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“The thread of migration: a Scottish-French linen and jute works and its workers in France, c. 1845-c.1870”¹

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Keywords: France; Scotland; Britain; Dundee; Jute; Linen; Spinning; Migration

Short abstract:

After 1815, European manufacturers in several sectors sought to reap the benefits of British technical superiority through the acquisition of British machinery and the workers who could operate this. France was one of the beneficiaries of this transfer process. Along with iron, engineering, and tulle making another British industry that established a French presence was linen and jute textile manufacturing.

The authors present the results of joint research carried out in Scotland and France, focusing on a spinning mill established by a Dundee-Paris partnership in Ailly-sur-Somme in 1845. Much of the technical, managerial and worker input came from Dundee, then becoming Britain's and for a time the world's leading coarse textile manufacturing centre – ‘Juteopolis’. But the flow of expertise was not always uni-directional and there was cultural interchange too in a process that by the 1870s had resulted in Ailly being one of the most important industrial establishments in France.

¹ The authors would like to thank Caroline Brown, of the University of Dundee Archive Services for her assistance in identifying and supplying much of the primary material and Annick Michaud for material on the French side. This article has benefited from the valuable reading of François Jarrige, Liliane Pérez, Philippe Rygiel, Jean-Marie Wiscart and two anonymous reviewers, whom the authors would also like to thank here. The Dundee-Ailly connection was first presented at the “Britain and the world” conference in Edinburgh in June 2012.

Long abstract: After the end of the Napoleonic wars, European manufacturers in several industrial sectors sought to reap the benefits of British technical superiority through the acquisition of British machinery and the workers who could operate this. France was one of the beneficiaries of this transfer process. As well as iron making, engineering, and tulle making another British industry that established a presence in France was linen and jute textile manufacturing. Along with capitalist proprietors, mill managers and engineers, linen and jute workers transferred to various parts of France. In all several hundred made the channel crossing, arriving in such unlikely places such as Landerneau in Brittany, Rouen in Normandy, Haubourdin in Northern France and Ailly-sur-Somme in Picardy. Some were from Scotland, which in the early nineteenth century was catching up with England in industries that in the previous century had lagged some way behind. But Scotland was several hundred kilometers north of Yorkshire and Lancashire, England's and Europe's most advanced manufacturing counties. Why then did Scottish firms decide to establish plants in France? What persuaded some of their workers – mainly but not always female – to go overseas, sometimes never to return? How were they recruited? What were the practicalities of these migrant journeys – in this case from Dundee, to Folkstone then across the English Channel to Boulogne and Picardy? How did the firm integrate with the indigenous population? What does this tell us about migration patterns in the early industrial period?

Detailed information that would allow for full responses to these questions is hard to find. Nevertheless as an initial contribution to the topic the authors present the results of joint research carried out in Scotland and France, focusing on a linen and jute works established by a Dundee-Paris partnership in Ailly-sur-Somme in 1845. Much of the technical, managerial and worker input came from Dundee, then well on the way to becoming Britain's leading coarse textile manufacturing town, but the flow of expertise was not always one way. Fortunately a considerable amount of documentation – albeit patchily – has also survived for this two-nation, integrated venture, particularly for the critical early years. By the 1870s it was being described as one of the most important industrial establishments in France.

The significance from the later eighteenth century of the transfer of technology and technical expertise, mainly from Britain, has long been understood by historians of European industrialisation. W. O. Henderson famously argued that Britain had played a decisive part in the industrialisation of Western Europe; in his assessment, British engineers and businessmen featured prominently in a narrative of diffusion from a technologically advanced Britain to a backward continent, from 1750 to 1870.² This has been challenged and there is now a significant revisionist body of work. It argues in particular that the industrial take-off was not so radical and that British prominence was not so important by the end of the 18th century. It also argues that the national scale is not necessarily the right one for such assessment, especially if one tries to focus on technological transfer and circulations “from below”.³ It even argues that the “diffusion” model on a macro-economic model is not satisfying. As Liliane Pérez and Catherine Verna have argued, local characteristics always interfere with circulation processes; delays, dilutions, failures and detours make it impossible for historians to think of a homogenous model of diffusion, either from Britain to Europe, or from Europe to the world.⁴

The importance of ‘manual skill and practical learning’ that could not easily be acquired simply by observation or by reading instruction manuals has also been acknowledged. Hence, the 1719 and subsequent British bans on the emigration of skilled artisans, which prevailed until 1824, when the ascending free-trading doctrine led to the repeal of restrictions on this emigration. Accordingly, such learning took longer, especially in those regions and localities where skills and knowledge of this kind had not been required beforehand. We also know that in some cases, skilled workers from the continent could make their way to Britain, in sectors where expertise was wanted. For example, Renaud Morieux has studied a flow of dozens of linen workers (spinners, winders and weavers) from Cambrésis (in Northern France) to a linen manufacture established in 1761 by Frenchmen in Winchelsea (Sussex), with the support of the British government.⁵ What is also clear is that most of the initiative in seeking to acquire British technology and managers, engineers and other skilled workers came from the

² W. O. Henderson, *Britain and Industrial Europe 1750-1870. Studies in British influence on the Industrial revolution in Western Europe*. Liverpool University Press, 1954.

