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Principle, practice and persona in Isambard Kingdom Brunel's patent abolitionism

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Abstract. The nineteenth-century engineering hero Isambard Kingdom Brunel was a prominent patent abolitionist in debates about the patent system in Britain. His opposition is usually regarded as principled, that is, based in liberal laissez-faire opposition to monopolies and to the constraints of bureaucracy. Against this it is argued that Brunel's views on patents evolved. As late as 1840, despite lessons about patents from the bad experiences of his father, Brunel could still consider taking out a patent himself, something that a decade later he denied he had ever contemplated. Brunel's engineering persona, his experiences and conduct of engineering practice were the base from which he eventually formulated principled opposition to the patent system. The paper examines his responses to importunate inventors who pestered him with inventions in the 1840s and elucidates how he dealt with the patented inventions of others that he wanted to use in his projects. It is suggested that for Brunel patent abolitionism was in effect a way of doing business before it became a political cause. The case suggests the value of approaching the history of patents and, by implication, of intellectual property more generally, through detailed examination of practices.

I have never taken out a Patent myself, *or ever thought of doing so* and I have gradually become convinced that the whole system of Patents … is one productive of immense evil.

I. K. Brunel, 1851.[1]

… I want to know if I could patent the application of such a fan … and I shall feel obliged if you will advise me professionally upon the point … I have reasons quite apart from any idea of pecuniary advantage or monopoly … which makes me very desirous of securing a patent for this part of my engine.

I. K. Brunel to John Farey, 21 January 1841.[2]

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1 'Memorandum for Evidence before the Select Committee on the Patent Laws [1851]', Letterbook 8, 164–73, Brunel Collection, Special Collections, Bristol University Library (hereafter Brunel Collection). This text is printed, more or less faithfully, in I. Brunel, *The Life of Isambard Kingdom Brunel, Civil Engineer*, London, 1870, 490–6. My italics.

2 I. K. Brunel to John Farey, 21 January 1841, Brunel Collection, Letterbook 2A, 44–5. Farey (1791–1851) was a well-known consulting engineer and is not to be confused with his father, of the same name (1766–1826). From the later 1820s much of Farey's work was as a consultant and it was in that capacity, presumably, that Brunel approached him. See A. P. Woolrich, 'Farey, John (1791–1851)', *Oxford Dictionary*

Isambard Kingdom Brunel (1806–59) is one of the great heroes of nineteenth-century engineering.[3] More than that, he is one of the most popular heroes of all time, at least in the United Kingdom, if consultation with television audiences to find the 'Greatest Briton' is taken seriously. Those moved to vote in that contest placed Brunel second in the all-time list, behind Winston Churchill and before Princess Diana.[4] The basis of Brunel's fame lies, of course, in his innovative engineering exploits, in the railways and massive steamships that he built and his civil engineering projects, especially bridges, tunnels and viaducts. In the hyperbole of one of the books about Brunel published in the bicentenary year of his birth, he was 'the man who built the world'.[5] The Thames Tunnel (on which he helped his father), the Clifton suspension bridge (though only finished after his death), the Great Western Railway and the innovative and progressively monumental ships the *Great Western*, *Great Britain*, and *Great Eastern*, are some of the engineering ventures that spring to mind on the mention of his name. I am not concerned in this paper further to examine or document Brunel's engineering exploits but rather to explore his views about the processes of invention and innovation that underlay them and in particular the background to his public advocacy of abolition of the patent system.

In the early nineteenth century there was mounting pressure for reform of the patent system. That system was based on legislation over two hundred years old and, from the perspective of the reformers who sought to improve it, was unnecessarily expensive and administratively cumbersome. The reformers felt that for these reasons there was less than optimal encouragement of invention. A Select Committee of the House of Lords was appointed in 1851 and took evidence from numerous witnesses, including Brunel. The Patent Law Amendment Act of 1852 introduced reforms welcomed by the pro-patent constituencies, but in some respects it left the basic process unchanged. Unlike the procedures used, for example, in the United States, the British system did not employ patent examiners to determine in advance of the grant whether a patent was novel or whether it was fully specified so as to enable someone skilled in the relevant art to realize it in practice. Rather the system remained one based on registration of a patent. The specification that the patentee provided was only ever tested for its sufficiency if the patent was challenged through litigation.[6]

of National Biography, Oxford, 2004, available at http://www.oxforddnb.com/ (hereafter *ODNB*); accessed 28 July 2006.

3 See C. MacLeod, 'The nineteenth-century engineer as cultural hero', in *Brunel: In Love with the Impossible: A Celebration of the Life, Work and Legacy of Isambard Kingdom Brunel* (ed. A. Kelly and M. Kelly), Bristol, 2006, 60–83.

4 See report from BBC News at http://news.bbc.co.uk/1/hi/entertainment/tv_and_radio/2509465.stm. The efforts of students of Brunel University, the then approaching bicentenary of Brunel's birth and, perhaps more surprisingly, the advocacy of Jeremy Clarkson reputedly contributed to the result.

5 S. Brindle, *Brunel: The Man who Built the World*, London, 2006. See also the review of Brindle by F. A. J. L. James, 'Partners of genius deserve a little glory', *The Times Higher Education Supplement*, 30 June 2006, 28.

6 On the history and operation of the patent system and debate about it before and during this period see C. MacLeod, *Inventing the Industrial Revolution: The English Patent System, 1660–1800*, Cambridge, 1988; H. I. Dutton, *The Patent System and Inventive Activity during the Industrial Revolution*, Manchester, 1984; M. Coulter, *Property in Ideas: The Patent Question in Mid-Victorian Britain*, Kirksville, 1991. See also the

That Brunel was not among the reformers but was rather a patent abolitionist, though well known to scholars, may at first seem strange. We all 'know' that patents are supposed to help and reward inventors by giving them a period of limited monopoly during which they are free to exploit their inventions; this providing that they fully specify the invention so that after the expiry of the set period it can readily revert to public use and benefit. Why then did Brunel seem intent upon biting the hand that was at least intended to feed him?

The first point to make is that Brunel was not, and is not, alone in his abolitionism. A significant and often distinguished minority of engineers and other figures in Victorian Britain also advocated the abolition of the patent system.[7] In other times and places patent systems have been abolished (such as in the Netherlands in 1869) or severely attacked. In Britain and the USA from the 1930s to the 1950s patents came under fire from New Dealers in the Roosevelt administration and from neoliberals of various stripes including, interestingly, some of the founders of the field of science studies such as Robert Merton, Karl Popper and Michael Polanyi.[8] In more recent times patents have attracted the ire of diverse groups including right-wing economists, cyberlibertarians and 'open-source' enthusiasts, those seeking to preserve a 'genomic commons' and the defenders of indigenous peoples and products from international bio-prospecting and cultural piracy.[9] Thus, taking a wide perspective, Brunel might be seen as part of a movement for the abolition of patents which has periodically mounted principled opposition to the creation and exercise of monopolies (whether in general, or over particular sorts of invention) and their presumed consequences. However, denominating such a movement creates very strange bedfellows, and one must beware of mistaking concerns situated in particular experiences and contexts for timeless principles. Much of this paper will be concerned with the relationship between principle and experience in Brunel's case.

A second preliminary point concerns the apparent irony in Brunel's patent abolitionism. As Christine MacLeod has argued,[10] there was a direct relationship between

treatment of the history of economic ideas about, and the philosophy of, the patent system in M. Fisher, 'Classical economics and philosophy of the patent system', *Intellectual Property Quarterly* (2005) **9**, 1–26. I am grateful to Dr Fisher for allowing me to see parts of his forthcoming book, *Fundamentals of Patent Law: Interpretation and Scope of Protection*.

7 These included William Cubitt, William Armstrong, Robert A. MacFie, John Fairrie and John Louis Ricardo. See Coulter, op. cit. (6), 73–92; and Dutton, op. cit. (6), 28–9.

8 A. B. Jaffe and J. Lerner, *Innovation and Its Discontents*, Princeton, 2004, 86–90; D. P. Miller, 'The political economy of discovery stories: the case of Dr Irving Langmuir and General Electric', paper presented to AAHPSSS Annual Conference, University of Otago, Dunedin, New Zealand, November 2005; A. Johns, 'Intellectual property and the nature of science', *Cultural Studies* (2006), **20**, 145–64. For a comparison of abolitionism old and new see M. D. Janis, 'Patent abolitionism', *Berkeley Technology Law Journal* (2002), **17**, 899–952.

9 See J. Boyle, *Shamans, Software, and Spleens: Law and the Construction of the Information Society*, Cambridge, MA, 1996; *idem*, 'The second enclosure movement and the construction of the public domain', *Law and Contemporary Problems* (2003), **66**, 33–74; V. Hafstein, 'The politics of origins: collective creation revisited', *Journal of American Folklore* (2004), **117**, 300–15; D. Hunter, 'Culture war', *Texas Law Review* (2005), **83**, 1105–36.

10 C. MacLeod, 'Concepts of invention and the patent controversy in Victorian Britain', in *Technological Change: Methods and Themes in the History of Technology* (ed. R. Fox), Amsterdam, 1996, 137–54.

a heroic ideology of invention, on the one hand, and defence (and promotion via reform) of the patent system, on the other. Individualistic tales of heroic invention proliferated in the period, a rhetoric with the intent and effect of making the reward of the individual inventor seem a reasonable, even a necessary, act. I will complicate this picture by suggesting that Brunel's heroic self-conception and the persona that he created and was granted were intimately tied up with his expressed views on the patent system. Brunel's dealings with the 'smaller men' of invention, his attitude to the processes of invention and his treatment of others' inventions (by absorbing them into his web and transforming them at the same time) were all part of the conversion of others' labour into his own heroic status as system-builder.[11]

In seeking to understand the sources of Brunel's expressed views on patents I will first survey the accounts offered in the extant literature on Brunel. Although this literature does occasionally gesture towards Brunel's experiences of invention and innovation as a source of his views on patents its overall thrust is to portray those views either as principled or as deriving directly from Brunel's character. I will problematize such claims by providing evidence from Brunel's dealings with patents and patentees that his views may have evolved, were context-dependent, or were at least not entirely consistent over time. Their complex roots lay, I will argue, in the interaction between his principles, his practice and his persona.[12]

Principles of patents and patents of principle

The earliest secondary account of Brunel's attitude to patents was in the biography produced by his son Isambard Brunel, which presented a number of documents and episodes that have remained standard resources in dealing with the topic. These included the memo that Brunel wrote for his appearance before the Select Committee of the House of Lords on the Patent Law Amendment Act in 1851, a contribution that Brunel made to a discussion on patents at a meeting of the Society of Arts in 1856, materials relating to Brunel's refusal to patent his invention of the polygonal rifle barrel and Joseph Whitworth's claiming of it, and so on.[13] This source and L. T. C. Rolt's account of 'Brunel against bureaucracy' have set the tone for most of the subsequent discussions.[14]

11 For a splendid treatment of Brunel as system-builder see B. Marsden and C. Smith, *Engineering Empires: A Cultural History of Technology in Nineteenth-Century Britain*, Basingstoke, 2005, 145–56.

