

In search of Samuel Penn, ironworker

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ABSTRACT: This paper is an account of Samuel Penn and his assistants, English ironworkers who travelled to Russia in the 1830s at the invitation of the Russian government. Penn's particular responsibility, when he travelled to Russia in 1831, was to introduce the puddling process. Together with two British assistants, he successfully demonstrated the process in a Urals ironworks in 1839, using firewood as a fuel rather than charcoal or coal. In spite of their achievements, virtually nothing is written in the English language about either Samuel Penn or his assistants. They are viewed as men of some importance by several Russian historians, however, in view of the importance of the puddling process as a precursor to industrialisation. This paper summarises information available from those Russian authors whose publications are available either electronically or in British libraries, appended by entries in English censuses and records of births, christenings and marriages.

Introduction

This paper is an account of the life of Samuel Penn and his assistants, English ironworkers who travelled to Russia in the 1830s at the invitation of the Russian government to introduce the puddling process into a Russian ironworks for the production of bar iron (Hill 2014). They were three of twenty British specialists employed in state-owned factories in the Ural ironworking region in the mid-19th century, and three of ten foreign specialists employed at the state-owned Kamsk-Votkinsk works (Ermakova 2013, 16). Samuel Penn initially demonstrated the puddling process with the assistance of a John Penn in 1834, despite early teething troubles when using firewood as a fuel: these problems were overcome by the recruitment of an assistant in 1839, Bernard Allender, who had previously worked in a Swedish ironworks using firewood as a fuel (Hill 2014). The puddling process was then widely adopted in Russia from the 1850s.

In spite of these achievements, there are only three

brief references to Samuel Penn or his assistants in the English language (Esper 1982; Blanchard 2005; Hill 2014) and one of these (Blanchard) refers to a Samuel John Paine rather than Samuel and John Penn. This contrasts with the range and depth of material in publications available on three other British ironworkers who travelled to Russia in the late 18th and mid-19th centuries, namely Charles Gascoigne, a director of the Carron works in Falkirk who travelled to St Petersburg in 1786 to advise on the casting of cannon and other armaments (Campbell 1961, 10-16, 144-53; Blackwell 1968, 251-2; Bartlett 1983; Cross 1997, 197, 242-61); Charles Baird, a Scottish engineer who was employed at Carron, travelled with Gascoigne, and was subsequently a partner in a steam engine works and shipyard in St Petersburg (Blackwell 1968, 62-3, 114, 252-3; Robinson 1975; Cross 1997, 252, 259-60); and John Hughes, who established a large iron- and steel-works and city (Yuzovka, now Donetsk in Ukraine) in 1872 (Westwood 1965; Bowen 1978; Friedgut 1989; 1994; Edwards 1992; Thomas 2009; Heather 2010). Hughes demonstrated the huge potential for smelting using local ores and good

quality coking coal in the 'New Russia' region of the Empire (now eastern Ukraine), and massive levels of investment were transferred there from 1880 onwards.

Although not widely mentioned in English language publications, Samuel Penn and Bernard Allender are, however, viewed as men of importance by some Russian historians such as Yatsunskii (1973), Yakovlev (1978), Ust'yantsev and Logunov (1992), and Ust'yantsev (1994) in view of the significance of the puddling process as one of the precursors to industrialisation (Yatsunskii 1973, 154). Those historians provide information on Penn's and Allender's time in the Ural region, based on material in the Russian state archives. Two musicians (Maiburova and Gorodilina 2003), who were friends of the family of Peter Tchaikovsky the famous composer, also provide some background on Penn's time in an ironworks at Kamsk-Votkinsk in the Ural region, where the composer's father (Il'ya Petrovich Tchaikovsky) was a director.

Samuel Penn's technical achievements in the Russian iron industry are analysed in the next four sections of this paper, making use of information available from Russian authors whose publications are available electronically or in British libraries. The paper then presents and evaluates available biographical information on Samuel Penn, followed by that on his assistants. Finally there is a discussion of the social contexts of Samuel Penn and Bernard Allender, compared to those of Gascoigne, Baird and Hughes, together with suggestions for further research.