³ John R. Harris, *Industrial espionage and technology transfer: Britain and France in the eighteenth century*, Aldershot, Ashgate, 1998; Liliane Hilaire-Pérez, « Transferts technologiques, droit et territoire: le cas franco-anglais au XVIII^e siècle », *Revue d'histoire moderne et contemporaine*, vol. 44, n° 4, Oct. – Dec., 1997, p. 547-579. Patrice Bret, Irina Gouzévitch et Liliane Pérez (dir.), numéro thématique “Les techniques et la technologie entre la France et la Grande-Bretagne XVII^e-XIX^e siècles », *Documents pour l'histoire des techniques*, 2010, n°19. This journal issue contains the proceedings of the Paris conference « Les échanges techniques entre la France et l'Angleterre (XVI^e-XIX^e siècles) Réseaux, comparaisons, représentations » held in Paris, on 14-16 December 2006. It is available online : <http://dht.revues.org/1243>

⁴ Liliane Hilaire-Pérez and Catherine Verna, “Dissemination of technical knowledge in the Middle Ages and the Early modern Era: new approaches and methodological issues”, *Technology and Culture*, vol. 47, n°3, 2006, p. 536-565.

⁵ Renaud Morieux, « La fabrique sociale des réseaux migratoires. Les ouvriers du lin entre Cambrésis, Pays-Bas autrichiens et Sussex dans la seconde moitié du XVIII^e siècle », *Documents pour l'histoire des techniques* [En ligne], 19 | 2^e semestre 2010, mis en ligne le 11 avril 2011, consulté le 21 novembre 2014. URL : <http://dht.revues.org/1286>

European continent, rather than such opportunities being sought out by British firms.⁶ At the same time however there had to be an attraction in such complicated movement and business integration for those British individuals or companies who responded positively to such invitations. But, paradoxically, although flows of British artisans to the continent were more frequent, especially after the end of the Napoleonic wars and the repeal of prohibitions on the emigration of artisans in 1824, we still have few documented studies of such cases. Notable exceptions are Kristine Bruland's research on British technology and Norwegian textiles, and Rainer Fremdling's study of the iron puddlers.⁷ As for France specifically, there is Pierre-Jacques Derainne's unpublished PhD dissertation on immigrants to France in 1830-1852.⁸ There are also some local studies, as well as studies on particular manufacturing sectors.⁹ Given the fact that France's modern cotton, woollen, flax and linen and jute industries were heavily dependent upon British technology and know-how, the establishment of a flax and jute spinning works at Ailly-sur-Somme in Picardy in northern France that drew on the technical and managerial expertise of the Dundee-based flax and linen manufacturing firm of Baxter Brothers was not of itself unusual. Yet the venture has attracted little interest amongst historians, including business historians who have studied what was Dundee's single biggest flax and linen producing firm. This may in part be due to the sources available. Any transnational study has to cope with the imbalance in what sources have survived. It often happens that inflows and immigration are easier to study than outflows and emigration.¹⁰ However, in the case of the Dundee-Ailly connection, little is available on the French side for the period from 1845 to 1870. Neither the small village of Ailly-sur-Somme, nor the

⁶ Sidney Pollard, *Peaceful Conquest: The Industrialisation of Europe 1760-1970* (Oxford, 1981, 2002 ed.), pp.142-8.

⁷ Kristine Bruland, *British technology and European Industrialization: the Norwegian textile industry in the mid-nineteenth century* (Cambridge, 1989); Rainer Fremdling, "The Puddler. A Craftsmen's Skill and the Spread of a New Technology in Belgium, France and Germany", *Journal of European Economic History*, vol. 20, n° 3, 1991, pp. 529-567.

⁸ Pierre-Jacques Derainne, *Le travail, les migrations, les conflits en France. Représentations et attitudes sociales sous la monarchie de Juillet et la seconde République*, thèse sous la direction de Serge Wolikow, Université de Bourgogne, 1998-1999 ; Pierre-Jacques Derainne, « Les perceptions sociales des travailleurs migrants britanniques en France dans la première moitié du XIX^e siècle », in Sylvie Aprile et Fabrice Bensimon (dir.), *La France et l'Angleterre au XIX^e siècle. Echanges, représentations, comparaisons* (Paris, 2006), pp. 351-367.