12 So far as studies of patents within the frameworks of history and philosophy of science, and science and technology studies, are concerned, my thrust is very similar to, and inspired by, that argued for and exemplified in the following: A. Cambrosio, P. Keating and M. Mackenzie, 'Scientific practice in the courtroom: the construction of sociotechnical identities in a biotechnology patent dispute', *Social Problems* (1990), **37**, 275–93; G. Myers, 'From discovery to invention: the writing and rewriting of two patents', *Social Studies of Science* (1995), **25**, 57–105; C. Bazerman, *The Languages of Edison's Light*, Cambridge, MA, 1999, Chapters 5 and 12; G. Bowker, 'What's in a patent?', in *Shaping Technology/Building Society: Studies in Sociotechnical Change* (ed. W. Bijker and J. Law), Cambridge, MA, 1992, 53–74.

13 Brunel, *Life of Isambard Kingdom Brunel*, op. cit. (1), 485–98.

14 L. T. C. Rolt, *Isambard Kingdom Brunel: A Biography*, London, 1957, 217–33.

Rolt describes Brunel's attitude to patents in this way: 'The Patent Laws were one of his anathemas, for it was his belief that, by enabling astute firms or individuals to take out patents of principle, they stifled invention instead of encouraging it'.[15] According to Rolt, Brunel 'obstinately refused' to take out patents himself and this is illustrated by the example of the rifle barrel design. That example is used, presumably, not because it was an important or typical example of Brunel's reluctance to patent. Of all the things that he might have patented but did not, it is surely one of the least significant. But the example enables Rolt to retail Brunel's quip on being told that his rifle infringed Whitworth's patent: 'What is it exactly that he does patent? It cannot be merely the polygon.' This reinforces the notion that what Brunel objected to was what he regarded as the absurdity of the patenting of principles. What this meant, Rolt does not fully explain. The very brief discussion of Brunel and patents then moves on to examine his hatred of bureaucracy. The contention is that Brunel's views on patents were a subset of his larger concern with bureaucracy. Both were symptoms of what we might call Brunel's 'hyper-individualism': 'Even in an age of individualism, Brunel's public life was remarkable for his roundly expressed hatred of government officials, and of any law, rule or regulation which interfered with individual responsibility or initiative.'[16] The impression given by Rolt is that Brunel's stance on patents, his forthright views expressed to royal commissions on railways about their 'regrettable tendency to legislate and to rule' and his scorn for the way Admiralty officials in particular did (or failed to do) business were all grounded in Brunel's principled individualism.[17]

The other substantial account of these questions is that provided by Angus Buchanan,[18] who once again locates Brunel's patent abolitionism in his adoption of the laissez-faire principles of economic liberalism. Indeed, Buchanan points out, Brunel perhaps ought to be seen as more of a purist than most of his engineering colleagues. He 'remained with the ideological rearguard' even as others shifted their ground. Many economic liberals began to see some careful state intervention as necessary to prevent the formation of monopolies in an entirely unregulated environment. Truly free trade might need a measure of state intervention to protect it. According to Buchanan, however, Brunel was never tempted by such ideas. So whilst his colleagues most often sought reform of the patent system (notably to make patents cheaper and so more nearly open to all) Brunel argued for their abolition before the House of Lords Select Committee in 1851 and before the Society of Arts in 1856. In considering the case of the adoption of the patented screw propeller (of which more below), Buchanan resists Andrew Lambert's suggestion that Brunel's ideological stance against Admiralty

15 Rolt, op. cit. (14), 217.

16 Rolt, op. cit. (14), 217.

17 In expressing to General Sir John Fox Burgoyne his frustrations with what he found to be the tardiness and obstructiveness of the Admiralty, Brunel referred to that august institution's 'extraordinary supply of cold water and capacious and heavy extinguishers' and its 'unlimited supply of some *negative* principle which seems to absorb and eliminate everything that approaches them'. Quoted in Rolt, op. cit. (14), 223; emphasis in Rolt.

18 A. Buchanan, *Brunel: The Life and Times of Isambard Kingdom Brunel*, London, 2002.

bureaucracy was less firm than usually thought, and perhaps was even influenced by others.

So, overall, the best accounts of Brunel's life and work have located his views on patents in political principles formed early. In the next section I will examine in some detail Brunel's experience with patents. Before doing so, however, it is worth considering two other matters: the issue of the principles of patents and of patents of principle and the matter of Brunel's inventive persona. Understanding these better will enable a more complete interpretation of Brunel's patent experience.

Let us take the issue of patents of principle first. Rolt claims, as we have seen, that Brunel objected to patents because it was possible for patents of principle to be taken out. The idea here is that if a patent were specified abstractly and broadly enough then it would prevent others from further improving the product or process that it covers. This is because all manner of realizations and modifications of the product or process would be covered by the patent and so any action by others to improve it would be blocked, potentially, as infringements. According to Rolt, it was such practices that Brunel found objectionable and which led him to oppose the granting of patents at all. Now, patents of principle were not allowed under the patent law, which required that the specification be of a practical product or process. But because there was no procedure for examination of patents before they were granted, the blocking of patents of principle required litigation, after the fact, in which the inadequacy of the patent specification was tested. If a specification were found to be insufficient for one skilled in the relevant art to bring the invention into practice then the patent could be declared invalid on that ground. I would argue, from a constructivist position, that the distinction between principle and practice is not natural but rather negotiated. The negotiation of that distinction often occurs through legal contest.[19] But it can and does also occur more discursively, albeit usually against the background of potential hostile litigation. For this reason we need to see Brunel's concern about patenting principles in the context of his engineering practice. Suffused as it was by Brunel's incredibly fertile invention, that practice could always make a given patent appear to be a patent of abstract principle. The abstractness of a patent was constituted by the gap between its specification and what had to be known and done to secure its successful application. This was a gap that Brunel could and habitually did make wide. We will see that whenever a patent was put before him, even if he liked and admired it, Brunel immediately saw the need to develop it further if it was to be successfully applied. Once those developments had themselves been spelt out, the original patent looked increasingly like one of principle since it had 'omitted' all these claimed necessities for its implementation.

19 See my treatment of patent specifications as susceptible to the 'patent specifier's regress' in D. P. Miller, 'Watt in court: specifying steam engines and classifying engineers in the patent trials of the 1790s', *History of Technology* (2007), **27**, forthcoming. I owe the language of 'gaps' to my colleague John Schuster's treatment of measurement and experiment. See his online text, J. A. Schuster, *An Introduction to the History and Social Studies of Science*, Chapter 6, accessible at http://hps.arts.unsw.edu.au/hps_content/online_resources/online.

We are talking about perceptions here. Perceptions of the status of a patent in this regard were important to the calculations of the patent owner and of the potential user. If a potential user considered a patent susceptible to legal challenge on grounds of insufficiency of the specification he might be emboldened to risk infringement. A patent owner might decide not to try to enforce his rights. Either might negotiate the terms of a license to use the patented invention in light of their perceptions of ultimate enforceability. Brunel did not simply object to patents because they could be cast by the unscrupulous as patents of principle; rather he often tried to make them into, or construct them as, patents of principle in order to devalue them, to bring them more under his control and to subvert any constraints that they otherwise might impose upon him.[20] If we contextualize patents of principle in this way by seeing them within Brunel's engineering practice, perhaps we should also contextualize Brunel's advocacy of the principles of patent abolitionism. There were, as we will see, occasions when, to an outsider at least, Brunel seems to have behaved expediently rather than in a principled fashion with regard to patents. It was, of course, open to him to interpret his behaviour as conforming to principle, but we do not have to follow him in that.

I have suggested that Brunel's 'inventive persona' is another important contributor to the way that he dealt with patents. By 'inventive persona' is meant his style and character as an inventive engineer. This has been understood in various ways, most usually by dubbing Brunel an engineer of extraordinary vision or, more recently, as a system-builder. An often-used quotation comes from the period when Brunel was almost overwhelmed by the scale and variety of tasks involved in building the Great Western Railway (GWR). He wrote to Charles Saunders, his closest friend among the directors of that venture,

> In my endeavour to introduce a few – really but a few – improvements in the principal part of the work, I have involved myself in a mass of novelties.
>
> I can compare it to nothing but the sudden adoption of a language, familiar enough to the speaker, and, in itself, simple enough but, unfortunately understood by nobody about him; every word has to be translated. And so it is with my work – one alteration has involved another, and no one part can be copied from what others have done.
>
> I have thus cut myself off from the help usually received from assistants. No one can fill up the details. I am obliged to do all myself … an invention is something like a spring of water limited. I fear I sometimes pump myself dry and remain for an hour or two utterly stupid.[21]

Rolt interprets this *cri de coeur* as an insight into the difficulties and challenges that Brunel faced in building the GWR. In one sense the GWR did this to Brunel. But in another sense he did it to the GWR. Rolt suggests that the GWR was 'the original conception of a single man who must by reason of that originality, keep a finger on every

20 I am not suggesting that Brunel was unique in doing this. Indeed, such 'games' were common between other engineering concerns and outside patentees. I am suggesting that Brunel was rather good at such games and that the knowledge that he played them allows us to understand more fully his attitude towards patents.

21 I. K. Brunel to Charles Saunders, 3 December 1837, quoted in Rolt, op. cit. (14), 113–14.

detail'.[22] Allowing for some hyperbole on Rolt's part, this rings true. With reference to the same passage, Marsden and Smith characterize Brunel as a Hughesian-style system-builder, making the rules from scratch. In their account Brunel was exercising his love of grandeur and pursuing 'exuberant innovation' in defiance of the efforts of others to lay down standards for railways. As system-builder Brunel also sought to exercise supreme authority over this and his other projects.[23] Brunel's vision, exuberance and sheer courage, even his bravado and 'technological hubris', were crucial elements of his heroic status. Although Brunel's undoubted recklessness cost him the highest place in the engineering pantheon of the late nineteenth century, it is part of his appeal to the television age.[24]

Brunel's critics among his contemporaries were given plenty of ammunition to develop a less heroic picture of him:

> his (alleged) inexperience, his self-indulgent experimenting, his arrogant independence and self-generated image of 'genius', and his failure to recruit substantial allies in the community of railway engineers. '£.s.d' claimed that 'Mr Brunel has learnt to shave on the chin of the Great Western Proprietors'.[25]

'£.s.d' was presumably so named to remind people of the fortunes lost and at risk in Brunel's hands.

