ‘family’. Their impact is explored through the medium of a real family; that of James Watt, the engineer, who came to Birmingham to manufacture the steam engine in partnership with Matthew Boulton. The vicissitudes of the Watt family, and of other prominent members of the Lunar Society, are unravelled to illustrate the dilemmas faced by men raised in the values of the Enlightenment when confronted with the reality – and the proximity – of a far-reaching political revolution.*

I

Towards the end of 1789 James Watt, the engineer and steam pioneer, remarked to his son that civil disturbances in France had caused his philosophical intercourse with that country almost to dry up, ‘so that I have lately heard nothing interesting in chemistry’.¹ Over the next half decade, public and private calamities multiplied to justify his sense of foreboding. ‘Politicks you will learn from the newspapers’, he wrote to a different correspondent in August 1795, ‘Philosophical news I have none of any consequence. These cursed French have murdered Philosophy & continue to torment all of Europe.’² Watt’s vehemence is easy to understand: the collision between Enlightenment and Revolution came close to wrecking both the philosophic ‘family’ of which he formed a part, and his own more immediate family of kith and kin.

Watt’s public career can be said to have begun in earnest in 1774 when he took up residence in Birmingham as the collaborator and business partner of

¹ J. Watt snr to J. Watt jnr, 11 Oct. 1789, Birmingham, Birmingham City Library (BCL), James Watt papers, private letter book 2.

² BCL James Watt papers, private letter book 2, J. Watt snr to W. Roebuck, Birmingham, 19 Aug. 1795.

the manufacturer Matthew Boulton of Soho. The move would transform him from a little known Scots mechanic into a figure of international stature among men of letters. Under the protection of a twenty-five year patent granted by act of parliament, his improved design for the steam engine eventually brought wealth as well as fame. United, Watt and Boulton bestrode the technological Enlightenment, basking in a reputation for innovative engineering which many envied and which their sons would carry forward into the nineteenth century. This story is well known, however. Watt, the inventor, and Boulton, the builder of the Soho Manufactory (the world's largest factory in the 1760s), feature in all the standard histories of applied science and industry. Indeed, such is the shadow cast by the steam engine, that the careers of the two men are rarely analysed in any other context.

The present article takes a rather different approach. While not underestimating the importance of their contribution to the development of power technologies, it places their lives in a broader, less determinate setting. Both men, it will be suggested, came to see themselves as *philosophes*, that is to say as members of a pan-European – indeed pan-Western – ‘family’ of discoverers and disseminators of useful knowledge. However, both found themselves caught up in the contradictions and dilemmas of the late Enlightenment. Is knowledge value-free? How should it be transmitted? Ought it be made available to all, irrespective of social station? Does greater access to knowledge produce greater public understanding? Under the glare of events in France from 1789 onwards many of the comfortable assumptions underpinning the discourse of educated men were rapidly laid bare, cruelly so in the case of James Watt. It became apparent that the Enlightenment possessed no overarching unity, that it meant different things to different generations, that ‘public opinion’ did not act with Newtonian constancy; in short that partisanship and dogmatism were as much characteristics of the politics of ‘reason’ as of any other branch of political intercourse.

The task of placing James Watt and his Birmingham contemporaries in their eighteenth-century setting is not hampered by want of sources. Quite the contrary: it seems more probable that the sheer volume of material relating to the Boulton and Watt partnership and the Soho undertakings has acted to deter scholars from attempting an overview. In circumstances where tens of thousands of in-coming and out-going letters have survived, it is often easier simply to burrow. Nevertheless conditions of access and consultation have certainly improved since Eric Robinson³ first signalled the riches contained within the archive some forty-five years ago. Virtually all of the primary source

³ For the purposes of this article see, in particular, E. Robinson, ‘Training captains of industry: the education of Matthew Robinson Boulton (1770–1842) and the younger James Watt (1769–1848)’, *Annals of Science*, 10 (1954), pp. 301–13; idem, ‘The international exchange of men and machines, 1750–1800’, *Business History*, 1 (1958), pp. 3–15; idem, ‘An English Jacobin: James Watt, junior, 1769–1848’, *Cambridge Historical Journal*, 11 (1955), pp. 349–55; idem, ‘The Lunar Society: its membership and organisation’, *Transactions of the Newcomen Society for the Study of the History of Engineering and Technology*, 35 (1962–3), pp. 153–77.

material bearing on the activities of Matthew Boulton and James Watt is now housed in the Central Library of the City of Birmingham. As recently as 1994 a final and important collection of Watt papers came into public ownership.⁴ These papers complete the jigsaw of Watt's family and philosophical connections, and complement the already substantial holding of material relating to the Boulton side of the partnership. Thus, for example, we can explore and analyse the networks of intellectual influence and patronage within which the two men operated, while at the same time probing their inter- and intra-family relationships. This is the purpose of the present article. It is based on a sample reading of the philosophical exchanges conducted by Watt and Boulton with a wide circle of fellow savants during the last quarter of the eighteenth century, and a much closer reading of the letters that flowed between Boulton senior and his son Matthew Robinson (born 1770), between Watt senior and his eldest son James (born 1769), and between Watt senior and his second wife Ann Macgregor (married 1776).

II

When James Watt arrived in Birmingham, a widower with two small children, he found a philosophical 'family' ready and waiting. Ever since the 1760s Matthew Boulton had contrived to gather around him a circle of intellectually inquisitive friends which he called, rather grandly, the Lunar Society. It met regularly (supposedly by the light of the full moon), but privately and with almost total informality. Nevertheless, the building of Boulton's showcase Soho Manufactory (1761–6), together with a fine new residence, on an empty stretch of heath a couple of miles outside Birmingham, gave the Society a headquarters of sorts. Although the friends continued to meet in each other's houses, Boulton's 'Hôtel de l'amitié sur Handsworth Heath', as he playfully described his new dwelling, became the principal venue for meetings and, in due course, the institutional linchpin of a discrete West Midlands *philosophe* community.

Since the Lunar Society counted several prominent manufacturers (James Keir, Samuel Galton junior, Josiah Wedgwood, etc.) among its members or affiliates, there has long existed a scholarly opinion that it functioned as a kind of technological 'think-tank' providing scientific propellant for the industrial revolution.⁵ Even before Watt's arrival on the scene members avidly discussed how to improve the steam engine, or how to facilitate canal navigation; and the presence in their midst of Dr Joseph Priestley following his own move to Birmingham in 1780 undoubtedly stimulated interest in the practical applications of gaseous chemistry. But none of these entrepreneurs could have

⁴ Purchased from Lord Gibson-Watt of Doldowld for £1,075,000 following a public appeal.

⁵ The impetus for this viewpoint derives from R. E. Schofield's detailed study: *The Lunar Society of Birmingham: a social history of provincial science and industry in eighteenth-century England* (Oxford, 1963), especially pp. v, 3, 419, 436–9. See, in addition, A. E. Musson and E. Robinson, *Science and technology in the industrial revolution* (Manchester, 1969), and A. E. Musson, ed., *Science, technology, and economic growth in the eighteenth century* (London, 1972).

known that they were standing on the threshold of the industrial revolution, and the question of their motivations has yet to be satisfactorily resolved. Besides, they were outnumbered by the physicians and gentlemen amateurs among Boulton's friends, whose eclectic interests correspond much more closely to an Enlightenment pattern of inquiry. Dr Erasmus Darwin, whose fluent and light-hearted letters are an important source of information on the activities of the Lunar Society, dabbled in everything from photosynthesis to poetry. William Withering, his one time medical rival, devoted his leisure hours to the study of botany, geology, and natural history. By contrast, Richard Lovell Edgeworth and Thomas Day, who were both gentlemen of independent means, brought social and educational concerns to the attention of members of the Society. Day's obsession with Rousseau even drove him to adopt two orphan girls from the Shrewsbury foundling hospital whom he escorted to France for a controlled experiment in child-raising.⁶

In the hands of its English and Scottish practitioners this Enlightenment was above all provincial and unofficial in character. The Scottish universities, it is true, were admired throughout Europe for their intellectual prowess, but south of the border university science was in the doldrums, and London-based institutions such as the Royal Society were not in much better shape. English manufacturers seeking a rounded education in chemistry or mineralogy for their sons either sent them northwards or across the seas to the continent. But what England could boast – at least until the storm clouds of the French Revolution started to gather – was a vibrant and accessible culture of lay scientific inquiry. The Dissenting academies in combination with itinerant lecturers, loosely constituted groups of provincial savants, resourceful publishers, and booksellers catered to a large and expanding public appetite for knowledge, and more especially useful knowledge. The 'candlelight' paintings of Joseph Wright of Derby (see *A philosopher giving a lecture on the Orrery* (1768) and *An experiment on a bird in the air pump* (1769)) provide eloquent visual testimony to this domestication of an essentially middle-class Enlightenment. Some wished to go further, of course. Dr Priestley, in the 1770s and 1780s, anticipated a veritable democratization of knowledge, as Jan Golinski⁷ has recently argued. Through the medium of his writings and experimental method, he made out a case for a free-ranging, non-dogmatic, and above all participatory style of intellectual inquiry. This was what Boulton's 'Hôtel de l'amitié sur Handsworth Heath' was all about; that is until the advent of political revolution raised powerful voices calling for an end to the unrestrained dissemination of knowledge.