Fining and puddling in Russia in the early 19th century

From the beginning of the 18th century, production from the Russian iron industry developed at a rapid pace, exporting some 50% of its bar iron production including some 25% to Great Britain between 1780 and 1800 (Blackwell 1968, 19-22, 56-62; Hill 2006). The overwhelming majority of Russian bar iron and pig iron had been produced in the Ural region, some 1,600km east of Moscow. Uralian ironmasters enjoyed a high reputation for the quality of their product as the pig iron feedstock was produced from plentiful local supplies of low-phosphorous ores, and both smelting and fining processes were charcoal-fuelled, thereby minimising the quantities of silicon and sulphur in the finished material. In contrast to their counterparts in Britain, Russian ironmasters had no need to substitute either coke or coal for charcoal, as there was an abundance of forests in the Ural region and in many other

ironworking areas of the Russian Empire. Furthermore, charcoal continued to be favoured as Uralian coal was unsuitable for ironworking in view of its high volatility and sulphur content, and difficult to extract because of its hardness: furthermore, possible alternative coal sources elsewhere in the Russian Empire were difficult to transport (Haywood 1969, 55-6). In addition, from 1700 to the early 1830s, Russian ironmasters continued to improve the fining process (Hill 2006; 2014) and reduce the costs of charcoal production (Blanchard 1999; 2000; 2005), although coaling still remained as a comparatively expensive part of the fining process. In contrast to Britain in the 1820s, Russian use of the puddling process was almost non-existent, however, and experiments on the process in the early 1800s had been far from successful (Hill 2006; 2014).

A re-think about the process was commenced when an order was issued from Tsar Nikolai I in 1829, that the Aleksandrovsk Factory in St Petersburg should be equipped for the production of anchors; and it was the technical view of the time that the structural consistency of puddled iron was better than fined iron for such a purpose. The Russian government's Department of Mining was ordered to organise anchor production at the Aleksandrovsk works, and the Ministry of Finance was instructed to recruit a foreign expert in the process of puddling to transfer that technology to Russia. Samuel Penn was selected for that purpose in 1831 (Yatsunskii 1973, 158) and he apparently left for St Petersburg during that same year, as explained later in this paper.

Samuel Penn's arrival and contract

On Penn's arrival, the Aleksandrovsk works was in a parlous financial position, and the tsar then decreed that anchor production at the works 'should be put off until a convenient time'. Penn agreed with a request from the Ministry of Finance, approved by the tsar, to move to the state-owned Kamsk-Votkinsk ironworks in the Ural region (Yatsunskii 1973, 158-60; Tikhonov 1988, 72), established by P I Shuvalov in 1759 and engaged in the manufacture of steel and bar iron materials and products, including anchors and chains (*Entsiklopediya 'Permskii Krai'*: Entry for *Votkinskii* ...). Penn's task was to study the ironworks' organisation of production, and report on recommendations for improvements with appended drawings. He departed for the factory during the spring of 1834 and returned to St Petersburg in December of the same year bringing with him his report and some puddled and fined bars from the Kamsk-Votkinsk works: this was some achievement bearing in mind the scope of investigative and supervisory work required at the

factory and the distances to be travelled (about 2,000 km each way) in difficult conditions. The skill of the workforce received Penn's approbation together with the works' geographical location and abundance of resources, but he was dismissive of the age of the equipment. The Ministry of Finance established a committee, comprised mainly of officials from the Department of Mining, to discuss Penn's recommendations (Yatsunskii 1973, 158-60). Penn was probably fortunate that the committee also contained Charles Baird, the Scottish engineer who had travelled with Gascoigne from the Carron ironworks in 1786 and then settled in Russia. Baird was a partner in an engineering factory close to the Aleksandrovsk works (Blackwell 1968, 62-3, 114, 252-3; Robinson 1975; Cross 1997, 252, 259-60) and greatly respected by the Russian government and industry; Baird's works probably also stood to gain from orders of machinery for Kamsk-Votkinsk.