What I am calling Brunel's inventive persona, then, is a particular manifestation of his larger character as an engineer. That persona involved his self-confidence (perhaps egomania), his undoubted inventive abilities and his habit of assuming authority and seizing control. It was to some extent under conscious control and a product of Brunel's 'self-fashioning'. But it is hard to escape the feeling that it had a compulsive aspect to it. It manifested itself as compulsive inventive activity once Brunel let himself loose on something. His almost maniacal experimentation with wooden and wrought-iron bridges is a more prosaic example of the way in which Brunel 'never stood still, never rested content with past achievements'.[26] This, I suggest, was the inventive persona that kicked into gear whenever Brunel decided to take a patented invention seriously.

22 Rolt, op. cit. (14), 113.

23 Marsden and Smith, op. cit. (11), 146–8. They draw on T. P. Hughes's concepts as presented, for example, in 'The evolution of large technological systems', in *The Social Construction of Technological Systems* (ed. W. Bijker, T. P. Hughes and T. Pinch), Cambridge, MA, 1987, 51–82.

24 MacLeod, op. cit. (3), 62, 79, who explains how Victorian engineers looked for safer hands in their most preferred heroes.

25 Marsden and Smith, op. cit. (11), 155, who also note that 'Brunel's dangerous individualism clashed with collective action'. For modern historical studies which attack what they see as the mythologies surrounding Brunel see A. Vaughan, *Isambard Kingdom Brunel, Engineering Knight-Errant*, London, 1991; and G. S. Emmerson, 'L.T.C. Rolt and the *Great Eastern* affair of Brunel versus Scott Russell', *Technology and Culture* (1980), **21**, 553–69; R. A. Buchanan, 'The *Great Eastern* controversy: a comment', *Technology and Culture* (1983), **24**, 98–106; G. S. Emmerson, 'The *Great Eastern* controversy: in response to Dr. Buchanan', *Technology and Culture* (1983), **24**, 107–13.

26 Rolt, op. cit. (14), 175–6, 179.

A man of patent experience?

Whatever principles we might discern in Brunel's patent abolitionism, we need to look no further than the memorandum prepared for his evidence to the 1851 Select Committee to find Brunel's own account of the origins of his attitudes and opinions on patents. This passage has not been given its due by his biographers:

> I should wish to observe that my opinions are not formed from any theory or from any consideration of what are or ought to be the laws of Patents … they are simply the result of a very long and tolerably intimate knowledge of the operations of *the hope of protection* held out, and the *operation* of that *protection* such as it can be when obtained, and these results do not in my opinion depend at all upon any question of whether Patents are cheap or dear, whether they be granted sparingly or profusely, by simple or by complicated machinery, it is the ruinous effects upon the class of inventors of the false dreams and hopes excited by the system and the injurious effect upon improvements, of the greater or lesser degree of exclusive privilege which is attained, which I have had consistently before my eyes for so many years … [27]

In his evidence before the Select Committee Brunel similarly emphasized his experience as the basis for his views. One way he did this was by stressing that he limited his observations 'to the present state of things' so far as patents are concerned. When asked to explain how the patent law had prevented the production of new inventions, as he claimed, Brunel introduced his answer by saying,

> it is a rather complicated network of causes, and although I see it very plainly in operation, yet until lately, when I began to think on the subject, I had hardly explained to myself how it operated, and, therefore, I may have some difficulty in explaining the matter clearly to your Lordships … [28]

So what did Brunel have consistently before his eyes for so long? Here he again helps us. In the course of asserting to the Select Committee his own status as an authoritative witness on the patent question, Brunel cites the following occasions of his exposure to and experience of patenting: direct involvement in the working out of his father's inventions and taking out patents on his father's behalf; giving professional advice to others on patents both jointly with his father and on his own; being involved in a professional capacity in numerous patent disputes; his frequent 'use of the patents of others'; and finally his own inventive activities pursued, as he puts it, 'without patents' and often requiring his defence of them 'against patents'.[29] Putting aside the possibility that Brunel was deploying a rhetoric of empiricism here (that is, presenting his principled or ideological views as deriving from experience) let us take him at his word and examine that experience. As the paper proceeds, I will refer back to those elements of his testimony that drew on or related to particular experiences.

27 Brunel, 'Memorandum for Evidence', op. cit. (1); original emphasis. Brunel's testimony before the Select Committee in many respects very closely followed the wording of the 'Memorandum'. See *Report and Minutes of Evidence taken before the Select Committee of the House of Lords appointed to Consider of the Bill intituled 'An Act further to amend the Law touching Letters Patent for Inventions …', London, 1851* (hereafter *Minutes of Evidence*).

28 *Minutes of Evidence*, op. cit. (27), 246.

29 *Minutes of Evidence*, op. cit. (27), 246.

Father and son

As is well known, Marc Isambard Brunel enjoyed a very mixed career as an inventor. According to Woodcroft's list he was granted a total of eighteen patents between 1799 and 1825. Six of these, including the important patent on a block-making machine, were concerned with sawmills or with the sawing and working of wood.[30] Three were for machines involved in writing, drawing and copying. Four were concerned with the handling or working of leather and fabrics. Three were directed at engine improvements and associated mechanical arrangements. One was for his famous tunnelling method, employed in the Thames Tunnel project, and one concerned tin foil.[31] Brunel began to work with his father in 1822 at the age of sixteen, by which time the elder Brunel's patenting career was almost at an end. The son certainly worked on the patent drawings for the steam engine patent of June 1822. He also conducted many of the experiments involved in formulating the specifications of the 'gaz' engine project, the subject of Marc Brunel's last patent.[32]

The extent to which the Brunels worked as professional advisers on patents is difficult to gauge accurately. There is some evidence of joint work on patent court cases. Clements notes that Isambard often held the fort at the office when his father was absent making his frequent appearances as an expert witness in patent actions. There is a report in *The Times* of the 'Messrs Brunel' making an affidavit during an infringement dispute.[33] When Brunel first joined his father in these patent-related activities the elder Brunel was not long out of debtor's prison. For all his fertile invention the father was plagued by financial difficulties. Perhaps it struck the son that his father's long list of patented property in invention had not helped him much? Given that Marc's patenting career closed so soon after his son joined him, perhaps its closure is attributable to Brunel's already formed and persuasive scepticism about the value of patents. Certainly, before the Select Committee in 1851 Brunel spoke as if more open communication, earlier in the piece, would have saved his father the needless expense of the patent for a gas engine that proved entirely fruitless:

> for 12 years (it was one of those few cases where a long series of experiments has been continued and money spent), I continued for my father, at very considerable expense, a long series of experiments for applying condensed gases as a motive power. Now, I believe, that

30 On the elder Brunel's block-making for the Navy see J. Coad, *The Portsmouth Block Mills: Bentham, Brunel and the Start of the Royal Navy's Industrial Revolution*, Swindon, 2005.

31 B. Woodcroft, *Alphabetical Index of Patentees of Inventions*, London, 1969 (first published 1854), 76–7. The latest biography of Marc Brunel lists only fifteen patents filed (and reproduces the texts of their specifications). See H. Bagust, *The Greater Genius? A Biography of Marc Isambard Brunel*, London, 2006, 122–47.

32 L. T. C. Rolt, *Isambard Kingdom Brunel*, Harmondsworth, 1989 (first published 1957), 38–9; P. Clements, *Marc Isambard Brunel*, London, 1970, 74–80, 77. Marsden and Smith, op. cit. (11), 65–9.

33 *The Times*, 3 July 1830, 6. The dispute in question was between Alexander Galloway of the City of London Engine Manufactory and Braithwaite and Ericsson. Other 'Law reports' in *The Times* document some of the elder Brunel's activities. See, for example, *The Times*, 8 January 1820, 3; 30 May 1820, 3; 28 February 1831, 6; 28 June 1832, 6.

> if instead of working at it myself, it had been the subject of discussion, and had been talked of more generally in the world, it would either have failed a great deal sooner, and my father would have been saved his money, or some good would have come out of it, instead of its becoming a dead letter.[34]

It seems likely, therefore, that his father's experience predisposed the son against the operation of the patent system. On the basis of a private diary entry made by Brunel on 30 January 1833, Angus Buchanan dates his resolution never to take out patents himself to the final abandonment of his father's 'gaz' engine project.[35] This may well be the case, but these were just the beginnings of Brunel's brushes with patents; his subsequent involvements suggest views still being formed.

The Brunel patent that almost was

As Brunel states, there were many occasions when he used others' patents and inventions in his various projects. There was at least one occasion, previously unnoticed, when Brunel seems to have actively sought a patent. There were others when he almost became involved in taking shares in the patents of others but backed away. More often, though, Brunel was faced by patentees seeking his advice, or his adoption of their inventions as part of one of his major ventures. In these cases, Brunel could be dismissive, and often was. The way in which he managed negotiations about those patents that he did take seriously is very revealing of his developing views and how they related to his engineering persona and practice.

First, however, consider the mystery of the patent that almost was. The epigraphs to this paper indicate that in 1851 Brunel denied ever having even considered patenting anything himself, yet in 1841 he is to be found actively seeking advice from the consulting engineer and patent expert John Farey on how to take a patent out. So what was this putative patent for? And can we solve the mystery as to why Brunel wanted it?

The invention concerned came from a period when Brunel was experimenting fervently with locomotive design. The letter to Farey gives us some clues as to what he was doing. Brunel appeared to want to patent the use of fans to aid the exhaust of the engine. He was aware of patents taken out for fans being used to blow fires, but not their use 'in lieu of the ordinary blast'.[36] He told Farey that there was no peculiarity of the fan capable of being patented. What he had done was to experiment with 'a different proportion of aperture &c than is usually adopted'. At various points in the same letter Brunel described what he had achieved:

> succeeded namely [to] produce an exhaustion both in quantity and extent of exhaustion as great as a fan with what I may call reversed dimensions & form now produced by

34 *Minutes of Evidence*, op. cit. (27), 254. For the rendition of this in the 'Memorandum' see Brunel, *Life of Isambard Kingdom Brunel*, op. cit. (1), 490.

35 Buchanan, op. cit. (18), 177. The source is I. K. Brunel, Private Diary, II.3.ii, 30 January 1833, Brunel Collection.

36 The 'ordinary blast' refers to the process of venting waste steam up the chimney of a locomotive, which has the effect of creating a draught beneficial to the combustion of the fuel. See E. L. Ahrons, *The British Steam Railway Locomotive 1825–1925*, London, 1927, 6–8.

> pressure … the fan applied successfully as an *exhauster* instead of the steam blast to a locomotive is I can assert, practically an entirely new thing … [37]

His plan was to apply this new method of exhaustion to 'a new arrangement of locomotives' on which he was also working, an application that he thought would be 'very valuable'.