⁹ Michel Cotte, « Le rôle des ouvriers et entrepreneurs britanniques dans le décollage industriel français des années 1820 », in Bret, Gouzévitch et Pérez (dir.), *op. cit.*, pp. 119-130 ; Annie Laurant, *Des fers de Loire à l'acier Martin. Vol. 1 Maîtres de forges en Berry et Nivernais* (Paris, 2005) ; Yves Blavier, *La Société linière du Finistère. Ouvriers et entrepreneurs à Landerneau au XIX^e siècle* (Rennes, 1999), pp. 87-98 ; Geneviève Dufresne-Seurre, *Les Waddington, une dynastie de cotonniers en Eure-et-Loir (1792-1961)* (Chartres, 2011) ; Gerd H. Hardach, "Les problèmes de main-d'oeuvre à Decazeville", *Revue d'histoire de la sidérurgie*, 8, 1967 ; David Brooke, *William Mackenzie. International Railway Builder* (London, 2004) ; Benoît Noël, « Outsiders. Petites entreprises et petits entrepreneurs anglo-calaisiens dans le marché français des tulles et dentelles mécaniques de la première moitié du XIX^e siècle » in Claire Zalc et Anne-Sophie Bruno (dir.), *Actes de l'histoire de l'immigration*, 2005, numéro spécial, vol. 5, 2005, pp. 161-180 ; Alain Alexandre, Michel Croguennec, *Histoires d'usines. 180 ans de vie industrielle dans l'agglomération rouennaise* (Nolléval, 2013).

¹⁰ Notable exceptions to this are: Charlotte Erickson, *Leaving England: Essays on British Emigration in the Nineteenth Century* (Ithaca (New York), 1994) ; Eric Richards, *Britannia's Children: Emigration from England, Scotland, Wales and Ireland Since 1600* (London, 2004).

département of the Somme, have kept significant records on the early years of the company. French economic historian and specialist of Picardy Jean-Marie Wiscart has indeed found some patchy information on the Carmichael business in Ailly, though not so much.¹¹ This is partly because Picardy was invaded and was a battlefield during both World Wars: many company records were destroyed then, or when companies closed down. The Evangelical church in Amiens, which had been built in the Scottish Presbyterian style and was partly financed by James Carmichael, was also destroyed with its records by bombings in 1940. In the early 1970s, Jean-Paul Delahaye had access to some family papers - including some excerpts from Carmichael's diary – which have been lost or destroyed since.¹² At the same time, the correspondence of the Carmichael brothers – James in Dundee and Peter in Ailly – has been kept and it offers invaluable insight into the venture. This is why, paradoxically, the Dundee-Ailly connection is better documented with British rather than French sources.

By the 1860s Baxter's with over 4,000 employees and a massive mill and factory complex, was probably the largest of its kind in the world.¹³ Even economic historians who have examined Dundee's global textile trade have ignored the French initiative. Internationally, the focus has been on Dundee's place within the nexus of the British Empire.¹⁴ This makes sense in that Bengal was the main source of the raw material, jute, and Kolkata was soon to become Dundee's main rival, with the establishment of large-scale mills and weaving factories, many of which depended on inputs of Dundee capital, but more importantly the contributions of Dundee-bred managers, overseers and engineers.¹⁵ Most recently it is the decline and virtual disappearance of jute manufacturing in Dundee that has taken central stage.¹⁶ Dundee's foray into textile manufacturing in Europe therefore remains to be investigated.

This article is a preliminary attempt to fill this lacuna. But the article is concerned too with the wider issues of the complex processes by which technology was transferred, how knowledge about mill management and machinery was organised, financed and learned, aspects of technological diffusion which until relatively recently have been overlooked. Critical in this regard are not only the political and legal frameworks in which technology transfer occurred but also what Maxine Berg and Kristine Bruland have termed the 'cultural matrix', that is the social environment in which new technology was introduced and adopted.¹⁷ This process was far from straightforward. At the level of the plant, managers and

¹¹ Jean-Marie Wiscart (dir.), *Les Patrons du Second Empire. Picardie* (Paris, 2007); Jean-Marie Wiscart, « Entre Bible et navette en Picardie septentrionale : XIXe siècle, le renouveau », *Bulletin de la Société de l'Histoire du Protestantisme français*, Oct-Dec 2000, pp. 743-772.

¹² Jean-Paul Delahaye, "La Filature d'Ailly-sur-Somme", unpublished MA dissertation (mémoire de maîtrise), université d'Amiens, 1976.