For all its prowess in the applied sciences, the Lunar Society more closely resembled the academies and reading circles of continental Europe than a

⁶ For a contemporary account, see Anna Seward, *Memoirs of the life of Dr Darwin chiefly during his residence at Lichfield* (London, 1804).

⁷ J. Golinski, *Science as public culture: chemistry and enlightenment in Britain, 1760–1820* (Cambridge, 1992), pp. 8, 50–90.

modern-day research organization. And in any case it was not the only, or even the principal, vector of Enlightenment influence in the English Midlands. That role was filled by Boulton's impressive new industrial emporium known as the Soho Manufactory. Unlike James Watt, who was dour of character and reticent in company, Matthew Boulton was a gracious host and tireless self-advertiser. From the 1760s until shortly before his death in 1809, he routinely escorted visitors and house-guests around his establishments (the Manufactory, and subsequently the Foundry in Soho, the Albion Mill in Blackfriars, London) as if driven by a pathological urge to display both the evidence of his own success and that of mankind in harnessing the forces of nature. Men and women from every corner of Europe and the Americas hastened to view the Manufactory, or else the new steam-powered corn mill briefly erected at Blackfriars Bridge. Indeed, these sites became obligatory stopping-places on the industrial Grand Tour of England. On occasion the flow of visitors reached flood proportions (following the signing of international peace treaties in 1783, 1802, and 1814 in particular), and Boulton, Watt, or their foremen could easily spend whole days showing them around. Boulton once reflected that in the space of a fortnight he had entertained Prince Stanislas Poniatowski, nephew of the king of Poland, four ambassadors, and Count Orlov, one of the '5 Celebrated Brothers' who were favourites of Catherine the Great.⁸

Why did visitors flock to Soho in such numbers? For many, indeed most, such sight-seeing was indistinguishable from the pursuit of knowledge for its own sake. Knowledge which, as Benjamin Martin the lecturer and science popularizer neatly observed 'is now become a fashionable thing, and philosophy is the science à la mode; hence, to cultivate this study is only to be in taste, and politeness is the inseparable consequence'.⁹ This was how late eighteenth-century men and women 'lived' the Enlightenment. A trip to Soho might lead on to an inspection of the ironworks at nearby Coalbrookdale, but it was no less likely to be followed by a visit to the landscaped gardens of the Leasowes made famous by the poet William Shenstone, to the seat of Lord Lytton at Hagley, or to Cheltenham for the waters. As reports of the efficacy

⁸ The visits took place in October 1772 and involved the envoys of France, Denmark, Sardinia, and the Dutch Republic. See M. Boulton to J.-H. Ebbinghaus, 24 Oct. 1772, Soho, BCL, Matthew Boulton papers, letter book D ('We had last week prince ponitowski y^e Nephew of the King of poland, the French, the Danish, the Sardinian & y^e Duch [sic] Ambassadors we have had this week Count Orlof one of the 5 Celebrated Brothers who are favourits with y^e Empress of Rusia & who have conducted her War against y^e Turks & Yesterday dined with me the Vice Roy of Ireland'). Prince Michael Poniatowski, primate of Poland and brother to the king, also came to inspect the manufactory in 1791. In addition, see J. G. Crowther, *Scientists of the industrial revolution: Joseph Black, James Watt, Joseph Priestley, Henry Cavendish* (London, 1962), p. 148; H. W. Dickinson, *Matthew Boulton* (Cambridge, 1936), p. 72; and the more accurate account in S. Smiles, *Lives of Boulton and Watt, principally from the original Soho MSS. comprising also a history of the invention and introduction of the steam engine* (London, 1865), pp. 180–1.

⁹ Quoted in D. H. Solkin, 'ReWrighting Shaftesbury: the *air pump* and the limits of commercial humanism', in J. Barrell, ed., *Painting and the politics of culture: new essays on British art, 1700–1850* (Oxford, 1992), p. 93.

of the new steam technology began to circulate, however, visitors of a rather different stamp set off for Birmingham: entrepreneurs with order books at the ready, and officials holding commissions from foreign governments. Typical of the former was Jacques-Constantin P rier whose Paris waterworks venture brought him to the Midlands in search of a pumping engine in 1777–8. The latter can be symbolized in the person of Baron Heinrich Karl vom Stein, the director of the mines of Westphalia and future reform minister of Prussia, who visited in the mid-1780s. Both of these gentlemen arrived on Boulton’s doorstep under a passport of Enlightenment gentility and intellectual comradeship, but neither was quite what he seemed.¹⁰

Provided that their visitors were of respectable background and appearance, Watt and Boulton tended to greet them in that spirit of free inquiry so characteristic of Lunar meetings. They made no systematic attempt to distinguish between general knowledge and sensitive commercial knowledge, at least not while the steam engine patent remained in force. None the less, disagreeable experiences at the hands of industrial pirates (the P rier brothers) and would-be spies (Stein) taught them a certain amount of caution and prefigured the sea-change in values that the Revolutionary decade would usher in. When, in April 1786, James Watt wrote to his partner to urge that ‘the doors of the [Albion] will be strictly shut against all comers without an order signed by three committee men’,¹¹ it was a sign that the tensions inherent in their position as at once custodians and disseminators of knowledge were beginning to show. Yet Watt no less than Boulton retained an attachment to the universalist values and aspirations of the Enlightenment. Not until 1789 would he have serious cause to question his beliefs in this domain. Instead he tended to compartmentalize his thinking. As an inventor turned businessman he worried that his intellectual property might be ‘kidnapped’¹² just as it was beginning to turn a profit, while in the privacy of his study or in the company of his Lunar friends he sought to explore and roll back the frontiers of knowledge at a higher and altogether more disinterested level. His exchanges with the Savoyard chemist Claude-Louis Berthollet, who had discovered the bleaching potential of chlorine, are significant in this regard. Berthollet loftily disclaimed any intention of taking private advantage of his discovery (‘quand on aime les sciences on a peu besoin de fortune, et il est si facile d’exposer son bonheur en compromettant sa tranquillit , et en se donnant des embarras!’).¹³

¹⁰ On the subject of the P rier brothers, see J. R. Harris, *Industrial espionage and technology transfer: Britain and France in the eighteenth century* (Aldershot, 1998), and M. C. Jacob, *Scientific culture and the making of the industrial West* (Oxford, 1997), pp. 175–7. Baron vom Stein’s visits are not as well documented, but see J. R. Seeley, *Life and times of Stein or Germany and Prussia in the Napoleonic age* (3 vols., Cambridge, 1878), I, pp. 66–9, and G. Ritter, *Stein: eine politische Biographie* (Stuttgart, 1958), pp. 44–5 and n. 16.

¹¹ BCL Matthew Boulton papers 351, J. Watt snr to M. Boulton, Birmingham, 17 Apr. 1786.

¹² See BCL Matthew Boulton papers 255, letter box S3, R. Rasp to M. Boulton, London, 26 Mar. 1787.

¹³ BCL James Watt papers W/11, 1787–90, C.-L. Berthollet to J. Watt snr, Paris, 9 Aug. 1789.

Nevertheless, Watt felt compelled to seek his permission before explaining the process to his father-in-law, the Glasgow cloth bleacher and dyer James Macgregor.

III

It was natural that Boulton, Watt, and their Lunar associates should look to France. For France set both the tone and the pace of the Enlightenment, particularly in matters concerning the theoretical sciences. Moreover, French and French-speaking travellers formed the largest single cohort of overseas visitors to Birmingham. Contacts forged on the shopfloor of the Manufactory and in the elegant drawing room of Soho House served to strengthen and extend the philosophical ‘family’, as well as holding out the prospect of lucrative business contacts. Matthew Boulton (but not James Watt) visited France as a relatively young man. In 1765 he turned up in Paris, his great-coat pockets full of samples and pattern books, and trekked around the merchant houses. While acknowledging the ingenuity of the capital’s craftsmen, he was not otherwise impressed by ‘this grand and paltry Country, a country that abounds wth pompous poverty and is in most particulars quite in the papier machee style’.¹⁴ Throughout his life, indeed, he would maintain a utilitarian attitude towards England’s closest neighbour and principal commercial rival, avoiding both the adulation and the execration of things French that would possess so many of his friends and contemporaries.