The committee agreed with all of Penn's proposals and considered that puddling could also improve the quality, and reduce the costs, of all types of wrought iron products in addition to anchors. The length of the contract to be offered to Penn was unclear; the Ministry of Finance had originally proposed five or six years, whereas the tsar recommended 'up to the time to be put aside' (ie the time required) to install machinery to produce anchor chains, rather than the anchors themselves as originally intended. It appears that the negotiations were quite tough, and possibly acrimonious, between the Ministry and Penn; the former was apparently stubborn and Penn refused to budge. His potential value to the Russian government and his strengths in negotiation can be seen from the relative generosity of his five year contract agreed in 1835 in line with his original proposals. This included a salary of some 10,000 'assigned' roubles, or some 2,800 'silver' roubles, and the provision of accommodation, heating and lighting and return travel costs for his family (Yatsunskii 1973, 159-60; Ust'yantsev and Logunov 1992, 45; Ust'yantsev 1994, 105-7). Penn's salary alone is estimated to have been far in excess of wages paid at the time to a Russian ironworking foreman or master craftsman (about 40 silver roubles per annum, or 150 'assigned' roubles) (Strumilin 1967, 375-81) although that may be a low estimate, and also higher than that of a Russian mining engineer (2,000 silver roubles per year) (Ust'yantsev 1994, 105-7). Penn was also well-resourced: the government provided him with two foundrymen (probably moulders), a patternmaker, a turner and a fitter from the Aleksandrovsk works to produce machines and tooling there to his specifications and then assist him in their installation at Kamsk-Votkinsk. In addition, he was provided with an interpreter, and

assistance from a John Penn (possibly a relative, see below) at Votkinsk. Samuel's contract was subsequently extended from 1840 to 1842, and thence to 1843; during that extension he was also granted the right to travel to privately-owned ironworks for consultations (Yatsunskii 1973, 160).

Early experiments and the arrival of Bernard Allender

The experiments were not without their problems, however. On the positive side, Samuel Penn and his team produced puddled iron of better quality in the Ural region than that available from English furnaces, which he partly ascribed to the higher quality of the locally charcoal-smelted pig iron used as feedstock. That would have removed the necessity of a desiliconisation stage, required in Britain to remove some of the impurities from coke-smelted pig iron, before loading into the dry-puddling furnace. In addition, the process was shown to be faster than fining. Of particular significance was Penn's adaptation of the process to use firewood as a fuel rather than the more expensive charcoal used in fining, and in place of coal which was used as a fuel for puddling in England (Yatsunskii 1973, 161). That latter substitution was important as the Ural ironmaking region was well-endowed with forests although charcoaling was quite expensive (approximately doubling the cost of the wood used in its production), and the local coals were unsuitable for puddling (Hill 2014).

Early experiments resulted in higher pig iron consumption than in fining, however, (Yatsunskii 1973, 161) and these problems were possibly due to Penn's previous experience of coal-fired, rather than wood-fired, puddling furnaces. Pig iron consumption had also been fairly high in British puddling furnaces using Cort's dry-puddling process, though, and Penn was probably more familiar with that technique. The wet-puddling process which reduced pig iron consumption was not widely adopted in England until the 1830s (Gale 1969, 68; Mott 1977; 1983, 76), and so knowledge and experience in its use may not have been widespread outside Staffordshire when Penn left for Russia in 1831.

The high pig iron consumption was therefore considered to make puddling more expensive than fining (Yatsunskii 1973, 161), but this may also have been influenced by the higher capital costs of the newer puddling furnaces compared to the older fining hearths (Hill 2014). Another Briton (Bernard Allender), who had gained experience in wood-fuelled puddling at the Nyby works in Sweden, was recruited to Kamsk-Votkinsk in August 1839. He

was also joined by a young graduate of the Russian Mining Institute (V Olyshev) who had obtained three years of practical experience in Sweden, including some time at the Nyby ironworks. Penn's furnaces were modified by Allender and the wood was cut into smaller pieces which led to further improvements in fuel consumption, and reduced some of the problems of high pig iron usage. By 1843, material and fuel costs from puddling were marginally cheaper than those of the most efficient fining process (*malokrichnyi* hearths) and subsequent developments enabled the process to be more widely adopted from the late 1840s (Yatsunskii 1973, 164-5).

By 1860, the Russian ironworking industry was producing some 100,000 tonnes of puddled iron annually from 415 furnaces, accounting for approximately half of the total national output of bar iron (Blackwell 1968, 58; Strumilin 1967, 337). Although this was small compared to British production at the time, Russian manufacture using the puddling process had expanded from zero over a twenty year period. Furthermore, bar iron output from the puddling process had reached the same quantity in 1860 as that from more than 1,000 hearths using the long-established fining process, which was at the same production level as some sixty years previously (Strumilin 1967, 337). Fining was continued, however, as it produced better material for some applications such as plates to be surface-treated (Hill 2014).