¹³ Anthony J. Cooke (ed.), *Baxter's of Dundee* (Dundee, 1980).

¹⁴ Gordon T. Stewart, *Jute and Empire: The Calcutta Jute Wallahs and the Landscapes of Empire* (Manchester, 1998); Anthony Cox, *Empire, Industry and Class: The Imperial Nexus of Jute, 1840-1940* (London and Edinburgh, 2012); Jim Tomlinson, *Dundee and the Empire: 'Juteopolis' 1850-1939* (Edinburgh, 2014).

¹⁵ Stewart, *Jute and Empire*.

¹⁶ Jim Tomlinson, Carlo Morelli and Valerie Wright, *The Decline of Jute: Managing Industrial Change* (London, 2011).

¹⁷ Maxine Berg and Kristine Bruland, 'Culture, Institutions and Technological Transitions', in Maxine Berg and Kristine Bruland (eds), *Technological Revolutions in Europe: Historical Perspectives* (Cheltenham, 1998), pp.3-16.

workers – in this case from Dundee – had to adapt to unfamiliar surroundings including language and religion and even the weather, whilst the indigenous population from proprietors through to factory hands, had to grapple with the technical aspects of flax spinning but also adjust to and adopt radically new ways of working.

The Dundee-France connection in linen

As indicated, it was from France that the overture for a partnership with the long-established firm of Baxter Brothers in Dundee came. The firm's founder, John Baxter, originally a hand-loom weaver, had settled in Dundee around 1728. Over the course of the eighteenth century Baxter and his descendants concentrated on the manufacture of linen cloth by putting out locally grown, hand-spun flax yarn to handloom weavers in and around Dundee, and then arranging the sale of the finished cloth. Following experiments in the district with machine spinning, in association with the factor of the earl of Strathmore William Baxter built (in 1806) a water-powered spinning mill at Glamis, some miles from Dundee, exploiting not only water power from the Glamis burn but also the fact that flax was grown locally, labour was readily available and there was an outlet for the yarn in surrounding handloom weaving communities.¹⁸ Over time the same time the firm extended its reach both backwards by controlling all stages of the manufacturing processes, including bleaching, as well as forwards by concentrating on cloth sales both at home and overseas, and investing in shipping. Increasingly too, flax was imported, from the Baltic and Russia, at lower prices than home-grown supplies. From an early stage the firm established a reputation for the quality and uniformity of its products – of critical importance in distinguishing Baxter's from the many other textile businesses in and around Dundee, not least by ensuring steadier sales at better prices even if there was a downturn in the market. To achieve this reputation, wrote one of Dundee's best-informed mill managers, 'a mill should be careful never to use bad flax'.¹⁹ One of the company's most important contracts, secured during the wars with France under Napoleon, was with the British Royal Navy, supplying sailcloth, or canvas. With other producers having begun to experiment successfully with steam engines to drive the spinning machinery, in 1822 William Baxter and his son Edward made their first foray into steam-powered spinning when they opened a mill at Lower Dens in Dundee, so further concentrating their control of operations.²⁰

The establishment of this and other state-of-the art mills was significant in that it helped confirm Dundee's status as the principal centre for mechanical flax spinning in Scotland – at a time when elsewhere in Europe, not least France, the linen industry was struggling to recover from the dislocation and in some places the devastation inflicted on it during the Napoleonic

¹⁸ Ian McCraw, 'The Glamis Mill and the Baxters', in Anthony J. Cooke (ed.), *Baxter's of Dundee* (Dundee, 1980), pp.6-10.

¹⁹ John R. Hume (ed.), *Early Days in a Dundee Mill 1819-23: Extracts from the diary of William Brown, an early Dundee Spinner* (Dundee, 1980), pp.17-18.

²⁰ Anthony J. Cooke, 'Baxter Brothers in Dundee', in Cooke (ed.), *Baxter's of Dundee*, pp.16-18.

Wars.²¹ Dundee's association with linen was long-standing, and had been strengthening during the course of the eighteenth century as part of the tendency in east central Scotland – backed by the state-sponsored Board of Trustees for Fisheries and Manufactures – to specialise in the production of coarse linen cloth as opposed to cotton which eventually concentrated in the west of Scotland.²² When the Baxters opened their mill in 1822 there were another sixteen such establishments in the burgh, compared to four in 1807. By 1826 Dundee had overtaken the English port town of Hull as Britain's main importer of raw flax and by the mid-1830s was rivalling Leeds as the principal British linen manufacturing town, although the signs that Dundee's best firms were able to compete with Leeds in terms of efficiency, cost and quality were to be seen over a decade earlier.²³ Exports of linen cloth from Scotland rose spectacularly, from an annual average of 26.6 million yards in 1813-17 to 79 million in 1845.²⁴ By this time Dundee was leading Europe in its capture of the world's markets for machine-flax and the coarse linen cloth woven from it.²⁵