Within the Lunar circle, however, enthusiasm for the scientific and social teachings of the Enlightenment mounted steadily to reach a peak of intensity in the 1780s. These were the years of experimentation (Erasmus Darwin sent his eldest son to sojourn in France for the purpose of curing a stammer), the years when rough-cast Midlands manufacturers and entrepreneurs sent their offspring abroad in order to acquire fashionable manners, the years when Watt’s engineering advances came to be acknowledged respectfully by savants across the continent, while Priestley’s phlogiston theory provoked intense debate. A glance at James Watt’s letterbooks tells the story in sufficient detail. They contain press copies of correspondence with Kirwan, Camper, and Cavendish, Berthollet, Black, and Blagden, Monge and Magellan, Landriani, Reveillon, and the Montgolfier brothers, to pick only the better known names. Matthew Boulton’s own, overlapping list of correspondents was scarcely less distinguished. Knowledge, and particularly scientific knowledge, during this final cosmopolitan decade of the *ancien régime* sped around Europe with extraordinary velocity. A letter from Paris to Birmingham might take only four days, enabling natural philosophers to replicate one another’s experiments and to disseminate their results with minimal delay. The craze for ballooning is a case in point. Inaugurated by the Montgolfier brothers of Annonay in the summer of 1783, the report carried by the *Journal de Paris* in December of that

¹⁴ BCL Matthew Boulton papers 279, M. Boulton to Mrs A. Boulton, Paris, 24 Nov. 1765.

year reached Watt just a short time later. It was followed by full design specifications which Boulton obtained through the intermediary of the Swiss inventor Aimé Argand. This latter subsequently witnessed Lunardi's London ascent (16 September 1784) and reported on it in detail. Back in Birmingham the necessary know-how and apparatus were assembled and, on 7 January 1785, Watt announced to his eldest son, 'we have had an inflammable air [hydrogen] balloon launched here on Tuesday last... It was over 28 feet in diameter, carried up one man and went with him to 4 miles beyond Newcastle under Line [Lyme].'¹⁵

This intercourse was greatly strengthened when Boulton and Watt received an official expenses-paid invitation to visit France in a consulting capacity. The government of Louis XVI wanted to know how the 'machine de Marly' which furnished a dwindling supply of drinking water to the palace of Versailles might be refurbished or replaced. It was an oblique acknowledgement of the superior technology of the Watt steam engine and, no doubt, the liberal hospitality bestowed on French visitors to Soho over the previous twenty years. Neither partner found it particularly easy to leave Birmingham, but there were other factors in play. Both the French foreign minister, Vergennes, and the controller general, Calonne, were thought to be amenable to the idea of granting the firm an exclusive 'privilege' or licence to supply and erect engines; Calonne needed technical advice regarding an ironworks at La Charité-sur-Loire in Burgundy where he had an interest; and, in any case, Matthew Boulton wanted to set up his son in France in order to push ahead with the next stage of his education.

In the short term, at least, the trip appears to have been a resounding success, although its significance for our purpose derives more from the looming shadow of the Revolution. Watt and Boulton arrived in Paris in late November 1786 to a flatteringly warm reception comprising men of letters and assorted ministerial *commis* and intermediaries. It was a striking contrast to Boulton's previous visit to the French capital some twenty years earlier. After an excursion into Burgundy escorted nobly by the abbé de Calonne,¹⁶ they returned to Paris and a busy round of official engagements. These included dinners with the controller general himself, with the banker and former minister Jacques Necker, and with William Eden (Lord Auckland) who had been in the throes of negotiating the commercial treaty between Britain and France. Early in the New Year they inspected the 'machine de Marly' and paid a visit to the Delessert banking family in Passy before returning to Dover on 16 January 1787, having paused only to admire the subterranean projection of the Picardy Canal near Saint-Quentin. Even James Watt, who was consistently more pessimistic about business matters than his partner, believed that the trip had gone well. On 7 January he informed his wife that it was just a matter of waiting for their licence to be confirmed. Boulton went further. On his return to

¹⁵ BCL Muirhead iv box 15, J. Watt snr to J. Watt jnr, Birmingham, 7 Jan. 1785.

¹⁶ Younger brother of the finance minister.

Birmingham he dispatched a letter (in French) to the Baron vom Stein claiming that they had secured, ‘depuis peu’,¹⁷ exclusive rights to erect engines in France.

What neither partner appears to have fully grasped was the gravity of the political crisis now developing as they made their way back to the Channel. A crisis that would not only curtail business prospects on the continent for a generation and more, but also reshape fundamentally the Enlightenment model of public discourse. Calonne had gambled his political future on the expectation that a specially convened assembly of notables would approve a package of fiscal reforms which he considered intrinsic to the survival of absolute monarchy in France. At the very least this policy required the unwavering support of the king and the comte de Vergennes, but on 14 February Vergennes finally succumbed to overwork and the assembly quickly slipped loose from the role allotted to it. Uneasily Matthew Boulton urged his son, ‘if you hear of any change in the departments of Government taking place do write to me as early as possible about it’.¹⁸ That was on 19 March 1787; ten days later Calonne was dismissed from office.

By this time both Boulton and Watt’s adolescent sons were established on the continent. Matthew Robinson had come over with his father in the autumn of 1786 and was now set up with a tutor in Versailles, whereas Watt’s eldest son (that is, James junior) had been sent abroad over a year earlier. The boys were of a similar age and there is a suggestion in the sources that Boulton might have wished them to travel in each other’s company.¹⁹ But James Watt junior left for the continent rather suddenly when aged just fifteen, the first of several abrupt departures from the parental home which calls for some explanation. It will be remembered that Watt arrived in Birmingham a widower with two small children (Margaret and James), only to remarry in 1776 and produce two further offspring (Gregory and Jessy) before the decade was out. Ann Macgregor, his new spouse, was a notably intelligent and plain-speaking woman and it is likely that she felt some antagonism towards James junior from the time of the birth of a son of her own blood (i.e. Gregory in 1777). What is not in doubt is that she wasted few opportunities to find fault with James junior during a long decade of intra-family feuding which eased only with the definitive return of her grown-up step-son from abroad in 1794. More than once Watt senior reproached his wife with an accusation of partiality towards the children of her own marriage bed.

However, James Watt senior was far from blameless in this regard. He, too, may have preferred the younger son, although his papers contain no clinching evidence to this effect (both Gregory and Jessy would die of

¹⁷ BCL Matthew Boulton papers 255, letter box S3, M. Boulton to Stein (copy), Birmingham, 3 Mar. 1787. Efforts to secure a special licence for France had started in 1779; see Jacob, *Scientific culture*, pp. 174–7.

¹⁸ BCL Matthew Boulton papers 280, M. Boulton to Bourdon, Soho, 29 Mar. 1787.

¹⁹ BCL Muirhead iv box 1, M. R. Boulton to J. Watt jnr, Stoke, 7 May 1785.

consumption without fulfilling their promise). And he could be a demanding and emotionally unrewarding father, even by the standards of his age. Extreme caution, a keen awareness of trials surmounted during his own early career, and a kind of atavistic loyalty to the values of his Calvinist forebears were the keys to his character. He wanted his eldest son educated for life, or rather for all that life might throw at him. This implied craft skills such as carpentry; a mastery of mathematics and mechanics in case a career in engineering should beckon; minerology and chemistry (for mining); book-keeping and counting-house procedures (for business); languages, geography, and so on. For Watt, as will be apparent, life was synonymous with unremitting labour: he had a horror of frivolity and extravagance, be it emotional or material. While the young Boulton was sent to Versailles (and eventually succeeded in persuading his father to let him move into Paris), Watt despatched James to Geneva with constantly reiterated commands to avoid card-playing, the theatre, musical entertainment, balls, romantic literature, relaxation at the lakeside, and excessive expenditure. Appropriately, if incongruously in view of James's subsequent escape into Revolutionary politics, the seal of Watt senior featured not a crest but a fixed eye and the word *observare*.²⁰

IV

These were the instructions ringing in James junior's ears when he set sail for Calais with two travelling companions towards the end of November 1784. Passing through Paris, he did as he had been bidden and visited P erier's waterworks engine at Chaillot – unconsciously confirming his father's suspicions of espionage in the process. 'I did not then know enough French', he wrote subsequently from Geneva, 'to ask the men many questions, but however I found that they did not know there was such a person in the world as you but ascribed the honour of the invention to Mr Perry [P erier].'²¹ He had arrived in Geneva shortly before Christmas and found Dr Priestley's eldest son Joseph already resident. Initially the tutoring facilities arranged through the brother of the geologist Jean-Andr e de Luc worked smoothly, but James junior soon began to be assailed by letters from home. His father grumbled at the cost of board and lodging in Geneva, the superfluous expense of trips to the Comedy, the quality of his son's handwriting, and the anglicisms contained in his first attempt at drafting a letter in French. Ann Watt, meanwhile, became quite outspoken about her step-son's supposed behaviour, detecting arrogance and even insolence in his day-to-day conduct as well as an inveterate taste for self-adornment. 'I have seen Mr Priestley', she would write pointedly, 'who has returned [from Geneva] no fribale [fribble] nor coxcomb. No long bills to barbers and hairdressers for powder and perfumes was in his charges.'²²

²⁰ BCL Muirhead II box 4, J. Watt snr to Mrs A. Watt, London, 10 June 1793.