To understand what Brunel was up to here and why the urge to patent came over him we need to review his involvement with locomotive design. Brunel's interventions in such design from the mid-1830s as part of the Great Western Railway scheme are widely seen by his biographers and by students of the history of railways as, to say the least, unfortunate. Nock considers Brunel to be a relative 'outsider' to railway engineering, compared for example with the Stephensons. Brunel's flamboyance and taste for scale made him very innovative in civil engineering and many other aspects of railway design.[38] Even Brunel's 'broad-gauge' railway, which proved so controversial and was, eventually, on the losing side of history, can be judged successful in many respects. Some of the locomotives designed for that gauge by Daniel Gooch are considered to be fine feats of engineering. But Brunel's locomotive specifications in the mid-1830s, with which he sought to direct the designers and manufacturers into his preferred channels, are widely judged to have been disastrous in their consequences.[39]

The early locomotives on the Great Western Railway experienced numerous problems and breakdowns, partly it seems because of Brunel's design stipulations. In an effort to conform to his demands manufacturers made compromises and departed from their usual practices. Brunel, in effect, created a situation in which the engines were more experimental than they might otherwise have been. This may have been an instance of Brunel's inability to leave anything well alone, of his compulsion to seek improvements in anything in the invention line placed before him. However, it also likely reflected his determination to realize his distinctive railway system. The manufacturers of engines for the GWR Company were increasingly unwilling to take all the blame for the locomotive misfortunes. Thus Mather, Dixon & Co., seeking final settlement of their account after a long period of negotiations about who should be responsible for the repair and modification of the locomotives *Premier* and *Ariel*, which they had supplied, wrote to the Company as follows:

> It is a source of deep regret to us that our engines have caused them [the directors of the GWR] disappointment, but for this we can only *share* the blame, and we have expressed our willingness to share the loss. The circumstances which led to the defects of the engines are well known to you, and we would merely enquire whether, as a matter of justice, individuals

37 I. K. Brunel to John Farey, 21 January 1841, Brunel Collection, Letterbook 2A, 44–5; original emphasis.

38 See, for example, O. S. Nock, 'Railways', in *The Works of Isambard Kingdom Brunel: An Engineering Appreciation* (ed. A. Pugsley), Cambridge, 1976, 69–88, 69. The idea of marginal men as innovative by virtue of their marginality is, of course, a well-known theme.

39 Ahrons, op. cit. (36), 43–5; Rolt, op. cit. (14), 117, 120–1. I report, rather than endorse, these judgements. In examining controversies over particular pieces of engineering practice (something in which I am not engaged here) I would recommend a symmetrical approach that allows the historian to avoid unthinkingly siding with the historical 'winners'. In comparison with Stephenson's locomotive designs, Brunel's were characterized by low bodies and massive wheels.

> should be made to bear *all* the weight of the losses incurred in making experiments for the benefit of a public Company to carry out a principle originating with themselves, and progressing under their sanction and by their desire …
>
> We make these statements in the hope that the Directors upon consideration will see that our case is one of peculiar hardship, and if they recollect that most of the defects arose from our desire, at Mr Brunel's request, to avoid weight, a point in which other makers were not so much restricted, they will view the matter more favourably.[40]

Even before this the directors of the GWR had begun to depend more heavily on Daniel Gooch, whom Brunel had employed. As Gooch confided to his diary, he was put in a difficult position because the directors began to ask him to report directly to them, 'apart from Mr Brunel', not through him.[41] That there was a great improvement in the work of the locomotive department thereafter is unanimously agreed upon.

Although Gooch and Brunel worked well together subsequently, it seems possible that when Brunel performed his extensive experiments on the use of an exhaust fan on engines, and then considered patenting the result, he was reacting to his implied 'failure' as a locomotive designer. In considering patenting this development Brunel insisted that it was not for any 'pecuniary advantage or monopoly'. Was reputation or vindication perhaps his object? The fact that Brunel seems to have been almost driven to a patent by the failure of his usual modus operandi of invention does suggest a very close relationship between that way of working and his opposition to the patent system. Of course in the end the patent was not taken out and one is reduced to speculation about why Brunel might have considered so 'unprincipled' a move. What we do know for certain is that, on this one occasion at least, Brunel contemplated putting expediency above principled opposition to patents. Even to consider this he must have anticipated little by way of public embarrassment as a result of taking out a patent and this, in turn, implies that he did not see himself as a publicly declared patent abolitionist at that stage of his career, merely as someone who had yet to take one out.

Importunate inventors

Examination of Brunel's reaction to some of the patented inventions that he found useful in his various ventures will further clarify how his compulsive urge to improvement of all inventions that came his way amounted to an attempt to bypass the patent system. His sense of his own ability to find further improvements in patented inventions that were presented to him reinforced his idea that such improvements were always possible (and necessary if the invention was to yield practical pay-off) but that in less powerful hands than his own improvements would be prevented, rather than encouraged, by the patent system.

I will examine in some detail Brunel's dealings over a number of patents that were important to him. First, however, it is worth looking at the situation that Brunel found

40 Quoted in E. T. MacDermot, *History of the Great Western Railway, Volume 1 1833–1863*, London, 1964 (first published 1927), 389; emphasis in MacDermot.

41 MacDermot, op. cit. (40), 395.

himself in as he became associated with ever grander projects and as his fame spread. When one works through the Brunel correspondence with an eye on patents it is striking just how many letters there are from Brunel to importunate inventors. Their number grew enormously through the 1840s, helped no doubt by the railway mania of most of that decade. By 1848 Brunel, with his impish humour, could inform the Reverend J. Hickman of Aston, near Birmingham,

> You are perfectly right in supposing that I have frequent applications on the subject of new or supposed new inventions, but probably you have no idea of the number of such applications – the result is that I am compelled to attend to none – the mere replying to the letters as on the present occasion occupies more of my time than a professional man ought fairly to be called upon to give away.[42]

Presumably the numerous responses that Brunel churned out would be a fraction only of the number of letters that he actually received from such importunate inventors. A survey of his replies (see Appendix) brings out a number of themes, as well as inducing more than a few wry smiles.[43]

The most important, insistent and paradoxical refrain was Brunel's requirement that anyone approaching him with an invention on which they sought his advice must have previously patented it. This was the question that Brunel asked if the situation was unclear: is your invention patented and specified, or otherwise made public? He insisted on a positive answer to this before he would even receive the communication. This seems paradoxical in that Brunel, the great opponent of patents, thus required those approaching him for advice to have taken out a patent and so effectively encouraged them to do so. Communications received where this was not the case were returned 'unread' (at least in principle). Brunel's reason for this, sometimes conveyed, sometimes not, was that he would not be a party to secrets. His great concern was that by receiving confidential communications he would open himself to numerous problems, including accusations of appropriation of the work of others. I have already noted Brunel's compulsion to improvement of anything placed before him. If a patent specification were not available then it would be hard to define, legally or otherwise, what was the importunate inventor's and what was Brunel's. With a patent available Brunel felt that he could communicate on the matter and, on those occasions when his creative energy was provoked, his own contributions would be clear.

A second, closely related, theme in these letters is that Brunel frequently declines to give opinions 'in the abstract'. Responding to Drake in 1846 he pointed out that pronouncing on abstract questions would be 'impossible … without misleading'. Given that there were 'hundreds of influencing circumstances not referred to in your question & "case"', it would be impossible to give a correct answer on whether the invention

42 I. K. Brunel to Reverend J. Hickman, 7 July 1848, Brunel Collection, Letterbook 6, 63–4.

43 The funniest response, and a sign that Brunel had no illusions about the efficacy of his patent advice, came in a letter of December 1852: 'As you ask me my opinion of the advisability of patenting your bridge, I give it you; though you will probably be the first person who will have followed such advice, if you do so, and might safely patent such a novel mode of using advice.' See Brunel, *Life of Isambard Kingdom Brunel*, op. cit. (1), 212 n. The advice, predictably, was that the bridge could not be patented.

was a good one or not.[44] To John Shuttleworth, who had written describing his patented hydraulic propelling apparatus, Brunel explained that his engagements were too pressing to allow him to investigate inventions 'unless I have occasion to examine into [their] applicability in some particular case'.[45] The implication was that unless inventions were investigated in specific applications their real utility could not be determined. In that sense, inventions were, by definition, abstract.

A third category was responses in which Brunel, apparently sometimes in contravention of his 'rule', did give instant advice. Usually this took the form of information that the supposed invention had already been invented many times (this was a kind of grassroots affirmation of the principle of multiple, simultaneous invention), that it had already been patented, or had already been investigated and tried and found to be useless. Brunel's responses were tailored to the social status of the inquirer. Those with social standing received less short shrift than did plain 'Misters' or workmen. Some inventors took the precaution of approaching Brunel through a Member of Parliament or a member of the local gentry, a legal representative or some other person of note. In such cases, or where the inventor himself was, for example, a clergyman, Brunel gave less curt responses. But the message was still the same. In more expansive moods Brunel gave advice to the effect that an inventor's lot was a sad one. He advised workmen in particular that they should save their time and money by not chasing patents in such a competitive and overcrowded field. Brunel could be brutal and, I suspect, enjoyed it. A peculiarly importunate John Lee made the mistake of approaching Brunel a second time about his invention. Brunel shot back:

> I was perhaps too anxious to avoid hurting your feelings but I nevertheless clearly explained to you that in my opinion your wheel was *inferior to those in use*. As this appears to have been misunderstood I must add I think it *good for nothing*.[46]

In Brunel's testimony before the Select Committee the marks of these experiences are clear. In rather more benign fashion Brunel places great emphasis upon the plight of the poor workman inventor. That class of inventor, Brunel says, will chase a patent and keep their idea secret while they elaborate it. In doing that they lose a lot of time and money. Even if they get a patent they usually find that there is no demand or that someone else has done it better before them. He argued that without the incubus of deluded hopes of patents, workmen would churn out more good things. Far from arguing on principle himself, Brunel contended that thinking about patents had been distracted too long by reference to a principle of fairness:

> we have so long been in the habit of considering, that the granting of an exclusive privilege to a man who invents a thing is just and fair, that I do not think the public have ever

44 I. K. Brunel to R. Drake, 19 April 1846, Brunel Collection, Letterbook 4, 249–50.

45 I. K. Brunel to J. G. Shuttleworth, 18 November 1846, Brunel Collection, Letterbook 5, 51. Shuttleworth had two patents at the time he approached Brunel: Patent No. 8,158, 18 July 1839, 'Obtaining a rotary motion from the recti-linear motion of the piston-rod of a steam or other similar engine', and Patent No. 8,539, 9 June 1840, 'Railway and other propulsion'.

46 I. K. Brunel to John Lee, 13 December 1847, Brunel Collection, Letterbook 5, 327–8; original emphasis.

considered whether it was, after all, advantageous to him. My feeling is, that it is very injurious to him.[47]

The poor but inventive workman of the sort that Brunel spent so much time dismissing or advising against the evils of patents was thus a major figure in his case against the patent system.

Dealing with expectant patentees

Brunel's dealings with those expectant patentees who presented him with patented, specified inventions that were of direct interest to him reveal that when Brunel did set to work on them the effect, or at least the claimed effect, was a transformation of the invention. This was not done in order to claim, as in a patent, the improvements that Brunel made but rather to neutralize the claim (and the patent) with which he had been presented. Brunel was effectively saying, 'look how I have transformed your invention. It's my work that has really made it useful and useable. I know more about this than you do. Now, let's negotiate the terms on which my company will take up "your" invention.' This sort of attack was the way in which Brunel pursued invention, as he described it in his 1851 testimony, 'without patents' and defended his own inventive activity 'against patents'.