Important however is that, by and large, Dundee's merchant-manufacturers such as Baxter Brothers who moved into centralised production did so cautiously, but also decisively. Although like many Scottish entrepreneurs of the period they were ambitious and keen to catch up with and even surpass their rivals – often in England – they were not 'first movers' but initially at least relied on imported machinery (usually from England), visiting mills and factories south of the border to observe at first hand the new technology *in situ*. The Dundee way was to adapt and improve as problems arose rather than to invent – a 'great mistake' according to Peter Carmichael (1809-91), Baxter Brothers' enormously influential engineer-manager who had joined the firm in 1833 and went on annual trips to inspect rival works.²⁶ Continuous adaptation was the key to business survival in what was a highly competitive, hard-driving local environment – in part created by the existence of so many spinning companies in Dundee. The margin for error became even slimmer from 1832 when the bounty on linen exports that had been introduced in the 1740s to stimulate the coarse linen industry in Scotland, was withdrawn.²⁷

France, whose soil and climate had long been conducive to the growth of flax in the north of the country, Normandy, Brittany and Picardy, also had a long tradition in the manufacture of linen yarn and cloth. The links between the French and the British and Irish linen industries were not new: the Frenchman Louis Crommelin (1653-1727), from Picardy, played a part in adding to the community of Huguenot artisans involved in linen manufacture Lisburn (Ulster)

²¹ Brenda Collins and Philip Ollerenshaw, 'The European Linen Industry since the Middle Ages', in Brenda Collins and Philip Ollerenshaw (eds), *The European Linen Industry in Historical Perspective* (Oxford, 2003), p.22.

²² Alastair J. Durie, *The Scottish Linen Industry in the Eighteenth Century* (Edinburgh, 1979), p.95.

²³ Gordon Jackson and Kate Kinnear, *The Trade and Shipping of Dundee, 1780-1850* (Dundee, 1990), pp.2, 7.

²⁴ Christopher A. Whatley, *The Industrial Revolution in Scotland* (Cambridge, 1997), pp.26-7.

²⁵ Louise Miskell, Christopher A. Whatley and Bob Harris, 'Introduction: Altering Images', in Louise Miskell, Christopher A. Whatley and Bob Harris (eds), *Victorian Dundee: Image and Realities* (East Linton, 2000), p.3.

²⁶ Louise Miskell and Christopher A. Whatley, "'Juteopolis" in the Making: Linen and the Industrial Transformation of Dundee', *Textile History*, 30, 2 (1999), pp.182-3.

²⁷ Enid Gauldie, 'The Dundee Jute Industry' in John Butt and Kenneth Ponting (eds), *Scottish Textile History* (Aberdeen, 1987), p.120; Alastair J. Durie, 'Government Policy and the Scottish Linen Industry Before c.1840', in Brenda Collins and Philip Ollerenshaw (eds), *European Linen Industry*, pp.242-4.

from 1698,²⁸ while French cambric weavers had been enticed to Scotland in the early eighteenth century to assist in raising the quality of Scottish linen cloth.²⁹ But in the eighteenth century the linen sector continued to operate on proto-industrial lines, on the basis of hand spinning and handloom weaving. There was little mechanization or centralized production. Change might have come with the support of the central state when in 1810 Napoleon, considering the advantage that France had in terms of a supply of home-grown flax at a time when Britain's textile development – key to its lead as a manufacturing nation – was becoming increasingly reliant on imported cotton and flax, promoted the development of linen machinery. He offered a million francs to the inventor that would devise a mechanical process to spin linen. A wet spinning machine was quickly patented by Philippe de Girard, although he did not get the million francs; he was ruined and had to leave France.³⁰ It was Peter Fairbairn, the engineer who modified Girard's innovations, and Marshalls of Leeds, Britain's premier flax spinning firm that benefited most from Girard's work. In France spinning machine usage grew only slowly, and accounted for only a small fraction of French linen yarn output; even in 1844 only 10 per cent of France's yarn was machine spun.³¹ Ambitious French linen manufacturers therefore had to resort to British technology if they were to establish larger scale works. This – British spinning equipment – they tried to imitate or to smuggle into France, notwithstanding the British ban on the export of such machinery that remained in force until 1842.