²¹ BCL James Watt papers W/8, 1784–7, J. Watt jnr to J. Watt snr, Geneva, 24 Jan. 1785.

²² BCL Muirhead IV box 15, Mrs A. Watt to J. Watt jnr, Birmingham, 15 Mar. 1786.

By the late summer of 1785 Watt seems to have concluded that the Geneva residence had been an expensive waste of time and he arranged for his son to continue his education in Germany. Semi-isolated in the small town of Stadtfeld close to Eisenach in Upper Saxony and with a clergyman for tutor, James's attention to his studies improved markedly. Such was his progress in the German language, that Watt senior felt compelled to request that his son should *not* use it for 'any parts of your letters which require to be well understood by me'.²³ Much progress in mathematics and chemistry was registered, too, and it continued when James junior moved to Freiberg in 1787 for a practical grounding in the mineralogical sciences. The tone of parental letters lightened in proportion to these signs of application. Watt senior even allowed his son to extend the time allotted for study and work experience in Germany. On the other hand, he could never reconcile himself to the spendthrift consumerism of the younger generation: 'you charge two watch chains in the space of a month', he wrote to James shortly after his arrival in Stadtfeld, 'one has lasted me these six years and I do not remember of having had above 3 in my whole life'.²⁴ And peevishly, as James got ready to return home after an absence of nearly three years, he pointed out that his day-to-day expenses while in Freiberg had not fallen far short of those incurred by Matthew Robinson Boulton in the royal city of Versailles.

This may well have been the case; James was still repaying the debts incurred during his travels some ten years later. Moreover, it is true that in the summer of 1787 Watt senior was contemplating an alarming drop in income consequent upon the fall of copper prices and the probable stopping of the Cornish mines. But the collapsing market for copper affected Matthew Boulton no less severely. The difference between the two men lay in the fact that the latter refused to worry about money. With his son agitating for permission to change his place of residence from Versailles to Paris, Boulton enlisted the help of the Delessert family in finding a suitable tutor. 'Expense not too much of a consideration',²⁵ he noted in the draft of a letter to Madame Delessert. On the other hand, he believed no less than his partner that juvenile time should be spent in useful activity. Escorted by his tutor, Matthew Robinson was to attend lectures on chemistry, mineralogy, and natural philosophy for 'I do not send him to Paris to go to operas, balls and places of dissipation, nor to contract habits of indolence, but on the contrary I am desirous he should be incessantly employed in gaining knowledge.'²⁶ In practice it is likely that the adolescent inclinations and abilities of the two boys did not differ significantly, although James junior seems to have used his studies to develop a more rigorous and theoretical cast of mind. According to Mary Anne Galton, Matthew Robinson

²³ BCL Muirhead iv box 15, J. Watt snr to J. Watt jnr, Birmingham, 15 Oct. 1786.

²⁴ Ibid., J. Watt snr to J. Watt jnr, Birmingham, 4 Dec. 1785.

²⁵ BCL Matthew Boulton papers 242 letter box LI, 'Rough sketch of my letter to Madame de Lessert of Paris' (n.d.).

²⁶ Ibid., M. Boulton to Miss Delessert (draft, n.d.).

returned to Birmingham in May 1788 kitted out ‘in the highest adornment of Parisian fashion’.²⁷ After three months of relaxation, his father sent him on his travels again – to Germany where he would in large measure retrace the footsteps of James Watt junior.

While Matthew Robinson was enjoying the warm glow of parental pride after his sojourn in France, James junior was retreating into virtual exile from the family home. He had returned to England late in October 1787 to find both parents away from Birmingham and a distinct chill in the air. Ann Watt seems to have been dreading his homecoming. Writing from Glasgow, she rehearsed all of James’s alleged misdemeanours and defects of character and proposed that he be found work down at the Albion Mill in London as soon as may be. This smacked of trial in absentia and her husband would have none of it. Instead, James junior returned to the family abode at Harpers Hill and was put to the task of preparing a detailed account of income and expenditure for parental scrutiny. Thereafter, the precise sequence of domestic events becomes blurred, although the rift between step-mother and step-son certainly grew wider. Accusations levelled against James of a ‘dogmatical and positive manner of speaking on many subjects and a rather rude way of arguing with those who are older than yourself’²⁸ appear to date from this period and to relate to his step-mother. More seriously, though, Watt senior came to the conclusion that James was not fit for employment in the engine business. Instead, he set about apprenticing him to a firm of Manchester calico manufacturers, dyers, and printers. The clash that triggered the final confrontation is not recorded. All we have is an indirect reference to it carried in a letter written by Matthew Robinson Boulton to his father: ‘Mr Rheinhard [James’s old tutor at Stadtfeld] has lately received a letter from Mr Watt junior, his situation is indeed one of the most unhappy; to be forced to quit the paternal dwelling, to abandon that pure joy resulting from the company of a Father is truly a rigorous fate.’²⁹

By removing his eldest son from Birmingham, James Watt managed to restore a degree of calm to relationships within his family. But the lull was temporary, for a new and unexpected source of disturbance was rapidly approaching. That autumn commemorative celebrations to mark the centenary of the Glorious Revolution took place in towns and cities across the country. This stirring up of political memories encouraged Dissenters to persist with their campaign for the repeal of the Test and Corporation Acts,³⁰ and within a matter of months the dramatic news of political revolution in France

²⁷ See C. C. Hankin, ed., *Life of Mary Anne Schimmelpenninck* (2 vols., London, 1858), 1, p. 149.

²⁸ BCL Muirhead iv box 15, J. Watt snr to J. Watt jnr, Birmingham, 24 Sept. 1788.

²⁹ BCL Matthew Boulton papers 280, M. R. Boulton to M. Boulton, Stadtfeld, 18 Nov. 1788.

³⁰ For the national picture, see G. M. Ditchfield, ‘The parliamentary struggle over the repeal of the Test and Corporation Acts, 1787–1790’, *English Historical Review*, 89 (1974), pp. 551–77. The regional and local context can be found in R. B. Rose, ‘The Priestley riots of 1791’, *Past & Present*, 18 (1960), pp. 71–2, and J. Money, *Experience and identity: Birmingham and the West Midlands, 1760–1800* (Manchester, 1977), pp. 219–22.

caused the political temperature to rise sharply. Matthew Boulton duly attended the commemorative banquet held in Birmingham on 4 November 1788, but neither he, a churchman, nor James Watt senior, who can best be described as a lapsed Presbyterian, showed much interest in reform at the conceptual level. Other members of the Lunar circle would feel differently, of course. Wedgwood, Darwin, Withering, Galton, Priestley, and even James Keir all expressed degrees of support for a reform of the constitution which they unwisely linked both to the cause of Dissent and to that of French-style *liberté*.

One consequence was a serious outbreak of rioting which was unleashed by the reformers' determination to hold a celebration to mark the second anniversary of the taking of the Bastille in July 1791.³¹ Although a number of meeting-houses and Dissenter-owned properties were clearly targeted, the principal object of the rioters was Dr Priestley's dwelling at Sparkbrook on the southern outskirts of the town. It was totally destroyed, together with his library and laboratory. Samuel Galton junior, the Quaker gun manufacturer, likewise had reason to fear the attentions of 'King and Country' supporters, but was able to deflect them by opening his purse, and his cellar. Dr Withering, on the other hand, took steps to defend his property as soon as it became evident that Anglicanism provided no sure antidote to an accusation of philosophy. As a precaution, though, he contrived to move his more valuable books and papers to a place of safety. By contrast Watt and Boulton trusted to their reputation as friends of government. Nevertheless both men made preparations in case of attack, with Boulton anxious above all to preserve his industrial premises from an invasion of fire-raisers. In a letter to Dr Swediaur written in the immediate aftermath of the riots, he described how he had enjoined his workmen not to frequent 'the Court of King Mob'. Yet cannon were deployed to defend the Manufactory, just in case. 'I should have suffered them to have burnt & destroyed my house rather than have fired on them', he confided, 'but I was solemnly determined to have poured destruction on their heads the moment they had attempted my manufacture, the destruction of which would have put 1,000 persons out of employ.'³² Although the riots petered out of their own accord after four or five days, they were a salutary reminder to the reformers of their minority status and they signalled the beginnings of an intellectual reaction against the Midlands *philosophe* community. Dr Priestley left Birmingham never to return. His friends and admirers did what was necessary to make good his material and scientific losses, but it was plain to everyone that the effort to construct an open and non-hierarchical model of Enlightenment discourse had suffered a crushing defeat. 'The Hellish miscreants who committed so many outrages here by banishing Dr Priestley', reported Watt senior to his old friend and mentor Joseph Black, 'have almost

³¹ See Rose, 'Priestley riots', pp. 68–88, and E. Robinson, 'New light on the Priestley riots', *Historical Journal*, 3 (1960), pp. 73–5.