Here are some examples of this. One concerns the treatment of wooden railway sleepers in order to preserve the timber before they were laid. Brunel had used a process known as 'kyanizing', which was based on patents taken out by John Howard Kyan in 1832 and 1836.[48] Early in 1850, via one Charles Jackson, Brunel entered into discussions with the patentee of an alternative preservation process, Sir William Burnett.[49] The process in question became known as 'burnettizing'. In negotiating the terms on

47 *Minutes of Evidence*, op. cit. (27), 248. Brunel was offering here a tale of the poor inventor alternative to Charles Dickens's 'Poor man's tale of a patent'. Dickens's intervention was an important one on the side of the pro-patent reform lobby with its account of the ludicrous obstacles and expense separating the virtuous but poor inventor from his just reward. C. Dickens, 'A poor man's tale of a patent', *Household Words*, 19 October 1850. On Dickens's direct inspiration by, and association with, other patent-law reformers, notably Henry Cole, see 'Introduction', in J. Phillips, *Charles Dickens and the 'Poor Man's Tale of a Patent'*, Oxford, 1984. See also C. Pettitt, *Patent Inventions: Intellectual Property and the Victorian Novel*, Oxford, 2004, 82–3, 185–8.

48 Kyan sold his patent rights to the Anti-Dry Rot Company in 1836. The process, which involved soaking the timber in mercuric chloride, was much vaunted. The timber used for building the British Museum, the Royal College of Surgeons and Temple Church was kyanized. Faraday gave his inaugural lecture as Fullerian professor of chemistry at the Royal Institution in 1833 on Kyan's process. Experience showed, however, that no iron fastenings could be used with wood treated in this way because they became brittle due to corrosive action. See R. B. Prosser, 'Kyan, John Howard (1774–1850)', rev. R. C. Cox, *ODNB*, op. cit. (2); accessed 16 August 2006.

49 Sir William Burnett (1779–1861) was a Royal Navy surgeon who saw active service in the French Revolutionary and Napoleonic Wars. He was subsequently head of the Royal Navy Medical Department but in his later years was controversial because of his entrepreneurial activities in the commercial exploitation of zinc chloride, first as a disinfectant and then as a timber preservative. See C. Penn, 'Sir William Burnett (1779–1861), professional head of the Royal Naval Medical Department and entrepreneur', *Journal of Medical Biography* (August 2004), **12**, 141–6.

which he, or more strictly the companies he represented, might use this process, Brunel began with the observation that he was 'just beginning to have faith in your process'.[50] Note that the existence of a patent meant nothing to Brunel so far as the quality of the process was concerned. His judgement was what mattered. Brunel then expatiated on his extensive use of such solutions and his determination that he, rather than the patentees, knew how best to apply the process. In particular, Brunel said, 'I should be afraid to depend on it [the process] unless I could afford to use the solution almost wastefully to inject a much larger quantity per load into the timber than that recommended by you.' Brunel considered it necessary to throw away solution that had absorbed impurities from the timber: 'a precaution which has never been sufficiently attended to but of which I soon discovered the necessity'. From these claims to knowledge of the practicalities of such treatments and from his own claims to have improved the process beyond the understanding and recommendations of the patentees, Brunel built his case for the financial and other terms that he wanted. The need to use large quantities meant that the price must be low. The need for guaranteed supply at a low price meant that Brunel must have the option of making the solution himself. He would not compete with them as a manufacturer provided they supplied the solution at 3d. per pint ('at which price I believe I shall not trouble myself to make it'). Brunel also undertook not to manufacture the solution for supply to others. On these conditions Brunel would offer a royalty on the patent of a farthing per 'load' of timber treated, and sought licenses for a number of railway companies with which he was associated.

Of course, negotiation between a patent holder and a potential licensee is unremarkable. But what is notable here is that Brunel is not just a prospective customer driving a hard bargain. Rather, he presents himself as practically a co-inventor and, moreover, a co-inventor who has a better grasp of the technical, practical and financial realities than the patent holder. As we will see, Brunel abstracted from this sort of personal experience the principled view that invention and improvement was a continual process. The taking of patents froze or fossilized that process and so ran counter to the interests of improvement generally. In his dealings with patent holders Brunel was determined not to allow such fossilization. He always had an improvement to suggest.

Consider another example, that of 'Wright's Patent Steam Generator'. When first approached about this, Brunel gave one of his standard suspicious responses to Hunt and Hunt, who were acting as agents for the patentee:

> I found a difficulty in determining who it was that wanted my opinion. Is it to guide *you* in a matter interesting to yourself, or merely as advising others and are those others seeking an opinion for their own guidance or merely if it is favourable to influence others?[51]

50 I. K. Brunel to Charles Jackson, 5 April 1850, Brunel Collection, Letterbook 7, 178–80.

51 I. K. Brunel to Messrs W. O. and W. Hunt, 1 June 1850, Brunel Collection, Letterbook 7, 235; original emphasis. The patent in question is that granted to John Wright (No. 12,285), on 12 October 1848, for 'Generating steam and evaporating fluids'. See Woodcroft, op. cit. (31), 639.

Brunel was here warning that what people intended to do with his advice was very important to him and would determine whether the advice would be forthcoming in the first place. In case the Hunts were unclear on this, Brunel spelt it out:

> I never give professional opinions on schemes and new inventions for the purpose of publication. If parties really desire advice and private opinion which is to guide their own proceedings I am ready to look into a question … but I must tell you beforehand that [my opinion] will be given candidly, that I shall state exactly what I think of the defects and difficulties as well as the advantages of the plan, and that however highly I may think of any new invention the probability, almost certainty, is that I should so qualify my opinion of its merits as would render my report only useful to guide those who consult me, and totally unfit for the generality of the public who are accustomed only to unqualified certificates of the unprecedented advantages of every new scheme.[52]

Despite Brunel having thus made it clear that he would call a spade an earth-moving device, and regardless of his declared 'almost certainty' that he would find defects and problems, Messrs Hunt still wanted his opinion. He launched upon an extensive series of experiments and by mid-July he reported progress with them ('there would appear to be a very marked economy'), but he wanted to do more experiments to test the extent to which the economy depended upon the dimensions of the boiler.[53] By 10 August Brunel had finished his experiments and was ready to give his opinion. He found an improvement in steam generation performance of between ten and fifteen per cent over the best Cornish boilers. It becomes clear that even as he obtained these positive results Brunel was applying his mordant scepticism and making tests to see whether other factors might be 'a principal cause of that increased effect of the fuel and not the *principle patented*'.[54] Fortunately for the patentee this turned out not to be the case, and Brunel conceded, 'I must therefore ascribe the satisfactory results obtained to the operation of the system which is the subject of the patent.'[55]

It might be thought that this represented, after all, a ringing endorsement of Wright's patented invention. Brunel's concluding words, however, reintroduced the air of scepticism. While acknowledging that the results showed that the principle was a good one and likely to be valuable, there was, so he said, always the possibility that 'some practical difficulty exists or should arise in the working of it' which he might have missed. So far as applying the scheme to marine or locomotive boilers was concerned (and the patentee and his agents must surely have held their breath at this point, given the large market those applications represented) 'several mechanical difficulties will arise, these no doubt may be overcome but every thing will depend upon the judgement with [which] such difficulties are met'.[56]

52 I. K. Brunel to Messrs W. O. and W. Hunt, 17 June 1850, Brunel Collection, Letterbook 7, 240–2.

53 See I. K. Brunel to Messrs W. O and W. Hunt, 15 July 1850, 24 July 1850, Brunel Collection, Letterbook 7, 267, 276–7.

54 I. K. Brunel to Messrs W. O. and W. Hunt, 10 August 1850, Brunel Collection, Letterbook 7, 286–8; original emphasis. Brunel's idea was that an alternative cause of the improvement might be 'the peculiar operation of the Gridiron forming a number of distinct jets of flame to which the Oxygen could more freely have access and the combustion be thus rendered more perfect'.

55 Brunel, op. cit. (54).

56 Brunel, op. cit. (54).

Whilst Brunel's relentless and parting scepticism might conceivably have been a routine device to protect him as a professional adviser, it seems to be more than that. It instances Brunel's unwillingness to treat any patented invention as a finished product. The principle of a patent might be sound; its application in practice was quite another matter and would involve further experiments and, almost certainly, further improvements. The fate of the patent and ultimately its value would depend on Brunel's judgement in its adaptation to practical use. At the level of practice this stance put Brunel in a strong position as a potential co-inventor or improver to negotiate a licence for the use of the patent. When read into principle such an exchange would reinforce the idea that, in terms of practical implementation, patented inventions were of limited value, and also likely to present obstacles to improvements of the kind that Brunel could always develop or envisage.

Those who sought to impose patent rights rather than complying with his efforts to weaken them roused Brunel's ire. John Barton apparently made an approach through the elder Brunel in the early 1840s suggesting that Brunel purchase his patent. Barton must have offered its potential use on a railway line competing with Brunel's railway associations as a reason for Brunel to buy it up. The response was devastating:

> Mr Barton has certainly hit upon a mode of effectually preventing my *considering* his invention … He thinks one of its principal merits is its applicability to a line of country which might afford an opportunity for a line competing and therefore injuring the lines I am interested in and suggests the buying up of the invention to *prevent* its being so used. I would as willingly discourage an improvement by throwing doubts upon its merits as *buy it up* when its merits were proved and as I should not like to be suspected of the former I would rather not receive any communication on the subject.[57]

This is a stark expression of Brunel's opposition to any attempted restrictive use of patents. That opposition is also illustrated by his response to the activities of the Permanent Way Company.

In late 1851 application was made to Parliament for a bill to incorporate the Permanent Way Company (PWC) 'for working certain patents relating to the permanent way of railways'.[58] By January 1852 the PWC was advertising to railway companies its willingness to make arrangements for the construction of permanent way under its patents, using 'eminent contractors'. It was subsequently announced that Charles May, 'lately of the firm of Ransomes and May, Ipswich', had been appointed to manage their transactions.[59] May (1800–60) is an interesting character. He was a

57 I. K. Brunel to Sir I. Brunel, 17 October 1842, Brunel Collection, Letterbook 2c, 73; original emphasis.

58 'Notices of application to Parliament', *The Times*, 29 November 1851, 3. The PWC is an interesting example of a company working patents, which has been strangely neglected. For an account of similar companies of this period and their operations see Dutton, op. cit. (6), 152–74.