Russians' evaluation of Samuel Penn and Bernard Allender

Russian references to Samuel Penn clearly indicate that he was well respected and held in high regard, as also was Bernard Allender. For example when Penn completed his contract in 1843, the director of the Kamsk-Votkinsk factory (Il'ya Petrovich Tchaikovsky) praised his work, especially the training of Russian ironworkers, in a report to Glinka, the Head of the Urals Works. Glinka in his turn forwarded Tchaikovsky's report, which also included a praiseworthy assessment of Allender, to the Mining Research Committee and appended to it his own appreciation of Penn's conscientiousness and skill. Those views were also echoed by the young Russian graduate (V Olyshev) who worked with Penn and Allender (Yatsunskii 1973, 163). Another report about Penn by Il'ya Petrovich Tchaikovsky, is provided by two Russian musicians who were friends of the family. They write that Il'ya Petrovich praised Penn for his intelligence and skill (Maiburova and Gorodilina 2003, 54).

Biographical information on Samuel Penn

In spite of Samuel Penn's achievements and praise from Russian sources, we know little about Penn's life other than his work in St Petersburg and Kamsk-Votkinsk. We do have some information on his family life, however, from the musician friends of Il'ya Petrovich Tchaikovsky (Maiburova and Gorodilina 2003, 54) who quote a reference by him to Penn's 'very nice wife and simply delightful daughters'. Although Susanna and Alice (see below) are explicitly mentioned as young girls (*devochki*), there could have been some confusion over the names of mother and daughters as one of Penn's daughters was named Susan (see below) and his wife's name was Susanna. Another source for identifying Penn's wife is a reference to his widow (referred to as either Sussana or Susan) as she petitioned the Russian government in 1872 for help in the maintenance of two sick daughters following the (undated) death of her husband. Although under no legal obligation as Samuel's contract was long finished and he had apparently left Russia in 1843, the Russian government provided a one-off ex-gratia payment of 500 silver roubles in recognition of his previous services (Ust'yantsev and Logunov 1992, 45; Ust'yantsev 1994, 105-7).

Using that information in Russian sources on Samuel and his family as a starting point, a search of English baptisms, deaths and marriages has provided a record of a marriage between a Samuel Penn and a Susanna(h) Baker in St Peter's Church, Wolverhampton, in 1818 ('England Select Marriages, 1538-1973'). There is also an entry in church records of the baptism of Samuel and Susanna's eldest daughter, Anne, in Liverpool in 1819 ('Lancashire, England, Church of England ...' Entry for Anne Penn). Then followed a series of nonconformist registrations for a younger daughter Susan, referred to previously, baptised in Liverpool in 1821, a further daughter, Elizabeth, born in 1823 and then a son Joshua (the same name as Samuel's possible grandfather, see below) born in 1825. Joshua may have been in poor health as he was christened only two days after his birth and on the same day as Elizabeth. In all of those cases, Samuel was listed as a blacksmith or smith ('England & Wales, Non-Conformist ...' Entries for Susan Penn, Elizabeth Penn and Joshua Penn). Furthermore, the record of baptism of their youngest daughter, Alice (see above) on 8 May 1831, also in Liverpool, mentions a previous residential address but a recent departure to 'Petersburg, Russia' ('England & Wales, Non-Conformist ...' Entry for Alice Penn). That year coincides with Samuel's recruitment by the Ministry of Finance and thereby