³² BCL Matthew Boulton papers 346, M. Boulton to F. Swediaur, Soho, 21 July 1791.

broke up our Lunar Society, at least when we meet we have more politics than Philosophy.’³³

Watt junior, by contrast, had found a means of combining politics and philosophy. Alienated from the affections of his family, impulsive, headstrong, and opinionated (even in the estimation of his friends), James found in Manchester not a place of exile, but a haven of comradeship, excitement, and emotional release. We do not know precisely how he came to imbibe the admixture of philosophic radicalism and French Jacobinism, but the most likely sources were Thomas Cooper and Thomas Walker. Cooper, a barrister-at-law with manufacturing interests, and Walker, the senior partner in a respected textile merchandising house, had long been dominant figures in Manchester radical politics, and it was most probably they who inducted James into the town’s Literary and Philosophical Society. James was certainly on familiar terms with Cooper by May 1789, and he seems to have brought a much-valued continental reinforcement to the Manchester movement for constitutional reform. In correspondence dating from September 1790, the chemist Berthollet confirms the existence of such a link and refers to James as the secretary of the ‘Society of Manchester’.³⁴ This must be a reference to his prominent role in the Literary and Philosophical Society, since the Constitutional Society – to all intents and purposes Manchester’s Jacobin Club – was not organized until the following month.³⁵ James junior’s membership of this latter body from its inception is not in doubt. As for the Literary and Philosophical Society, he joined forces with Cooper, Thomas Walker, and several other members to urge an official gesture of commiseration with Dr Priestley following his losses in the Birmingham riots. When the Society turned down the proposal, they all resigned.

In choosing Manchester as a place of apprenticeship Watt senior could not have known that he was nurturing a Jacobin vocation in his son, as well as preparing the ground for further family upsets. His own view of the French Revolution was unenthusiastic from the outset, and made more so by the accounts he received from the Calonne brothers and the printed-paper manufacturer Reveillon who numbered among the first refugees to turn up at Soho. Only in moments of severe stress would he give way to the temptation to blame the higher authorities for setbacks encountered; in March 1792, for example, when it looked as though Hornblower’s Bill infringing the Boulton and Watt engine patent would pass through the House of Commons. ‘A little more of this will make me an enemy to corrrt p^{ts}. [practices] and a democate if democracy were less evil’,³⁶ he wrote to his wife. Matthew Boulton, on the other hand, remained cool and businesslike. His son, now returned from

³³ See Robinson, ‘English Jacobin’, p. 351 n. 9.

³⁴ BCL Muirhead iv box 1, C.-L. Berthollet to J. Watt jnr, Paris, 15 Sept. 1790.

³⁵ See P. Handforth, ‘Manchester radical politics, 1789–1794’, *Transactions of the Lancashire and Cheshire Antiquarian Society*, 66 (1956), pp. 87–106.

³⁶ BCL Muirhead ii box 4, J. Watt snr to Mrs A. Watt, London, n.d. (March 1792).

Germany (October 1790) and living at home, confined himself to helping his father exploit the commercial openings presented by the French Revolution. Nevertheless, Boulton senior did what he could to ease the tensions in his partner's household. Unbeknown to Watt, he responded to James's pressing money worries with a loan of £50, but took the opportunity to lecture him on the need to cut his coat according to his cloth.

This was precisely what James junior could *not* do, at least not before 1794; and the event that rekindled parental anger and indignation was his trip to France in the spring of 1792. With his apprenticeship almost expired, James had started to cast around for a source of employment which would be both financially rewarding and politically congenial. At one point he contemplated entering a business partnership with Joseph Priestley junior who was also having trouble settling down, but the idea was scotched by his father and step-mother; at another he hatched a 'scheme'³⁷ involving an ill-defined visit to France in the company of Josiah Wedgwood junior. In the event he took up a position as a commercial traveller in the firm of T. & R. Walker whose partners were his longstanding political associates. Choosing to overlook the ulterior motives that must surely have determined his son's choice, and alert mainly to future career possibilities, Watt senior readily agreed to the arrangement.

V

James Watt junior landed at Calais early in March 1792 accompanied by two companions, Thomas Cooper and John Tuffen. Ostensibly his task was to solicit orders on behalf of his employers whereas the other two men were travelling for pleasure, but, in reality, all three regarded themselves as 'friends of liberty' on a mission of political fraternization. They arrived at a critical moment. The solidarities that had sustained the first generation of French revolutionaries were now crumbling; war was in the offing and the Constitution of 1791 no longer looked safe from its domestic opponents. Having reached Paris, James's first thought was to renew old philosophic acquaintances and to plunge into the political life of the capital. The friends called on Pétion, the mayor, whom Cooper had encountered in London the previous autumn, and presented letters of introduction supplied by Dr Priestley to La Rochefoucauld d'Enville and to Lavoisier. At the latter's house, they met Guyton de Morveau, Fourcroy, Hassenfratz, 'and other first rate chemists'. All save Lavoisier (and La Rochefoucauld) were in the van of the Revolution that spring, and James duly confirmed his father's earlier prognostication, 'not a word of Chemistry was there spoken, they are all mad with politics'.³⁸

James, too, it would seem. On 22 April he wrote home to say that he and Cooper had just presented an address to the Paris Jacobin Club on behalf of the Constitutional Society of Manchester, little suspecting the sensation that the

³⁷ BCL Muirhead iv bundle W, J. Wedgwood jnr to J. Watt jnr, Etruria, 8 Sept. 1791.

³⁸ BCL James Watt papers C1/33, J. Watt jnr to J. Watt snr, Paris, 22 Mar. 1792.

news would cause. In fact the friends had also featured prominently in an international rally, or festival, held in Paris on 15 April. One, it seems, had paraded with a flag, the other with a bust of Algernon Sidney.³⁹ While the address was no doubt the work of Thomas Cooper, its translation, presentation, and distribution in 1,000 printed copies can be attributed to James Watt junior since he was the only member of the party to speak French fluently. In any case, Cooper, and probably Tuffen, returned to England towards the end of May. When James's step-mother came to hear of the letter she was alarmed, but alarm turned to consternation when, on 30 April, Edmund Burke stood up in the House of Commons and denounced the pair of them, plus Thomas Walker for good measure.

Burke's condemnation mixed fact with fiction to produce a sinister interpretation of a commonplace occurrence. Ever since the start of the Revolution delegations had been crossing the Channel bearing messages of goodwill. The French king was still on his throne and if war had been declared between France and Austria and Prussia, Britain was not yet involved. There was no legislation on the statute book to deter intercourse between the two countries. On the other hand, suspicion as to the ultimate objectives of the English radicals was undoubtedly mounting, both within the government and in the country at large. The riots in Birmingham had reverberated widely, and in Burke's mind they served to anchor the connection between chemistry (i.e. 'Dr Phlogiston') and unbridled political enthusiasm. The Watt family had a specific ground for complaint, moreover. Burke's public denunciation did not sufficiently distinguish between father and son (nor, for that matter, did Cooper's *Reply to Mr Burke's invective* penned upon his return from France). As a result the reputation of Watt the inventor was thrown into question. Even his wife experienced a moment of confusion: 'I never was more surprised when I saw something Cooper and James Watt held forth in the house of Commons as regards... had I not know[n] you were in London I certainly would have thought it was you.'⁴⁰ Potentially more damaging still was the threat to the business partnership as Boulton and Watt's suit against Hornblower approached a climax. Watt senior wrote urgently to his son to point out that his activities were supplying ammunition to the firm's parliamentary enemies. James junior appears to have taken little notice of these strictures and warnings, however. During a business excursion in June to Rouen and Amiens, he seems to have spoken in public again, possibly at a session of the Rouen Jacobin Club. A bout of scarlatina curtailed both public and private activity throughout July, but on 14 August 1792 he co-signed an address which a group of Englishmen presented to the legislative assembly. A garbled version of this event came to

³⁹ The best account of these rather confused events is to be found in D. V. Erdman, *Commerce des lumières: John Oswald and the British in Paris, 1790–1793* (Columbia, 1986), pp. 150–5. See also F.-A. Aulard, ed., *La Société des Jacobins: recueil des documents pour l'histoire du club des Jacobins de Paris* (6 vols., Paris, 1889–97), III, pp. 499, 621, 653–5.