59 See *The Times*, 31 January 1852, 2a; and 2 July 1852, 9a. Later advertisements inform us that the patents that the PWC held included those by W. B. Adams, P. Ashcroft, P. W. Barlow, W. H. Barlow, P. S. Bruff, John Gardner, L. D. B. Gordon, C. F. Guitard, J. W. Hoby, Sir John Macneill, Charles May, Robert Richardson, James Samuel and Charles H. Wild. See *The Times*, 11 March 1854, 6a. The company subsequently managed the patent of Dr Boucherie for preserving wood, especially but not exclusively railway sleepers. See *The Times*, 23 April 1856, 4a. Later still some of the engineer–patentees associated with the Company acted on its behalf in designing and laying down an experimental line incorporating numerous improvements as part of the Greenwich Railway. Presumably this was a demonstration line. See 'Railway

Quaker inventor and became a partner in Ransomes and May, iron-founders of Ipswich. His partner James Ransome had taken out a patent with May (Patent No. 8,847) on 15 February 1841 for the chill casting of railway 'chairs' (fastenings in which the rails are held) and for a process for making wedges and pins to fix the chairs and rails. May took out further related patents in 1847 (No. 11,641) and 1851 (No. 13,801). These appliances were the foundation of a very large business employing hundreds of men and boys. At the time of the formation of the PWC, May was actually retiring from Ransomes and May. The partnership was dissolved in June 1852. May had done engineering work on a number of astronomical observatories and most famously helped George Airy, the Astronomer Royal, in constructing the altazimuth and meridional circle instruments at the Royal Observatory, Greenwich. He had also been the local secretary for the Ipswich Meeting of the British Association in 1851 and was to be elected FRS on 1 June 1854, with Airy, Brunel and other distinguished scientists and engineers among the signatories of his certificate.[60]

The PWC, with May to the fore, was at the centre of a brouhaha among engineers in early 1852, the precise nature of which has yet to be fully unravelled. Meetings of the Institution of Civil Engineers seem to have been a major forum for this. On 10 February W. B. Adams (one of the inventors in the PWC 'stable') presented a paper to the institution about the construction and durability of permanent way. Among the contributors to the subsequent discussion were five other members of the PWC stable.[61] If the event was in any way staged, the participants had reckoned without Brunel. He began by contradicting Adams on a number of technical points, emphasizing the large number of trials he (Brunel) had conducted on the questions at issue. Then Brunel warmed up a little:

> With respect to the various modifications of the forms of rails, proposed by the Author of the paper, in the diagrams exhibited … he must say, that … [t]hey might be ingenious, but they were not useful, and most of the forms had already been tried and condemned.[62]

Intelligence. London and South-western', *The Times*, 28 October 1858, 5e. Ben Marsden has pointed out to me that a number of the PWC's stable of patentees were educators and/or associated with the creation of government-imposed standards. Neither characteristic would endear them to Brunel. On the academic engineering career of one of them, who had earlier worked on the Thames Tunnel with the Brunels, see B. Marsden, '"A Most Important Trespass": Lewis Gordon and the Glasgow Chair of Civil Engineering and Mechanics', in *Making Space for Science: Territorial Themes in the Shaping of Knowledge* (ed. C. Smith and J. Agar), Houndmills, 1998, 87–117.

60 On Charles May see *Proceedings of the Royal Society of London* (1860–2), **11**, pp. x–xi; Royal Society of London, Certificates of Election and Candidature, EC/1854/10, available at http://www.royalsoc.ac.uk/DServe/dserve.exe?dsqIni=Dserve.ini&dsqApp=Archive&dsqDb=Catalog&dsqSearch=RefNo==EC/1854/10'&dsqCmd=Show.tcl. Details concerning the dissolution of the partnership Ransomes and May can be found in 'Deed of Dissolution of Partnership', Papers of Ransomes, Sims and Jefferies Ltd, Museum of English Rural Life, Reading University, TR RAN/CO1/2. May, like Brunel, gave testimony on patents to the Select Committee of 1851. See *Minutes of Evidence*, op. cit. (27), 367–72.

61 W. B. Adams, 'The construction and duration of the permanent way of railways in Europe, and the modifications most suitable to Egypt, India &c', *Minutes of Proceedings of the Institution of Civil Engineers* (1851–2), **11**, 244–73. The discussion is printed on 273–98. The five PWC inventors and discussants, in addition to Adams himself, were P. W. Barlow, P. Ashcroft, J. Samuel, W. H. Barlow and C. May.

62 *Minutes of Proceedings of the Institution of Civil Engineers* (1851–2), **10**, 276.

Others entered the discussion, hoping perhaps that Brunel would cool down. Instead he smouldered for a while, then ignited. Brunel noted that many if not all of the numerous modifications of rails discussed by the author were the subjects of patents. They had not been tried and probably never would be:

> the only effect, therefore, to be anticipated from this accumulating of numerous fanciful forms in one patent was, that when a really good form was devised, it would be found to bear so close a resemblance to some one of these imagined sections, that either the use of the positive improvement would be prohibited, or a fertile field would be opened for litigation … It was notorious that engineers frequently found their practice restricted, by the claims of some theoretical patentee …[63]

For all Brunel's attempts to disclaim any invidious intent and his professed 'desire to remark courteously on the papers kindly prepared for the meetings',[64] the PWC affiliates must have been very angry.

Two months later a couple of papers on railway accidents and on the economy of railways sparked discussions that spread over four evenings, much of which concerned the desirability or otherwise of railway companies engaging in their own manufacturing. Once again Charles May and Brunel were among the contributors to the discussions, May being strongly against railway companies expanding their activities into manufacturing, as might be expected from someone associated with a major new supplier like the PWC. Brunel for his part adopted a more equivocal position. He thought that in some circumstances railway companies might manufacture. Though he did not spell this out it would probably have been clear that the circumstances he had in mind were those in which specialist manufacturers like the PWC might try to maintain a monopoly position on the basis of their combined patents, and to use this to raise prices.[65]

Informal discussions must have occurred about the PWC initiative at these meetings or elsewhere, because shortly afterwards Brunel wrote to May saying that he and all the engineers he had been able to speak with were very much against the company's attempt to effect a 'combination'. He warned that he would 'watch its proceedings with anxiety and even with suspicion, because it is capable of much evil'.[66] The dangers of the accumulation of fanciful forms in one patent (like that of Adams) were presumably compounded by the accumulation of numbers of such patents in one company. But the PWC could also do good:

> if you seek to facilitate and encourage the use of all such parts of your several patented inventions as are acknowledged to be good and useful improvements and *to cheapen their manufacture* without interfering with the honest attempts of Engineers to improve upon them,

63 *Minutes of Proceedings of the Institution of Civil Engineers*, op. cit. (62), 287. In his testimony before the Select Committee Brunel had characterized patents of this type as 'rambling' or 'fishing' patents (*Minutes of Evidence*, op. cit. (27), 251, 253.)

64 *Minutes of Proceedings of the Institution of Civil Engineers*, op. cit. (62), 276, 288.

65 M. Huish, 'Railway accidents', *Minutes of the Proceedings of the Institution of Civil Engineers* (1851–2), **11**, 434–50; B. Poole, 'The economy of railways', ibid., 450–60. The discussion is recorded on 461–77.

66 I. K. Brunel to Charles May, 14 May 1852, Letterbook 9, 20–2.

> and harassing us with such interferences, you shall have my cordial support and I have no doubt that of the other members of the profession … but if you should unadvisably [*sic*] begin to throw the network of your combined patents about us so as to entangle or embarrass our free movements and strain the line at all tight, you will find as you did today that the fish is much too strong for your health, the whale will disappear and be swallowed up.[67]

Thus although in Brunel's ideal world patents would not exist, his concern was that, given that they did exist, they should not be 'abused'. Apart from the cost implications of patents Brunel saw them as potentially an obstacle to attempts at further improvement. If patent holders sought to stifle competition by filing interference suits indiscriminately then evil would result. If they refrained from such action then they were behaving well in Brunel's estimation. The PWC was dangerous because it was an organization dedicated to owning and managing patents. A rational approach to that business on behalf of the shareholders in the company might easily mean raising obstacles to further improvement by others. The temptation to patent 'fanciful forms', to deliberately create what Brunel regarded as patents of principle by means of abstract specifications, and to use its stable of patents in combination, like a net, to entrap and control others, would always be there. Once again, in the real world of patent practice Brunel was happy to stipulate ways in which he could live with the realities of patent protection and cope with the dangers that, from his perspective, its misuse threatened. Nevertheless, those engaged in misuse as Brunel saw it were left in no doubt as to where he stood. Nor were the members of the House of Lords Select Committee when Brunel informed them that abolition of patents would not only advantage the poor class of inventors but would also get rid of 'the class of men at present called schemers, who I believe are a pest to society'.[68]

As a final example of Brunel's dealings with patents let us examine the case of the screw propeller. One of the most celebrated of Brunel's shipbuilding innovations was, of course, the use of screw propulsion in the SS *Great Britain*. A key patentee of the screw propeller was Francis Petit Smith, whose financial backers formed the Screw Propeller Company to build the steamer *Archimedes* to trial his design.[69] Early in 1840 T. R. Guppy attended some of these trials on behalf of the directors of the Great Western Steamship Company, sailing on the *Archimedes* to Liverpool from Bristol, and reported back to the building committee for the SS *Great Britain*. The directors, on Brunel's advice, delayed work on the ship until the screw propeller could be fully investigated. Over the course of a few months, Brunel, Guppy and Captain Christopher Claxton experimented with different screw designs in the *Archimedes*. Brunel drew up an elaborate report, which has been described by experts as 'a masterpiece of clarity and insight … a foundation stone of the rational analysis and application of screw

67 Brunel, op. cit. (66); original emphasis. The gibe about the 'fish' goes deeper than just a nice simile. 'Fish' was, of course, the name for one of the key components of the rail construction for which the PWC had patents. Brunel was saying that the company's attempt to contain invention and improvement was doomed. The reference in this letter to 'today' is puzzling. 'Today' was 14 May, whilst the nearest institution meeting to that date was on 11 May. Either the letter is dated misleadingly, having been partially written on 11 May, or there was another, as yet unidentified, occasion when Brunel discussed the PWC with other engineers.

68 *Minutes of Evidence*, op. cit. (27), 248.

69 On Smith see D. K. Brown, 'Smith, Sir Francis Petit (1808–1874)', *ODNB*, op. cit. (2).

propulsion in ships'.[70] The report was given to the directors on 1 October 1840 and the screw propeller was adopted for the great ship. It would be some time, however, before the design for the *Great Britain* would be finalized, and in the meantime Brunel became involved in advising the Admiralty on the possible use of screw propellers in Navy ships.