Even so, by 1837, France could boast only 14,000 spindles, compared to Britain's 250,000. Not helpful was the absence of tariffs on British linen imports until 1836 when a tariff on carded linen was erected. The duties were raised in 1842, again in 1847 and they remained high until 1860 and the Cobden-Chevalier free trade treaty between both countries. The effect of the impositions was a sharp decline in the imports of British yarns, which fell to a very low level.³² The improved market environment in France prompted the erection of spinning mills in France, a process which continued until the late 1860s, with further benefits coming from the disruption of the UK cotton industry caused the difficulty of obtaining raw cotton during the US civil war – with some cotton goods being substituted by linen and jute. By 1864 had begun to close the production gap in relation to Britain, with 563,625 spindles, around one third of Britain's total of 1.7m (in 1866).³³ Nevertheless, the French industry appears to have been far less concentrated than the British. By 1855, there were in France 5,576 factories in the flax and hemp manufacture, employing a total of 56,167 persons, an average of ten people, while in Britain 440 factories employed 94,003 persons, an average of 213, although

²⁸ Brian. Mackay, 'Overseeing the Foundations of the Irish Linen Industry: The Rise and Fall of the Crommelin Legend', in Collins and Ollerenshaw (eds), *European Linen Industry*, pp.99-122.

²⁹ Durie, *Scottish Linen Industry*, pp.48-9.

³⁰ Xavier Daumalin, Olivier Raveux, *Philippe de Girard ou l'invention de l'Europe industrielle (1775-1845)*, Avignon, Association pour la Sauvegarde et la Promotion du Patrimoine Industriel en Vaucluse (ASPPIV), 1999, p. 49.

³¹ Collins and Ollerenshaw, 'European Linen Industry', pp.21-2, 24.

³² Alexander. J. Warden, *The Linen Trade, Ancient and Modern* (Dundee, 1864), p. 306.

³³ Alfred Renouard, *Etudes sur le travail des Lins, chanvres, jutes, etc. Tome Premier. Histoire de l'industrie linière*, Lille, 1879.

the extent to which the difference is accounted for by the way the statistics were recorded is not clear.

It was the high tariffs during the period 1836 to c.1860 that largely account for the settling of several British textile firms in France. The same process had taken place twenty years before with tulle and then lace. After the end of the Napoleonic wars, many tulle-makers from Nottinghamshire had settled in Calais so as to be able to sell in the French market without the handicap of tariff walls; all in all, 270 British citizens set up different 230 tulle and lacing businesses in the Calais area between 1815 and 1865.³⁴

In flax and linen, there were several examples. As early as 1836, David Dickson (1811-69) established in Coudekerque (Nord) the first modern spinning factory for linen and hemp, and later moved into jute.³⁵ By the mid 1840s, large linen factories could be found in Landerneau (Britanny), where la Société linière du Finistère was set up with 5,000 spindles³⁶; in Rouen (Normandy), La Foudre with 20,000 spindles; and in Capécure (Boulogne-sur-Mer), Hopwood and Borson. Of most relevance to this paper was the establishment in Amiens (Picardy) of a joint stock company for flax spinning under the management of John Maberly (1770-1845), with a reputed 25,000 spindles, with new mill being established by another partnership in the same place in 1838.³⁷ Maberly had moved to France after having gone bankrupt in 1832, despite having established a large and highly profitable coarse linen manufactory – the Broadford works – in Aberdeen in the north-east of Scotland.³⁸ All of these mills relied on British machinery: Maberly's works for example were driven by two 80 horse power steam engines, manufactured in France by William Fairbairn, Leeds' pre-eminent steam engine and boiler maker.

Critically however, because of the industry's proto-industrial origins France had a limited pool of workers with the requisite skills to operate the new machines or who were familiar with or ready to acquiesce in the regular work discipline demanded by water- or steam-powered mill production. Neither were there many mechanics to build and maintain the new machinery. Employers thus tried to import British workers along with British machines. Dundee, with its dynamic flax and linen industry and the start that had been made in jute production, and a sizeable skilled workforce that two decades earlier had begun to become habituated to regular work in enclosed, supervised conditions, was an ideal location from which to recruit both managerial expertise and labor.

The Baxter Brothers and James Carmichael in Ailly-sur-Somme

³⁴ Benoît Noël, « Outsiders. Petites entreprises et petits entrepreneurs anglo-calaisiens dans le marché français des tulles et dentelles mécaniques de la première moitié du XIXème siècle » in Claire Zalc et Anne-Sophie Bruno (dir.), *Actes de l'histoire de l'immigration*, 2005, numéro spécial, vol. 5, 2005, pp. 161-180 ; Benoît Noël, « Les Anglais et l'origine de la dentelle à Calais », *Revue du Nord*, vol. 88, n° 364, 2006.

³⁵ Odette Bonte, « Les Dickson et la colonie d'Ecosse dans la région de Dunkerque », *Revue de la Société Dunkerquoise d'Histoire et d'archéologie*, novembre 1992, n° 26, pp. 11-75.