⁴⁰ BCL Muirhead II box 9, Mrs A. Watt to J. Watt snr, Heathfield, 6 May 1792.

the attention of Ann Watt while she was visiting her family in Glasgow. 'I saw in a newspaper since I came here [she wrote to her husband], that a Mr Watt had appeared in the National [*sic*] assembly to congratulate them on having deposed the King and had offered them money to purchase a sword to assassinate kings.'⁴¹

The story about the sword was pure fabrication. However, there can be no doubt that James junior had utterly committed himself to the cause. Tom Wedgwood who shared lodgings with him in the summer of 1792 reported to his father that his companion was 'a furious democrat',⁴² a judgement the young William Wordsworth would endorse, albeit many years later.⁴³ But which was James's cause exactly? Like so many foreign enthusiasts he arrived in France with only the haziest awareness of the specifics of party politics. The Revolution was the Enlightenment on the march *voilà tout*. Except, of course, that no one inside France still believed in this fiction by the spring of 1792. The king's attempt at flight in June 1791 and the struggle to fix the constitution had damaged irretrievably any hope of a painless 'rebirth'. James therefore embarked upon a rapid learning curve; and the evidence of his friendships, of his debut in the Paris Jacobins, and of his enthusiasm for a continental war of liberation suggests that he attached himself to the Brissotins. After all, the vast majority of deputies, Parisian clubbists, and newspaper proprietors found some merit in a policy of war that spring, whatever their ulterior motivations and calculations might have been.

James moved among savants whose leisurely investigations on the frontiers of natural philosophy were now becoming a vital national asset (Guyton de Morveau, Berthollet, Monge, Fourcroy, Hassenfratz, etc.), he dined with future patriot ministers such as Roland, and he doubtless acquired inside knowledge as to the likely direction of political events. 'Watt says that a new Revolution must inevitably take place, and that it will in all probability be fatal to the King, Fayette, and some hundred others',⁴⁴ reported Tom Wedgwood on 7 July 1792. In a revealing sign of a shifting sense of identity, James confided that he planned to join the French army 'in case of any civil rupture'.⁴⁵ That rupture took place on 10 August when militants in the Paris Sections coordinated an uprising which resulted in the physical overthrow of the monarch and the de facto establishment of a republic in France. During the days and weeks that followed a potent new source of political authority emerged in the capital. It browbeat the expiring legislative assembly into passing a series of radical ecclesiastical, social, and agrarian measures, and took energetic steps to organize the defences of the country against an impending invasion by the Prussian army. By early September that invasion had become a reality, and in a frenzy of fear and fury crowds swarmed into the prisons of Paris and several provincial towns in order to put supposed counter-

⁴¹ Ibid., Mrs A. Watt to J. Watt snr, Glasgow, 2 Sept. 1792.

⁴² See Erdman, *Commerce des lumières*, p. 162.

⁴³ Ibid., p. 150.

⁴⁴ Ibid., p. 162.

⁴⁵ Ibid.

revolutionaries to the sword. The new rulers of France did little to prevent these massacres from taking place, and afterwards condoned them as deeds that were justified by the circumstances.

The events of the summer of 1792 were a test of James Watt junior's new found party allegiance, and one which he seems to have passed without undue qualms. After all, the successful insurrection against the king restored his political acquaintances to ministerial office. La Rochefoucauld had fallen victim, he reported (inaccurately) to his father on 15 August, but 'your friend Mr Monge is Minister of the Marine. Mr Berthollet dined with me yesterday, he & all the Patriots are in extasy at the flattering prospects which affairs now bear'.⁴⁶ A soothing assurance that he was keeping clear of public politics followed a few days later. However, the accompanying admission that 'had the other [i.e. Court] party prevailed, I probably should have been in the list of the proscribed'⁴⁷ would have done nothing to ease parental anxieties. The reassurance was disingenuous in any case, for we know that James was actively involved in raising money to help support the widows and orphans of the men killed during the assault on the Tuileries Palace on 10 August.⁴⁸ As for the so-called September Massacres, he grimly justified them, employing the standard Jacobin rhetoric to which Roland no less than Danton and Robespierre subscribed at this juncture.

Nevertheless there is some evidence that James's enthusiasms were becoming more focused in the weeks following the Massacres. No doubt this was in response to the escalating factionalism of Paris-based politics during the early autumn of 1792. Like most English 'friends of liberty' landing in France, he had begun by worshipping at all the shrines more or less indiscriminately. Among early items of expenditure we find listed engravings of Mirabeau, Guadet, Peythion (Pétion), and Robertspierre (Robespierre), not to mention an array of Revolutionary brochures and weighty volumes by Enlightenment authors.⁴⁹ Tom Paine, who arrived in Paris in late September, just as James was preparing to leave, went through a similar process of psychological adjustment. Expecting to find in the Revolution a mechanical articulation of the supposedly universal values of the Enlightenment, he encountered instead a deteriorating atmosphere of division and recrimination that held even the sternest supporters of the Revolution in its grip. Watt junior responded by tying his colours ever more firmly to the Rolandist or Brissotin wing of the Jacobins. As accusations of responsibility for the Massacres began to fly and electoral activity replaced the normal business of the Society, he seems increasingly to have adopted a posture of hostility towards extra-parliamentary radicalism of the type sponsored by the Cordeliers Club, and which had now brought Danton,

⁴⁶ BCL James Watt papers W/6, J. Watt jnr to J. Watt snr, Paris, 15 Aug. 1792.

⁴⁷ Ibid., J. Watt jnr to J. Watt snr, Paris, 23 Aug. 1792.

⁴⁸ See Erdman, *Commerce des lumières*, pp. 163–4; also BCL Muirhead iv bundle W, T. & R. Walker to J. Watt jnr, Manchester, 10 Oct. 1792.

⁴⁹ BCL Muirhead i box 6, 'Account book of James Watt jnr. concerning travels to Paris, Italy, Sicily, Switzerland, Germany, 1792–1793'.

Desmoulins, and their comrades to the threshold of legislative power. ‘We perfectly agree with you in your abhorrence of the principles of Danton and Co’⁵⁰ wrote Thomas and Richard Walker on 10 October. Although the letter that elicited this comment has not survived, it seems most likely that James had reported critically on the uniquely radical complexion of the recently elected Paris delegation to the national convention.

In the second week of October, James junior left Paris in order to resume his activities as travelling salesman and debt collector for the Walker brothers. He visited merchant houses in Nantes, Bordeaux, and Marseille before taking ship for Leghorn and thence to Naples late in November. Despite suggestions that have been made to the contrary, there is little evidence to indicate anything other than commercial considerations prompted his departure from Paris and, subsequently, France.⁵¹ Direct contact with the Revolution and its actors ended consequently in the autumn of 1792. Thereafter James had to be content to watch events from afar, which was perhaps fortunate if our surmise that his political trajectory might otherwise have followed that of Tom Paine is correct.⁵² Watt senior was certainly relieved to hear that his son had quit Paris, and it is his correspondence which provides the main source of information on James’s state of mind over the next twelve months or so. During this period he clung to beliefs, ideas, and loyalties that the onward march of events, both inside and outside France, made ever less tenable. The result was a bitter family rift, a crisis of identity reflected in a renewed determination to join the French army, a near mental breakdown following the news of the arrest and subsequent execution of the Brissotins, a reconciliation with his father, and, finally, a political compromise that allowed James to return to Birmingham in relative safety.

VI

Viewed from England, the march of events within France had ceased to be a matter for mere disagreement by the autumn of 1792. The deposition of Louis XVI caused the government to withdraw its ambassador, but the reports of lynch mobs roaming the prisons of Paris (the September Massacres) provoked a far sharper reflex of indignation. English, Scots, and Irish supporters of

⁵⁰ BCL Muirhead iv bundle W, T. & R. Walker to J. Watt jnr, 10 Oct. 1792.

⁵¹ See J. P. Muirhead, *The life of James Watt, with selections from his correspondence* (London, 1858), pp. 491–3; L. Stephen and S. Lee, eds., *Dictionary of national biography* (21 vols., London, 1908–9), xx, p. 973; Crowther, *Scientists of the industrial revolution*, p. 151; J. O. Baylen and N. J. Gossman, eds., *Biographical dictionary of modern British radicals* (2 vols., Harvester Press, 1979), 1, p. 96. Later, it is true, James junior would refer to ‘My old enemy the sanguinary Robespierre’, but contemporary correspondence contains no hint that he had become an object of political malice. See BCL James Watt papers, private letter book 7, J. Watt jnr to S. Delessert, Soho, 10 Sept. 1794.

⁵² Having fled England in the autumn of 1792, Paine was offered French citizenship instead, and was elected to the national convention. Unable to communicate in the language of his adoptive country, he mistook the dynamics of party politics and became identified with the Brissotins. In December 1793 he was imprisoned and seems only to have escaped the guillotine by chance. See J. Keane, *Tom Paine: a political life* (London, 1995), pp. 343–414.

French-style *liberté* were thrown into confusion. However, it was the rapid advance of French armies into the Low Countries that completed their discomfiture, inasmuch as it brought Britain and Holland into the Austro-Prussian coalition against Revolutionary France on 1 February 1793. Willy nilly, therefore, James Watt junior found himself caught in the spokes of two revolutions, one actual and one imagined. Watt senior, it is true, had issued a warning to his son about the turn of the home political tide as early as May: ‘the eyes of our Ministry are upon you, and without you act cautiously, you may be found to have transgressed some of the laws of this country’.⁵³ But caution was not James’s strongest suit as we know, and the letters exchanged between father and son across the spring and summer months of 1792 read more like a dialogue of the deaf. Watt senior was prepared to acknowledge the force of the argument for parliamentary reform but not if it risked ‘unhinging the constitution’,⁵⁴ that is to say unleashing a mass agitation. James, in contrast, preferred to conduct his thinking about the polity at the ‘visionary’⁵⁵ level and remained unmoved at the prospect of popular involvement in politics, whether in France or England.