At the initial meeting with the Admiralty on 27 April 1841 Brunel demanded, and was assured, that the experiments with the screw would be entirely in his hands. No government officers were to interfere. Brunel would report directly to Sir Edward Parry, controller of steam machinery to the Navy, and to the Lords of the Admiralty themselves. A famous comedy of errors and apparent subversion by hostile Admiralty officials ensued during attempts to bring suitable engines and vessel together for trials. These finally began in 1843 in HMS *Rattler* and continued periodically for more than a year. The upshot was that in 1845 the Lords of the Admiralty ordered a number of vessels to be fitted with screw propellers.[71]

The most recent scholarship on this affair suggests that Brunel was boxing very clever in taking on the Admiralty assignment in that he used the trials as a way of conducting experiments, at public expense, useful to the SS *Great Britain*.[72] He also boxed clever in the matter of most direct interest to us here, the use of others' patents. Both the Admiralty and Brunel exploited Francis Petit Smith and the Screw Propeller Company, which owned Smith's patent. As Buchanan puts it, 'in effect the Screw Propeller Company supplied essential development research free to both Brunel and the Admiralty before being forced into liquidation'. Before that happened, though, Brunel had positioned himself as effectively a co-inventor with Smith. He saw Smith's patent as one of principle in the sense that 'he realized that much more work was needed to determine the best size, shape and fitting for the screw'. Their conjoint work took the principle of the screw into efficient action.[73] At one stage, in April 1844, as trials were still being conducted, the Admiralty seemed reluctant to make a screw of which Brunel had sent a drawing. It appears that their concern involved their belief that Smith intended to patent the modified screw. Writing to Smith, Brunel was once again puzzled and exasperated by Admiralty behaviour: 'I do not understand the distinction drawn as all the screws which are being tried are the subjects of patents but of course I can say no more.'[74] A couple of days later the difficulty, however unfounded, was solved. Brunel wrote to Sir John Barrow informing him that Smith 'does not propose to

70 J. B. Caldwell, 'The three great ships', in *The Works of Isambard Kingdom Brunel: An Engineering Appreciation* (ed. A. Pugsley), Cambridge, 1980, 137–62, 158.

71 Brunel, *Life of Isambard Kingdom Brunel*, op. cit. (1), 253–4; Rolt, op. cit. (14), 218–20.

72 A. Lambert, 'The Royal Navy and the introduction of the screw propeller, 1837–1847', in *Innovation in Shipping and Trade* (ed. S. Fisher), Exeter, 1989, 61–88; *idem*, 'Brunel, the Navy and the screw propeller', in *Brunel's Ships* (ed. D. Griffiths, A. Lambert and F. Walker), Chatham, 1999, 27–52. See also D. K. Brown, *Before the Ironclad: Development of Ship Design, Propulsion and Armament in the Royal Navy, 1815–1860*, London, 1990, Chapters 9 and 10.

73 A. Buchanan, op. cit. (18), 178–9; A. Lambert, 'The SS Great Britain', in *Brunel: In Love with the Impossible. A Celebration of the Life, Work and Legacy of Isambard Kingdom Brunel* (ed. A. Kelly and M. Kelly), Bristol: 2006, 163–80, 167–9.

74 I. K. Brunel to F. P. Smith, 1 April 1844, Brunel Collection, Letterbook 3, 8–9.

take out a patent for the modification of the screw … as I had understood to be his intention'.[75]

The veritable orgy of patenting of screw designs that occurred in the late 1830s and early 1840s would have severely tried Brunel's patience, especially since so many of the exotic schemes were, from his perspective, patented fancy rather than practical possibility.[76] The ownership of the invention was thoroughly contested in the courts. In the 1840s both Smith and the marine engineer John Penn, Brunel's other major coadjutor in designing and supplying engines for screw propulsion, were heavily involved in litigation.[77] Though noting that he always kept out of court as much as possible, Brunel expressed his willingness to do anything he could 'to secure to those who have *really* brought the screw to work all the advantage and credit of the invention, and if I can be of service you may make use of me'.[78] Once again Brunel was making a distinction between those whose claims he considered to be based merely on patents of principle and those who had '*really* brought the screw to work'. Smith and Penn, unsurprisingly given their collaboration with Brunel, were in the great engineer's estimation those who had made the screw workable.[79] Once again, the black and white of principled patent abolitionism gave way to shades of grey according to which some patents, in some circumstances, could, and should, be defended.

In his testimony before the Select Committee Brunel at one point drew a distinction that illustrated nicely his self-image as an improver of inventions and indicates the type of patent (and patentee) that he was prepared to support:

> I think you must draw a distinction between those who appear as inventors, and the parties from whom the ideas have really proceeded; I think they come generally from men of observation rather than inventors. Circumstances attract his attention; he sees a result produced which did not occur to him before, and being an intelligent man, he sees how it may be applied, and some opportunity occurs, by accident, by which he can apply it, or suggest it to other intelligent men, and that is how the best inventions have come about; they have not been certainly through what may be called professional inventors.[80]

By 'man of observation' here Brunel does not mean someone in a detached, 'objective' position. Quite the contrary: a man of observation is genuinely involved in practical hands-on work which gives him the opportunity for observation of its details. The

75 I. K. Brunel to Sir John Barrow, 4 April 1844, Brunel Collection, Letterbook 3, 15–16. Perhaps Brunel's scepticism about the value of patents had rubbed off on Smith. Lambert explains that the Admiralty had by this stage lost interest in further experimental work and saw it as benefiting Smith's patent only. When they learned there was no new patent they relented. See Lambert, 'Brunel, the Navy and the screw propeller', op. cit. (72), 47.

76 See Caldwell, op. cit. (70), 158. Caldwell tells us that by 1852 there were over ninety distinct patents for ship propellers, seventy-two of them being granted after 1836 when Smith had begun his experiments.

77 On Penn see A. Lambert, 'Penn, John (1805–1878)', *ODNB*, op. cit. (2). A sense of some of the litigation can be gained from 'Woodcroft v. Smith', *The Times*, 12 March 1846, 7a; and 'Lowe v. Penn', *The Times*, 12 May 1846, 7f.

78 I. K. Brunel to John Penn, 10 December 1846, Brunel Collection, Letterbook 3, 235–6; original emphasis.

79 On Brunel's estimation of Smith's contribution see Lambert, 'Brunel, the Navy and the screw propeller', op. cit. (72), 50–2.

80 *Minutes of Evidence*, op. cit. (27), 248.

contrast is with the professional inventor, whose business is invention (those who 'appear as inventors' by the accumulation and exploitation of patents) rather than the activity from which, in Brunel's view, genuine invention springs. Although as a 'man of observation' Brunel would not take out a patent, he would support others of the same type who made a different judgement on that matter, but not those who, with their portfolios of abstractly specified patents, were for him mere pretenders to invention.

Conclusion

Brunel's supposedly principled public stance on the patent question becomes more complex when we examine in detail his professional and private dealings with patents. Although he may well have formed early views about them, informed in part by his father's tribulations, those views were further shaped by the experiences of succeeding decades. At one stage, contrary to later denials, Brunel seriously pursued a patent, though in circumstances which remain somewhat mysterious and are worth further investigation. The large projects that he undertook, the experience of dealing with the importunate inventors who besieged him, and his inventive persona (which meant that he could not look at a patent without seeing many ways to improve it or bring it into practice) combined to make Brunel read every patent as a patent of principle. Brunel could thus cast patents into the mould of brakes upon progress and constraints upon improvement whilst at the same time avoiding or minimizing those constraints on him. Those constraints were loosened with regard to patents that he did want to use by his exuberant development of them to the point where their 'original' status as mere patents of abstract principle became hard to deny. Brunel made his point. He got what he wanted. In this way, principle, practice and persona combined.

Turning the microscope on what we might call the 'ecology' of Brunel's patent abolitionism, or on patent abolitionism as a way of doing business, has significance in other ways. It is an example of historical work trying to get inside the patent phenomenon. Economic historians have long and usefully explored the links between the macro-phenomena of economic growth and various measures of patenting activity, but otherwise most historical study of patents has been of principles and debate about the system.[81] On the other hand, an emergent cultural history of patenting has opened up exciting new avenues, not least that relating patenting to heroic, individualistic histories of engineering, technology and creative endeavour more generally.[82] Our

81 There are clearly important exceptions. Dutton, op. cit. (6), long ago pursued the patent agents, and the legal and the trading aspects of the patent business. See also J. Andrew, J. Tann, C. MacLeod and J. Stein, 'Steam-power patents in the nineteenth century – innovations and ineptitudes', *Transactions of the Newcomen Society* (2001), **72**, 17–38; aspects of C. MacLeod, J. Tann, J. Andrew and J. Stein, 'Evaluating inventive activity: the cost of nineteenth-century UK patents and the fallibility of renewal data', *Economic History Review* (2003), **56**, 537–62; K. Bruland, 'The management of intellectual property at home and abroad: Babcock & Wilcox 1850–1910', *History of Technology* (2002), **24**, 151–70; A. Guagnini, 'Patent agents, legal advisers and Guglielmo Marconi's breakthrough in wireless telegraphy', *History of Technology* (2002), **24**, 171–201.

82 See C. MacLeod, 'James Watt, heroic invention and the idea of the Industrial Revolution', in *Technological Revolutions in Europe: Historical Perspectives* (ed. M. Berg and K. Bruland), Cheltenham,

understanding of the changing cultural bases and relations of intellectual property is set to benefit from this. However, study of representations of patenting, whether statistical or cultural, fail to provide insight into the varieties of patenting practice and their relationship with these wider economic and cultural currents. My study of the intermeshing of principle, practice and persona in Brunel's case only begins to reveal some of the complexities involved. It is also limited in the period that it covers, and it is not claimed that the ecology of patent abolitionism described here was in any sense typical, or general, in later nineteenth-century Britain.[83] However, this paper does, I hope, orient us in a useful direction for further historical study of this sort, which links the cultural, psychological, legal, economic and technical engineering dimensions of patenting activity.

1998, 96–116; Pettitt, op. cit. (47); D. P. Miller, '"Puffing Jamie": The commercial and ideological importance of being a "philosopher" in the case of the reputation of James Watt (1736–1819)', *History of Science* (2000), **38**, 1–24, 6–14.

83 For example, the extent in later periods and other industries of 'collective invention', of the sort revealed in the early nineteenth-century Cornish steam engine industry by Alessandro Nuvolari, remains to be established. Such collective invention was in part a reaction against those seeking to enforce a dominant patent position, in that case against Boulton and Watt. In this sense, like Brunel's practices, it represents a strategy (albeit a collective one) for dealing with troublesome patents. See A. Nuvolari, 'Collective invention during the British Industrial Revolution: the case of the Cornish pumping engine', *Cambridge Journal of Economics* (2004), **28**, 347–63.