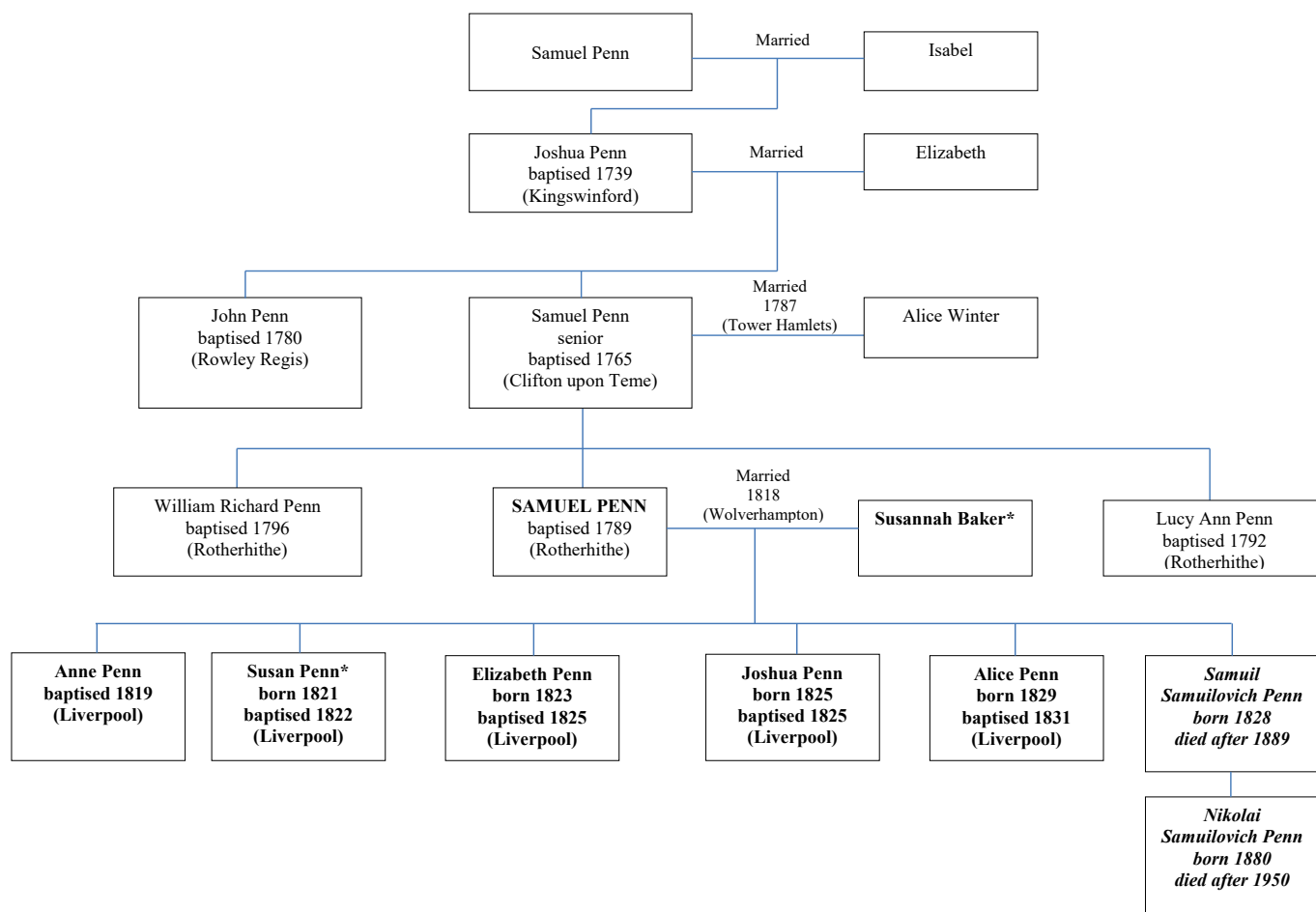


Figure 1: Samuel Penn's Family Tree. Names in bold are recorded relationships for Samuel Penn; plain text is speculative. Sources are English and given in the text, except for names in bold italic which indicates Russian sources given in the text. *See text for discussion of forename.

confirms that this is almost certainly the family of our Russian traveller. The information on his marriage also narrows Samuel's probable birth date to sometime between 1785 and 1800, enabling him to have reached marriageable age by 1818, to have gained sufficient experience by 1831 to carry out his work in Russia and also to have been young enough to face an arduous journey to the Urals. The above information on Samuel's wife and children is summarised in Figure 1.

Samuel's recorded occupation as a blacksmith in Liverpool between 1819 and 1825, clearly demonstrates a competence in the forging of bar iron and the possibility that he had worked in a dockyard and perhaps even gained experience in the production of anchors. Puddling is a different skill from forging, however, but similar at the fusion stage. Although he could have assimilated high levels of skill in puddling and particularly in forging, a question arises as to how he became so well-known to be recruited by the Russian Ministry of Finance. A partial answer to this question is provided by the publication of a technical pocketbook in Liverpool in

1825 containing a set of data on the weight of iron bars of various shape, cross-section and length, written by a 'Samuel Penn, mechanic' (Penn 1825) and referred to by Thomas Telford (Telford 1825, 582-3 [appendix o.6]) in his account of the construction of the Menai Suspension Bridge. A study of Penn's pocketbook reveals a computational ability, an understanding of scientific terms such as specific gravity, and an enquiring turn of mind as the author refers to '... numberless experiments in the Chain Cable Manufactory of Messrs Brown, Logan & Co ...' (Penn 1825, v). Furthermore, publication of his book might also have brought him to the attention of the Russian authorities. The author of these data therefore was almost certainly our Russian traveller, as he was certainly in Liverpool from 1819, probably staying there until his departure to Russia in 1831, and the contents of his published pocketbook demonstrate the intelligence referred to by Il'ya Petrovich Tchaikovsky.