As a result relations plummeted to reach a point of hostile incomprehension by November. Taxed with the canard about the sword, James belligerently retorted, ‘not that I consider the assassination of a king as any crime when such an action may save the lives of millions of my fellow creatures’.⁵⁶ Remarks such as these exasperated Watt senior beyond all measure. On 6 November he informed Abraham Guyot, a long-time friend, that further argument with James was pointless: ‘if he continues in an error prejudicial to the interests of his country and makes himself obnoxious to government I look upon him as an alien to my blood, and let him try to find a father among his democratic friends’.⁵⁷ As the loyalist response to the perceived threat of domestic revolution gathered momentum, options and avenues were closing in all directions. Later that month Watt senior wrote to the attorney general, with the assent of Matthew Boulton, to report on the proselytizing activities of ‘apostles of Paine’⁵⁸ in and around their Manufactory. In March 1793, after a lengthy silence, he ominously informed James that legislation was being prepared (the Traitorous Correspondence Act) which would make it ‘treasonable to supply the French with arms, ammunition, cloathing, corn etc., or to hold any communication with them on the political affairs of this country’.⁵⁹

⁵³ BCL James Watt papers, private letter book 2, J. Watt snr to J. Watt jnr, Heathfield, 27 May 1792.

⁵⁴ Ibid.

⁵⁵ BCL James Watt papers W/6, J. Watt jnr to J. Watt snr, Paris, 19 May 1792.

⁵⁶ Ibid., J. Watt jnr to J. Watt snr, Nantes, 17 Oct. 1792.

⁵⁷ BCL James Watt papers, private letter book 2, J. Watt snr to A. Guyot, Birmingham, 6 Nov. 1792.

⁵⁸ Ibid., J. Watt snr to Sir A. MacDonald, Birmingham, 29 Nov. and 4 Dec. 1792. The ‘apostles’ in question were emissaries dispatched by the Sheffield societies; see Money, *Experience and identity*, pp. 226, 231, 236.

⁵⁹ BCL Muirhead iv box 15, J. Watt snr to J. Watt jnr, Heathfield, 18 Mar. 1793.

At last James began to reflect on the precariousness of his situation. With war officially declared, his value as a salesman to the house of Walker was likely to dwindle rapidly. He could yet return to England (provided that he did not stray into French-controlled territory). But this course of action would certainly have been humiliating and quite possibly politically embarrassing to boot. Or else he could swallow hard, ignore the mounting evidence of party strife and throw in his lot with Revolutionary France – perhaps by joining the army as had his Paris companions John Oswald and William Maxwell.⁶⁰ However, even James's closest political comrades (Cooper, Tuffen, Joseph Priestley junior) counselled against such a precipitate step: 'as to joining the French army and finishing your life gloriously as you would soon do, it is an idea quite worthy of you, and from your saying life is perfectly indifferent to you I shall expect to hear of your having blown your brains out in a gloomy fit',⁶¹ wrote Priestley junior on 14 April 1793. Yet he went on to point out that even the army provided scant refuge from the disturbing sectarianism of Revolutionary politics (Dumouriez, the popular Brissotin commander, had just defected to the Austrians) and, in any case, James was far too hot-headed to make a satisfactory officer of the line.

Young Priestley's comments give some hint of the turmoil in James junior's mind as he battled with his father to defend a Revolution that had started to consume its own, while apparently oblivious of the gathering pace of conservative reaction to the Enlightenment at home. It scarcely helped matters that Cooper, Thomas Walker, and even Dr Priestley himself were now echoing Watt senior's earlier warnings of the manifest dangers of mass politicization. Indeed, they were talking the language of emigration to America. Unlike James who was travelling northwards, safely albeit aimlessly, via Rome, Turin, Zurich, Frankfurt, and Amsterdam, they had felt the hot breath of the rabble at very close quarters. Notwithstanding a mounting level of doubt, James clung doggedly to his beliefs throughout the spring and summer of 1793. 'I wish I knew how to take off your prejudices against your native country', complained his father in July, 'but I despair, you have imbibed notions of liberty that in my opinion are utterly incompatible with the happiness of mankind.'⁶² In fact, a partial resolution of the crisis was beckoning and it arose from several quarters.

Early that autumn James Watt junior was forced to confront a reality that many other would-be reformers had already come around to acknowledging. Jacobinism had produced a monster in the shape of dictatorship and blood-soaked terror in France combined with paranoid nationalism abroad. His erstwhile comrades-in-arms – the Brissotins – had been expelled from the legislature, hunted down and were now awaiting execution in the prisons of the

⁶⁰ See Erdman, *Commerce des lumières*, pp. 225–6, 242, 270, 275–7.

⁶¹ BCL Muirhead iv bundle P, J. Priestley jnr to J. Watt jnr, 14 Apr. 1793; Muirhead iv box 1, T. Cooper to J. Watt Jnr, Manchester, 10 Apr. 1793.

⁶² BCL James Watt papers, private letter book 2, J. Watt snr to J. Watt jnr, Heathfield, 17 July 1793.

Revolutionary Tribunal on trumped up charges of conspiracy against the ‘one and indivisible’ Republic. A second factor that began to weigh in James’s mind was the peril of his situation vis-à-vis the British government. His father had long since alerted him to the risks involved in provoking the authorities, but now his warnings were urgently seconded by James’s closest political associates. Moves to indict Thomas Walker had been started in June (he would be put on trial in April 1794), John Frost of the London Society for Constitutional Information had been thrown into prison, the Scots reformers Muir and Palmer had been savagely sentenced to transportation, and government law officers were preparing to deal sternly with the general convention should it succeed in re-convening in Edinburgh.⁶³ From all directions James was advised to remain abroad for the time being. In the climate of repression then developing, anyone with ‘hands on’ experience of the French Revolution might fall victim to a prosecution for seditious libel, or even high treason.

French Jacobinism had lost its appeal; English Jacobinism was becoming a difficult, even dangerous, career to pursue. In these conditions of mental turmoil and anguish, Watt senior threw his twenty-four-year-old son an olive branch. ‘Do not suffer yourself to give way to a fruitless despondance, nor in the flames of your age cease to encourage hope’, he wrote on 9 October 1793; ‘you ought to combat your own passions and consider coolly whether many of your opinions are not founded on prejudice and false report’.⁶⁴ On the reverse of the letter James jotted the annotation ‘friendly advice’, and, indeed, the letter seems to have marked a turning-point in father–son relations. Within a few days it was followed by another in which Watt senior even supplied a line of credit in order to ease the financial costs of a more protracted stay abroad. There can be no doubt that James recognized and accepted these tokens of goodwill. He signalled as much in his correspondence with his employers, the Walkers. ‘My father’s last letters have given me great pleasure’, he reported on 5 November, ‘as they breathe a warmth of affection I never before experienced from him and prove to me that with time and moderation on my side we shall live in that harmony I so much desire.’⁶⁵ He responded in kind, moreover, offering to return to Birmingham under ‘a feigned name’⁶⁶ in order to be with his anguished parents as half-sister Jessy’s consumptive illness entered its concluding phase.

We cannot know the details of the political compromise reached between father and son. James, it seems, retreated from the exposed position of denial of any connection between the reform movement and the stirring up of popular passions, and for the rest they seem to have agreed to disagree. In a somewhat later letter to his brother-in-law, Watt senior characterized his son as

⁶³ See A. Goodwin, *The Friends of Liberty: the English democratic movement in the age of the French Revolution* (London, 1979), pp. 274–306.

⁶⁴ BCL Muirhead iv box 15, J. Watt snr to J. Watt jnr, Birmingham, 9 Oct. 1793.

⁶⁵ BCL Muirhead i 7/1, J. Watt jnr to T. & R. Walker, private, Frankfurt, 5 Nov. 1793.

⁶⁶ BCL James Watt papers W/6, J. Watt jnr to J. Watt snr, Frankfurt, 5 Nov. 1793.

substantially cured of Jacobinism, but still a republican.⁶⁷ James appears to concede as much on 1 December in a reference to the fate of the Brissotins: ‘my friends in France, the friends of rational liberty have most of them passed the fatal guillotine and the reigning party were always objects of my hatred as well as Mr Cooper’s’.⁶⁸ More difficult to explain, perhaps, is Watt senior’s change of heart. Was he alarmed at his son’s deep-seated melancholia, or maybe afraid that he would abandon kith and kin entirely and follow Cooper and the Priestleys into exile in America? Alternatively – and this is largely speculation – it is possible that Matthew Boulton senior intervened to encourage a *rapprochement*. Both partners were in a mood to retire, and they may have been looking for ways of settling the business on the next generation.