Appendix: Brunel's Letters to Importunate Inventors

FROM	TO	DATE	PRECIS	REFERENCE Letterbook: Page
I. K. Brunel	E. Shelton	25 November 1840	Has rule of never receiving communications on inventions till secured by patent.	LB2b: 118
J. Bennett	Messrs Parkin & Wylde	26 November 1840	Declines receiving communications on inventions not secured by patent.	LB2b: 120–21
I. K. Brunel	R. H. Gower	18 February 1841	Cannot communicate on third party's unsecured invention until it is patented.	LB2b: 156
I. K. Brunel	Charles Russell MP	16 July 1841	Third party's inventions *to be* patented and so cannot communicate on them.	LB2b: 198
I. K. Brunel	J. Agnew	07 July 1843	Rule not to communicate on inventions unless patented or otherwise published	LB2c: 184
I. K. Brunel	Francis Danby	23 February 1844	Rule not to communicate on inventions unless patented or otherwise published.	LB2c: 315
I. K. Brunel	C. Chitty	17 April 1845	Third-party invention. Never expresses opinions on *untried* inventions.	LB4: 57
I. K. Brunel	Hardy	16 May 1845	Does not give professional opinions on inventions.	LB4: 77–78
I. K. Brunel	W. Prosser	07 June 1845	Rule never to see inventions until patented.	LB4: 96
I. K. Brunel	Mrs Hinde	16 July 1845	Declines to receive any confidential communications on inventions. Advises Mr Hinde not to waste 'his time, thoughts, or money upon inventions, still less this particular one'.	LB4: 119
I. K. Brunel	Isaac Blackburn	26 July 1845	The form of screw he proposes already patented. In present times 'very difficult to invent anything new'.	LB4: 127
I. K. Brunel	H. Scale	01 April 1846	Obliged to confine himself to necessary business. Consideration of new inventions 'which appear to be as numerous as the stars' is impossible. For a time 'I must stand still even if the rest of the world goes on'.	LB4: 242
I. K. Brunel	R. Drake	19 April 1846	Never gives professional opinions on abstract questions.	LB4: 249–50
I. K. Brunel	D. Crawford	14 August 1846	Cannot connect with any speculation in trade or manufacture. Cannot receive communication on invention until patent is secured and specified.	LB5: 6
I. K. Brunel	John Vizard	17 September 1846	Third-party invention. Does not give professional opinions on new inventions. Not prepared to recommend Dutton's plan.	LB5: 11
I. K. Brunel	W. Carpmael	17 September 1846	Never gives opinions on inventions.	LB5: 12
J. Bennett	Sylvanus Hanley	29 October 1846	Brunel never takes shares in patents and declines communications on inventions unless patented and patent published.	LB5: 42
I. K. Brunel	E. Chesshire	06 November 1846	Unfair to ask professional men to commit themselves to professional opinions on merits of an invention unless in a particular case of adoption.	LB5: 45–46
I. K. Brunel	R. Spooner	10 November 1846	Re Chesshire's invention. Needs to follow his rule. How to get over simple difficulty of having to tell a man that his 'plan was absurd', yet this will be the case ninety-nine times out of one hundred.	LB5: 47
I. K. Brunel	J. G. Shuttleworth	18 November 1846	Cannot investigate invention unless has occasion to look at its application 'in some particular case'.	LB5: 51

Appendix (*Cont.*)

FROM	TO	DATE	PRECIS	REFERENCE Letterbook: Page
I. K. Brunel	J. De Barski	19 November 1846	Rule never to look at any invention unless patented and specified. Only expresses opinions when 'called upon to determine upon the *application* of an invention in any particular case in which I am professionally employed'. Will see him if his invention is 'so circumstanced'.	LB5: 52
I. K. Brunel	Mr Jesse Francis	22 November 1846	Cannot communicate unless invention patented and published. If did look at it 'I am not likely to recommend any Company to buy the patent and I take no interest in such matters myself'. 'Your offer to *give* me *a good reward* is of course made in extreme ignorance of what is right and therefore inoffensively'.	LB5: 57
I. K. Brunel	J. Taylor Junr	11 December 1846	Re third party but scheme not patented and could not look at it.	LB5: 76
I. K. Brunel	Thomas Parker	11 January 1847	Re third party. Not proper person to receive this invention. Never receives confidential communications on inventions.	LB5: 103–04
I. K. Brunel	B. Bromwich	12 January 1847	Cannot receive his plans and inventions unless patented and specified or otherwise published.	LB5: 107–08
J. Bennett	W. Ashe	15 February 1847	Cannot help Mr. B. Never gives professional opinions on inventions.	LB5: 125
I. K. Brunel	R. Neville, MP	19 March 1847	Re third party (Lumley). Rule not to receive communications on inventions not secured by patent unless public or not going to be patented. Tried to explain this to Lumley but he did not understand and left dissatisfied which 'on your account I regret'.	LB5: 143–44
I. K. Brunel	W. S. Staite	08 April 1847	Never takes a 'personal interest in the profits of patents or inventions'. As regards merits of his scheme 'I see none'. 'I speak plainly for your benefit, tho' I dare say like most gratuitous advice it will be of no value'.	LB5: 158
J. Bennett	C. J. Edwards	14 May 1847	Declines to receive communication, with thanks.	LB5: 179
J. Bennett	G. Wadsworth	14 May 1847	Declines communication on inventions with thanks.	LB5: 180
I. K. Brunel	G. E. Quinton	28 May 1847	'Number of inventions and improvements which are almost daily proposed is so great that it is impossible to examine into their merits'.	LB5: 195
W. Barber	T. Padley	04 June 1847	Re railway 'break'. His plan frequently proposed and already patented by others.	LB5: 198–99
I. K. Brunel	Rev. H. M. Dyne	08 July 1847	Not aware of great demand for instruments for measuring speed of railway trains. Not even those familiar with all that has been done 'and the numerous little difficulties that exist to prevent anything very good being done are likely to improve upon them'.	LB5: 218
J. Bennett	B. V. Gandee	16 July 1847	Mr B's rule never to give opinions on patents.	LB5: 220
J. Bennett	J. L. Hale	16 July 1847	Mr B's rule never to give opinions on patents.	LB5: 221

I. K. Brunel	Bremner	18 September 1847	Would be happy to look at his scheme for building harbours but constantly on the move and cannot meet.	LB5: 267
J. Bennett	James Trehearne	21 September 1847	Brunel never receives confidential communications on unpatented inventions.	LB5: 268
I. K. Brunel	J. H. Simpson	10 November 1847	Cannot examine invention unless patented. If it is, then has a duty to look at it for the Railway Company. But no demand for what he has invented and if there were 'we have in our establishment ample means of devising and effecting it'.	LB5: 302–03
I. K. Brunel	A. J. Brooke	16 November 1847	Letter one of three received today on methods of preventing collisions and 'this not very much above the average supply'. Has a rule not to give opinions on unpatented inventions.	LB5: 304–05
J. Bennett	R. Brown	20 November 1847	Cannot receive communications on unpatented inventions.	LB5: 311–12
I. K. Brunel	John Lee	13 December 1847	Has received Lee's note marked 'Private and Confidential' stating that B. previously expressed a favourable opinion of his patent wheel. 'I was perhaps too anxious to avoid hurting your feelings but I nevertheless clearly explained to you that in my opinion your wheel was *inferior to those in use*. As this appears to have been misunderstood I must add I think it *good for nothing*'.	LB5: 327–28
I. K. Brunel	Mr W. L. Jones	18 January 1848	'I never have anything to do with patents and always decline receiving any confidential communications of inventions'.	
I. K. Brunel	William Daniel Junr	31 January 1848	Correctly supposes that B will not receive communications on unpatented inventions. On 'this point my determination is fixed and invariable'.	LB5: 340–41
I. K. Brunel	Vallance and Vallance	08 March 1848	Does not give professional opinions on inventions or upon patents.	LB5: 352
I. K. Brunel	Thomas Carr	22 April 1848	Never receives confidential communications on inventions.	LB6: 25
J. Bennett	W. Stubbs	03 May 1848	Mr. B does not give opinions on unpatented inventions.	LB6: 27
I. K. Brunel	W. Reid	18 May 1848	Does not give opinions on unpatented inventions but if he has patented inventions on railway working it is his 'duty to attend to it' and will see him.	LB6: 31–32
I. K. Brunel	W. Reid	19 May 1848	Thinks the Electric Telegraph Company most likely parties 'to treat liberally with you for any improvements you can offer'.	LB6: 32–33
I. K. Brunel	Addis Jackson	21 June 1848	Does not give opinions on unpatented inventions.	LB6: 60
I. K. Brunel	Addis Jackson	07 July 1848	Refers him to J. D. Samuda as patentee of the atmospheric apparatus.	LB6: 63
I. K. Brunel	Rev. J. Hickman	07 July 1848	Right in supposing B. has frequent applications on new inventions but probably no idea how many. As result compelled to attend to none. 'The mere replying to the letters as on the present occasion occupies more of my time than a professional man ought fairly to be called upon to give away'.	LB6: 63–64
I. K. Brunel	C. Ewens	28 September 1848	The enclosed is very vague but thinks it is 'nothing but a perpetual motion which is the philosopher's stone of mad mechanics and as such not likely to be taken up by sober Englishmen'.	LB6: 102
I. K. Brunel	George Parsons	22 December 1848	Obliged for his communication. Is 'very fond of seeing ingenious contrivances' but cannot look seriously at the project referred to for any useful purpose. 'These are not times for thinking of anything new, and I should be misleading you and others if I did not say so'.	LB6: 166–67

Appendix (*Cont.*)

FROM	TO	DATE	PRECIS	REFERENCE Letterbook: Page
I. K. Brunel	F. Brown	20 February 1849	Obliged 'to adhere rigidly to the rule of never receiving confidential communications on the subject of inventions'. When his invention is patented and specified, 'if you are so imprudent as to waste your money upon patents', will then be able to see it.	LB6: 211
I. K. Brunel	C. Ewens	21 July 1849	On third party's invention. Rule not to receive private communications on unpatented inventions. But inadvertently read the enclosed before reading Ewens's note, so will state his opinion 'for my own sake as well as Mr Barker's'. Does not think his invention is sufficiently new to admit of its being patented. Mr Barton 'may depend on it that the patent would never be used to an extent that would repay the cost of my opinion but which cost I trust will save him the expense of taking out the patents'.	LB6: 336
I. K. Brunel	R. Orme	25 January 1850	Never receives confidential communications on inventions or gives opinions on them.	LB7:88
I. K. Brunel	J. W. Buller	12 August 1850	Never receives confidential communications. Would be prevented from using good things by his knowing about something similar to subject of a *proposed* patent.	LB7:285–86
J. Bennett	C. W. and J. J. Harrison	06 May 1852	Is invention patented? If not, cannot receive any confidential communications.	LB9:15
I. K. Brunel	John Adams	22 November 1853	His brake invention anticipated by others. As a working mechanic he should not waste his time and money on the brake.	LB9: 262
I. K. Brunel	Eugene Bartholomew	05 May 1855	Cannot receive communications on any plans not patented or open to public.	LB10: 143
I. K. Brunel	C. B. Yarrow	10 May 1855	Cannot take share in proposed patent.	LB10: 144

Notes

(1) All letters are from the Brunel Letterbooks, Bristol University Library, Special Collections.

(2) J. Bennett was for many years Brunel's chief office assistant and dealt with much of his correspondence, often writing on his behalf.