³⁶ Yves Blavier, *La société linière du Finistère. Ouvriers et entrepreneurs à Landerneau au XIXe siècle*, Rennes, Presses universitaires de Rennes, 1999.

³⁷ *Mechanics Magazine and Journal of Science, Arts and Manufactures*, 32, January 1840, p.255.

³⁸ Durie, 'Government policy', pp.238-9.

It was this background that in large part explains the keenness of the French firm Jules Cohin & Co to partner Baxter Brothers in their Ailly venture. Cohin & Co was one of the French companies which from the later 1830s had been formed from smaller partnerships in order to raise capital and exploit the opportunities there were for the sale of machine spun yarn in France itself following the erection of tariff barriers on imports of spun flax in 1843.³⁹ Something similar happened in nearby Belgium where there was a flurry of new flax mill construction in the late 1830s, as there was in Silesia although generally mechanisation of the industry in Germany came later.⁴⁰

What was needed at Ailly, evidently, was expertise in mill technology and management. This was a challenge James Carmichael (1817-75), the aforementioned Peter Carmichael's brother was asked to take on, and who in preparation for his venture in France, embarked on an inspection tour of the mills in Glasgow, Manchester and Leeds, even though as a mechanical draughtsman at Baxter's Dens works he was already familiar with spinning machinery.⁴¹ A particular advantage of Baxter's is that it was one of the few textile firms in Dundee that it had begun to operate on a scale sufficient to warrant having its own engineering establishment and millwrights. Most other firms had to rely more heavily on the dozen or so independent foundries and engineering works that were Dundee's major employer of adult males.⁴² Beneficial for the Ailly project however was that the town's textile industry was supported by several highly-capable engineering concerns led by inventive and adaptable proprietors such as the machine makers William Low in Monifeith (where Peter Carmichael had been an apprentice), and James Carmichael (1776-1853), an inventive engineer with a national reputation whose Ward Foundry had supplied much of the machinery used by Dundee's flax spinners from the 1820s.⁴³ Striking were the intricate social and business links between many of the town's leading family firms, with Peter Carmichael for example being married to one of the daughters of the aforementioned James Carmichael.⁴⁴

Being in the vanguard of the move to mechanised production, Baxter's too was one of those Dundee textile companies that had experience not only of overcoming worker resistance to the introduction of machinery which displaced hand skills, but also of recruiting and training labour unaccustomed to the discipline required of mill and factory workers.⁴⁵ After several failed attempts had been made to weave linen cloth using power-looms, in 1836 David

³⁹ Enid Gauldie (ed.), *The Dundee Textile Industry, 1790-1885* (Edinburgh, 1969), xxii-xxiv, 102-3.

⁴⁰ Peter M. Solar, 'The Birth and Death of the European Flax, Hemp and Jute Spinning Firms: The Irish and Belgian Cases', in Collins and Ollerenshaw (eds), *European Linen Industry*, p.251; see too Karl Ditt, 'The Rise and Fall of the German Linen Industry in the Nineteenth and Twentieth Centuries', in the same volume, pp.259-83.

⁴¹ Gauldie, *Dundee Textile Industry*, pp.xii, 85, 103; Bruce Lenman, C. Lythe and E. Gauldie, *Dundee and its Textile Industry* (Dundee, 1969), pp. 43-4.

⁴² Christopher A. Whatley (ed.), *The Diary of John Sturrock, Millwright, Dundee, 1864-65* (East Linton, 1996), p.5.

⁴³ Miskell and Whatley, "'Juteopolis'", pp.183-5.

⁴⁴ Louise. Miskell, 'Civic leadership and the manufacturing elite: Dundee 1820-1870', in Miskell, Whatley and Harris, *Victorian Dundee*, p.61.

⁴⁵ Lenman, Lythe and Gauldie, *Dundee and its Textile Industry*, pp.18-20.

Baxter established Dundee's first power-loom factory, an innovation that helped Baxter's to improve the quality of the cloth they could now produce consistently.⁴⁶