At any event soundings were taken as to how James junior might be brought back to England, with discretion and in safety. Here, too, it is possible – even probable – that Matthew Boulton played an important role. He had excellent contacts in government and an impeccable local reputation. Indeed, he would shortly accept appointment as high sheriff of Staffordshire. Such was the delicacy of the operation that it is not possible to say with certainty exactly how or when James returned. Most likely he took passage on board a ship from Rotterdam, arriving in London early in February 1794. There he was greeted by his father (in marked contrast to his return from the continent in 1787), and by John Tuffen. He stayed with Tuffen in the capital for some days, no doubt seeking legal advice, for he informed the Walkers by letter that it would be too risky for him to venture to Manchester. Eventually, early in March, he travelled quietly and without luggage back to Birmingham where Matthew Boulton provided lodgings. James’s return caught nearly everyone unawares; only the family and an inner circle of political confidants knew what was going on. When Josiah Wedgwood junior received a missive marked ‘Soho’ he was mightily surprised, thinking that James was still biding his time in Italy.

The reconciliation and subsequent return to Birmingham after nearly five years of physical and emotional separation improved James’s material prospects, of that there can be no doubt. Oblique remarks in Tuffen’s letters suggest that a transfer of the copying machine and engine businesses may even have been part of the deal. Certainly a new engine-building company came into being before the year was out, in which Boulton, Watt, and all of their sons (i.e. Matthew Robinson, James junior, and Gregory) were associated as partners. But James’s political ghosts could not be laid to rest quite so easily, and nor could the differences of opinion with his father and step-mother. When Thomas Walker triumphed over his accusers at the Lancaster assizes in April 1794, the jubilation of the reformers threatened once more to compromise the tranquillity of the Watt household. Cooper, who had returned from America in order to attend the trial, made ready to pay a visit to his old comrade-in-arms.

⁶⁷ BCL James Watt papers, private letter book 2, J. Watt snr to G. Hamilton, Birmingham, 16 Mar 1794.

⁶⁸ See Robinson, ‘English Jacobin’, p. 354.

‘I hope for your sake that his being at Birmingham will not be known’,⁶⁹ commented Tuffen. With fresh treason trials in the making throughout May and June, and the Habeas Corpus Act in abeyance, there were further alarms to torment Watt senior and to test the newly minted discretion of his eldest son. As for Ann Watt, she put a brave face on her errant step-son’s return stipulating only that he should not presume to reside in the family home.⁷⁰

When James Watt senior informed William Roebuck, one of the offspring of his original engine backer, that the French had ‘murdered’⁷¹ philosophy, he probably intended the comment to be taken rhetorically. But the remark had a literal poignancy. For in May 1794 Lavoisier, the greatest of the French theoretical chemists, had mounted the steps of the scaffold – a victim of his privileged *ancien régime* status as a tax farmer. However, most of the men of letters whom Watt, Boulton, and their sons chose to count among their intellectual brethren managed to do rather well out of the Revolution. Monge, Fourcroy, and Guyton de Morveau were elected to high offices of state, while Berthollet, Hassenfratz, Prony, and young James’s former travelling companion, Faujas de Saint-Fond, all proceeded to occupy senior positions in teaching institutions founded, or re-founded, by the Directory government. The philosophic ‘family’ had grown up so to speak. It had also grown old and defensive, for the universalist precepts of the pre-1789 Enlightenment could offer no ready explanation of the visceral antagonisms that were now dividing European states and their peoples. In an age dominated by Burke’s *Reflections* (1790) and his *Letter to a noble lord* (1796), would-be reformers and innovators had to choose their ground with care. The cultural climate that had allowed informal and socially dilute bodies like the Lunar Society to flourish had disintegrated and would not be reconstituted for a generation and more. The emigration to America of Dr Priestley, together with many hundreds of less-well-known ‘friends of liberty’ acknowledged as much.

A period of twenty-two years of nearly continuous continental and maritime warfare after 1792 would also gravely weaken the free trade in knowledge which the *philosophes* had taken for granted. While the informal networks of influence and patronage that characterized the English Enlightenment eroded under the pressures of political reaction, the French Enlightenment became ever more institutionalized and distant from the lay model of scientific endeavour that Priestley had pioneered. Thus ballooning, which in the 1780s had featured as little more than a game for intellectuals, came to be viewed as a secret of state. By 1794, both Fourcroy and Guyton de Morveau had moved on from their earlier enthusiasms for pneumatic chemistry and were heavily engaged in research work aimed at adapting static balloons to military uses.

⁶⁹ BCL Muirhead iv bundle T, J. Tuffen to J. Watt jnr, London, 12 Apr. 1794.

⁷⁰ Three months after his return to Birmingham, James told Joseph Priestley jnr that he was still lodging with Boulton, it being ‘an article of my agreement with my father that I should not live in his house. I need not tell you why!’, see BCL James Watt papers, private letter book 7, J. Watt jnr to J. Priestley jnr, Soho, 1 July 1794.

⁷¹ See n. 2 above.

In the manufacturing towns of England pressures of a more commercial nature were tending to produce a similar effect. Old Matthew Boulton contrived to show visitors around his establishments until well into his seventies, but his son and the Watt brothers showed small regard for this ‘benevolent’ approach to the circulation of scientific knowledge. In 1802, the protective engine patent having expired, they arranged for the London and county newspapers to carry the following notice:

Soho Manufactory: The Public are requested to observe that this Manufactory cannot be Shewn in consequence of any Application or Recommendation whatever. Motives, both of a public and private Nature have induced the Proprietors to adopt this Measure and they hope their Friends will spare them the painful Task of a Refusal.⁷²

A new generation was in charge; one which no longer shared the reflexes of those who came to maturity in the high decades of the Enlightenment. Although Matthew Robinson and James junior appear to have attended the infrequent meetings of the Lunar Society held in the later 1790s, they rarely referred to its existence in their personal correspondence, or, indeed, to the great public communicators of their parents’ generation (Priestley, Darwin, Withering, etc.).⁷³ With Boulton senior virtually bed-bound, the society seems to have ceased to function in the early years of the new century in any case.

As for the French Revolution, it confounded both generations, inasmuch as the grand narrative failed to conform to the script rehearsed by educated men and women all over Europe. In her autobiography, Mary Anne Schimmelpenninck (née Galton) recalled how on a fine summer’s evening towards the end of July 1789, Harry Priestley burst into her parents’ house at Barr shouting ‘Hurrah! Liberty, Reason, brotherly love for ever!... France is free, the Bastille is taken.’⁷⁴ Two years later that young man’s father, Dr Joseph Priestley, was still insisting that the combined effects of the American and the French Revolutions had shifted the world ‘from darkness to light, from superstition to sound knowledge, and from a most debasing servitude to a state of the most exalted freedom’.⁷⁵ Old Watt was much less sanguine, as we know, while Boulton kept his thoughts to himself. Instead, he employed his new mint machinery to supply the Revolutionaries with medals bearing the effigies of their heroes.

However, it was James Watt junior’s encounter with the French Revolution that was the most painful and disillusioning. He witnessed the retreat from

⁷² BCL Matthew Boulton papers 342, Soho Manufactory. The notice is also reproduced in Dickinson, *Matthew Boulton*, p. 74.

⁷³ Gregory Watt, James’s half-brother and a young man of considerable scientific promise, seems to have made his debut in the Society in 1799 or thereabouts, but by that date the founding generation was sorely depleted. R. L. Edgeworth, J. Priestley snr, and E. Darwin had left the district and would pass permanently from the scene in the early years of the new century. T. Day died in 1789, J. Wedgwood snr in 1795, and W. Withering snr in 1799.

⁷⁴ Hankin, ed., *Life of Mary Anne Schimmelpenninck*, 1, pp. 216–17.

⁷⁵ See J. Priestley, *Letters to the Right Honourable Edmund Burke, occasioned by his reflections on the Revolution in France etc.* (Birmingham, 1791), letter XIII [sic], p. 141.

‘brotherly love’ at close quarters, and the darkness which overwhelmed the Brissotins at the height of the Terror was also a personal darkness from which he could count himself fortunate to have emerged. As the conservative reaction of the 1790s gathered strength, he did his best to clear politics from his mind. Living a solitary, bachelor existence with just a cat, a dog, and a Sicilian manservant for domestic company, he poured every ounce of his energy into the family business. ‘After all my rambles’, he informed a Dutch business associate, ‘I probably shall never quit this country any more, particularly as I find all my friends, Dr Priestley excepted, determined to remain here. Indeed, bad as this country may be, it is the best I know.’⁷⁶

⁷⁶ BCL James Watt papers, private letter book 7, J. Watt jnr to L. D. Huichelbos van Liender, Soho, 5 Apr. 1794.