At the time of writing it has been possible to find records of baptisms of several Samuel Penns between 1785 and 1800: these include in Rotherhithe (Surrey) in 1789 (the

son of Samuel and Alice) ('London, England, Church of England ... 1538-1812' Entry for Samuel Penn), Grimley (Worcestershire) in 1790 (the son of Bate and Mary) ('England, Select Births ...' Entry for Samuel Penn, son of Bate and Mary), and Dawley Magna (Shropshire) in 1799 (the son of a William and Mary) ('England, Select Births ...' Entry for Samuel Penn, son of William and Mary). The latter Samuel may not have been able to gather sufficient ironworking experience to have published a book by 1825, however, nor to attract the attention of the Russian government by 1831, but it is remotely possible that the subject of this research was the son of Bate and Mary. Although their son Samuel was born in Grimley, Bate and Mary (if the same couple as recorded in Grimley) appear to have spent much of their time in Dudley where Bate was a hop merchant ('UK Register of Duties ...'). As Dudley is only about 12km from Wolverhampton, it is not unreasonable for Bate and Mary's son to have been married there. Furthermore, they also had a son called John, the same name as one of Samuel's assistants in Russia (see below), baptised in a non-conformist church near to Dudley in 1779 ('England & Wales, Non-Conformist ...' Entry for John Penn). John Penn is subsequently recorded in 1835 as a maltster ('England, United Grand Lodge ...' Entry for John Penn), however, which seems to rule him out as Samuel's assistant who was probably still in Russia at that time or in transit, and as there was no apparent family link to ironworking it is unlikely that Samuel, the son of Bate and Mary, was the puddler who sailed to St Petersburg in the 1830s.

The traveller to Russia, therefore, is more likely to have been the Samuel born in Rotherhithe (son to Samuel and Alice), as Alice was also the name given to Samuel's youngest daughter who also travelled to Russia (Fig 1). Incidentally, present research does not show any connection between Samuel senior and Alice and the family of the engineer John Penn working at Greenwich (which is near to Rotherhithe) from 1800 (ODNB). There remains the obvious query about what brought Samuel Penn to Wolverhampton in 1818, although he could have been working in the Staffordshire iron industry, or staying there whilst travelling from Rotherhithe to Liverpool. Samuel senior (Fig 1) may have been a Samuel baptised in Clifton upon Teme, Worcestershire, in 1765, the son of an Elizabeth and Joshua (see the following paragraph) and Joshua, in his turn, was the son of a Samuel and baptised in Kingswinford (located on the River Stour in Staffordshire) in 1739 ('England, Select Births ...' Entries of baptism for Samuel Penn, son of Joshua and Elizabeth, and for Joshua Penn). Both the Teme and the Stour were sources of water power for ironworks in

the 18th century (Ince 1991) located relatively close to Joshua and Samuel senior's possible birthplaces, thereby enabling them to have obtained early employment and experience in that industry.

The possibility of Samuel senior and Joshua being father and grandfather to Samuel, the traveller to Russia, is strengthened by a report in 1828 of an affidavit for recompense from a 'Samuel Penn senior' for work at Jellicoe and Cort's Fontley works in 1784 (Anon 1828), when the patent for the puddling method was awarded. Mr Samuel Penn, senior, refers to his involvement in the slitting of puddled iron at the Fontley works in 1784, and the roll-turning carried out by his father, Joshua. Although the evidence is circumstantial, it is possible that Samuel senior moved to Rotherhithe shipyard in 1784 to assist in the adoption of Cort's process, where it was apparently used more successfully than subsequently at Darby's works in Coalbrookdale or Crawshay's Cyfartha ironworks in Merthyr Tydfil (Mott 1983, 47-56, 72-5, 86). If there was disagreement with Jellicoe and Cort over possible royalty payments, particularly after Jellicoe's death in 1789 and Cort's bankruptcy in 1790 (Mott 1983, 57-66), there would have been little incentive for Samuel senior to return to Fontley. Samuel senior and Alice may have been the Samuel Penn and Alice Winter married in St George in the East, Tower Hamlets (close to Rotherhithe) in 1787 ('London, England, Church of England ... 1754-1921' Entry for marriage of Samuel Penn and Alice Winter), who apparently stayed in Rotherhithe until at least the mid-1790s, as two further children were baptised in St Mary's, Rotherhithe in 1792 and 1796 ('London, England, Church of England ... 1538-1812' Entries for baptism of Lucy Ann Penn and William Richard Penn).

It is also likely that the Russian government or its advisers knew of Cort's patent, and it would have made sense to approach previous employees of the Fontley works or those of its licensees, as a starting point to approach ironworkers in 1831. Although Samuel did not work at Fontley, someone of the same name had, and Samuel senior would have attracted some attention from the industry and associated professionals due to the published report of his affidavit in 1828. Furthermore, as mentioned earlier, Samuel had also published his book in 1825 based on experiments in an ironworks which might have aroused the interest of the Russian government or its advisers. He would therefore have been an ironworker with proven expertise in 1831, and a sound choice to transfer puddling technology to Russia.

The previous reference to Samuel Penn leaving Russia

in 1843 (Ust'yantsev 1994, 106, 107) may only relate to his departure from Kamsk-Votkinsk, however, as Ust'yantsev also records that he had the right to engage in consultancy to private companies between 1840 and 1843, and there would have been many opportunities available to such a talented ironworker in Russia after 1843, particularly in the Urals. There is also evidence that Samuel had a son (Fig 1), namely Samuil Samuilovich Penn (following the Russian custom of given name and patronymic) who came '...from the family of an Englishman arriving in 1836 travelling for work at the Votkinsk factory...'. Samuil Samuilovich's year of birth is given as 1828 although there is no record of his birth in England at around that time. The source also states that he worked in Russia as a translator in the Transcaucasus region in the 1850s, and subsequently as a journalist, and administrator in the 1860s in the Perm province of the Ural region: his death is stated as '...after 1889' (*Entsiklopediya 'Permskii Krai': Entry for Penn...*). As Samuil Samuilovich apparently remained in Russia after the completion of Samuel's contract in 1843, Samuel himself or Susanna may also have stayed there or returned at a later date. Samuil Samuilovich also had a son (Nikolai Samuilovich Penn, born in 1880, see Figure 1) who studied in Ekaterinburg and subsequently worked as an educator in mining and metallurgy in the Tomsk province (in Western Siberia, an adjacent region to the Urals): Nikolai Samuilovich was still alive in 1950 (Romanova and Baksht 2009, 96-101).

Nothing more is recorded of Samuel's life after 1843, however, until Susanna petitioned the Russian government in 1872 for help in the maintenance of two sick daughters following her husband's undated death. It is not clear whether Susanna found herself in dire financial straits at the time of Samuel's death or some years after: puddling was strenuous work (McNeil 1990, 165) and few puddlers lived well beyond their thirties (Landes 1969, 218), although Bernard Allender lived well into his seventies and John Penn may have lived to his sixties (see below). Samuel had probably moved into supervisory work by his mid-thirties however, and may therefore have survived until 1872; but in any event it would have been easier for Susanna to have petitioned the Russian government if she was still living there with her family, rather than if she had returned to England.

Biographical information on Samuel Penn's assistants

A John Penn was born to a Joshua and Elizabeth Penn, and baptised in Rowley Regis in 1780 ('England, Select Births ...' Entry for John Penn, son of Joshua and

Elizabeth). If that was the same John Penn who travelled to Kamsk-Votkinsk then he might have been Samuel's uncle as the names of John's parents were the same as those of Samuel senior. If that was the case then John would have been 51 years old if he had travelled to Russia in 1831 and 63 years old at the end of Samuel's contract in 1843, which may have been old for the demanding work of a puddler but not impossible.

Some information on a Bernard Allender is available from English censuses; there are some inconsistencies, however, in his recorded forename and place of birth. The earliest reference within the time frame of this research is in the English census of 1861 which lists a Bernard Allender, widower of 57 years old born in Burton, Notts, occupied as a puddler, and boarding in Rotherham. In the 1871 census, a Barnard Allender, widower of 67 years old and born in Burton on Trent and occupied as a foreman in an ironworks, is listed as head of a house in Midland Terrace in the Park Gate, Rawmarsh, area of Rotherham. The 1881 census refers to a Bernard Allender, 77 year old widower born in Burton on Trent, Staffordshire, retired engineer, living with his daughter Elizabeth Wood (27 years old, born in Barnsley, and married in 1880), son in law (George Wood) and two of George's children, in the Midland Hotel Sheffield where Mr Wood was the proprietor. Although there are slight differences in the entries of the three censuses they are minor, and presumably refer to the same person: they show his professional progression and indicate that his birth was between 1802 and 1804. According to the 1891 census, Elizabeth and George had moved to the Royal Hotel, Highfields, with their nine year old daughter Maggie, but there is no mention of Bernard: presumably he had died between 1881 and 1891, aged somewhere between 77 and 87 years.

In view of the comparative rarity of Bernard Allender's name and his recorded occupation as a puddler, it is likely that the person who was born in Burton upon Trent and spent his latter days in Rotherham and Sheffield was our Russian traveller. Although Burton upon Trent is famous as a brewing town, it was also the location of a large ironworks and boatyard owned by the Lloyd family in the 19th century (Lloyd 1975, 122-213); Bernard could therefore have gained training and experience as an ironworker near to his place of birth before travelling to Sweden and Russia. He was possibly the son of a George and Mary Alander, baptised on 4 July 1803 at St Francis of Sales church, Needwood, Staffordshire, near to Burton upon Trent ('England, Select Births ...' Entry for Bernard Alander), although there is a discrepancy in the spelling of the family name.

Samuel Penn and Bernard Allender in context

The material above has attempted to provide background information on an influential English ironworker and his assistants, but there is clearly more to be done. As mentioned in the second paragraph of this paper, the information available in the English language on Samuel Penn and his assistants is far less than on other British ironworkers who travelled to Russia, namely Gascoigne, Baird and Hughes. All of the latter three appeared to have had their origins in different social groups to those of Penn and Allender, however, which may have led to more biographical material becoming available: Gascoigne's mother was from an aristocratic family (Campbell 1961, 10; Bartlett 1983), Baird's father had a senior position at the Forth and Clyde Canal in Scotland (Robinson 1975), and Hughes's father was a senior engineer at the large Cyfartha ironworks in Merthyr Tydfil (Heather 2010). Furthermore, Gascoigne, Baird and Hughes either owned, or became partners in, substantial works in Russia which would have raised their public profile at the time and they clearly made significant contributions to Russian industrial development; Gascoigne made major contributions to the manufacture of Russian armaments (Campbell 1961, 144-53; Bartlett 1983) and Baird's works in St Petersburg built the first Russian steamship in 1815 and had constructed 141 steam engines by 1825 (Robinson 1975). The production of rails from Hughes's works enabled faster movement of troops within Russia (Westwood 1965) as well as providing a transport infrastructure for subsequent economic development. Gascoigne and Hughes had also been company directors in Britain, although Gascoigne's commercial success was chequered and he also received unwelcome attention from the English and Scottish legislatures over the sale of production equipment to Russia (Campbell 1961, 123-53).

At present we cannot be completely certain about Samuel Penn and Bernard Allender's origins or any of their possible entrepreneurial activities, but it is not unreasonable to speculate that Penn was the son of an iron slitter and grandson of a roll turner, both highly skilled ironworking trades; and Allender continued to develop his career as an ironworker on his return to England. Penn had also shown an ability to collate and interpret data as shown by the publication of his book and it is possible that his family was connected to a John Penn who was engaged in methods for rolling iron as early as 1728 (Strumilin 1967, 406), but this speculation clearly needs further research. Samuel Penn and his assistants, however, probably did not share the

same social origins as Gascoigne, Baird and Hughes, and perhaps were not as entrepreneurial. Nevertheless, Penn and Allender were highly trained, experienced and intelligent ironworkers who made significant contributions to Russian industrial development as the output of puddled iron in Russia rose rapidly after their pioneering work in the 1830s and 1840s. They received recognition and approbation for their contributions to national industrial developments by Russian colleagues and the tsarist government, but have attracted little attention in their native country. This paper is an attempt to remedy that gap, but as with all research studies there is clearly scope for further investigations as to whether there is any additional information in the archival sources used by the Russian authors cited in this paper, and whether more is available in English local records on the early lives of Penn and Allender before they left for Russia.

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- Note on transliteration: almost all published sources in the Russian language cited in this paper, as well as references to places and individuals, have been transliterated from the Cyrillic script in conformance with British Standard BS2979:1958 (*Transliteration of Cyrillic and Greek characters*). The only exception to that practice has been conversion of the transliterated 'Chaikovskii' to the commonly used 'Tchaikovsky'.
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