Peter Carmichael, manager and chief engineer at Baxter's (he became a partner in 1852) was one of the UK's most knowledgeable and sought after textile engineers, having in his 20s worked not only at iron works in Dundee and London but also with the Fairbairn brothers in Manchester and Leeds. In the early 1840s he had been responsible for planning, laying out and overseeing the construction of much of Baxter's burgeoning mill and factory complex – Upper and Lower Dens - in Dundee.⁴⁷ Of particular interest as far as Carmichael's Ailly partners may have been concerned is that after a drawn-out confrontation in Dundee with the flax dressers or hacklers who hand dressed the flax in preparation for spinning, by the middle of the 1830s this vital part of the production process – which determined the quality of the flax to be spun, as well as how much - had also begun to be mechanised. The male 'hecklers', described by Peter Carmichael as 'a peculiar class of men with strongly marked characteristics' which included an ability to use collectively their bargaining power within the trade and a determination to resist the use of hackling machines, were over time replaced by women and younger workers. Indeed in 1846 (the second year of the Ailly operation) Carmichael patented a hackling machine that was described by one contemporary as 'the greatest improvement' in textile machinery he had seen, not least as it was self-acting, leaving the 'attendant' to fill and empty the flax holders.⁴⁸ But this was not Carmichael's only mechanical innovation: later in the same year, in association with Peter Fairbairn of Leeds he patented several improvements in the machinery used for roving, drawing and spinning, with other significant modifications to other process following in the 1850s.⁴⁹ Both Peter and James Carmichael were acutely conscious that being alert and responding to innovations in the trade were essential for a firm's success in what was a highly competitive market – with James late in 1847 for example recognising that after over two years at Ailly he would benefit from a visit to Dundee that 'would more than repay itself', or a tour, during which he would 'see much new and useful.'⁵⁰ He continued to return on a regular basis, but the Dundee press too proved to be a useful conduit for the interchange of information, as in 1867 when a letter was sent from Ailly to the *Dundee Advertiser*, to enquire about the "spontaneous combustion" of jute.⁵¹

The impression should not be given that the initiative for the Cohin-Baxter's business partnership was altogether France-led. There was considerable interest from the Dundee end too, as evidenced by the presence in France, as the Ailly works was being established, of

⁴⁶ Gauldie, *Dundee Textile Industry*, p.78.

⁴⁷ Enid Gauldie, 'Peter Carmichael', in Anthony Slaven and Sidney Checkland (eds), *Dictionary of Scottish Business Biography, 1860-1960, I: The Staple Industries* (Aberdeen, 1986), p.319.

⁴⁸ University of Dundee Archive Services [UDAS], Peter Carmichael of Arthurstone MS, MS 102/1/2, Peter Carmichael, Life and Letters, II, pp.47-9.

⁴⁹ UDAS, MS 102/1/2, Peter Carmichael, Life and Letters, II, 47; Lenman, Lythe and Gauldie, *Dundee Textile Industry*, pp.45-6.

⁵⁰ UDAS, MS 102/9 (36), James Carmichael [JC] to Peter Carmichael [PC], 16 December 1847.

⁵¹ "Spontaneous Combustion", *Dundee Advertiser*, 5 July 1867, p. 2.

David Baxter, who at the time of his death was Dundee's wealthiest and arguably most successful textile magnate.⁵²

It is true that by selecting certain years it is possible to construct a continuously rising growth trajectory for the linen industry in Dundee – in terms of flax imported, spindles available, worker numbers and output. We have already noted the rise in the number of spinning mills between 1807 and 1822. By 1832 there were 40, and by 1851 43 were going. Flax imports – mainly from Russia and the Baltic states such as Estonia and Livonia – tell a similar story, rising from under a thousand tons in 1789 to over 12,000 in the second half of the 1820s and twice that figure ten years later.⁵³ As we have seen already, output too soared, as did exports, with new markets being identified and exploited, above all in North America, with higher grades of linen going to New York and coarser varieties to the south as well as the West Indies where they were used for clothing slaves.⁵⁴ Dundee's lead in low-cost, high volume production paid dividends.

Yet what such evidence conceals are a series of slumps that marred the industry's progress. These could be severe, as in 1815 when government contracts for sailcloth, hammocks and cheap shirting material plummeted. Further serious recessions struck in 1826, 1836-7, 1842-3 and 1847; even without these there was a high rate of business failure in an industry characterised by much uncertainty.⁵⁵ In times of difficulty therefore merchants and manufacturers necessarily sought new market opportunities. Of greatest relevance as far as the development of Baxter's French connection is concerned was the severe downturn in trade in 1836, a direct consequence of overstocking in anticipation of rising demand in America which failed to materialise. Flax imports fell by two-thirds, leaving much of the town's recently erected plant and machinery lying idle. It was at this point, apparently, that Baxter's, now being managed by Peter Carmichael, began to supply yarns to France, a departure which helped to sustain the company through the depressed years of 1842-3.⁵⁶

The heightened tariff however, effective from 1843, persuaded Baxter's to become directly involved in yarn spinning in France.⁵⁷ Although Baxter's reputation had been built on flax and linen, at the spinning mill at Ailly-sur-Somme heavy tows and jute were also to be spun and indeed was being tried there as early as October 1845. Jute manufacture was barely established in Dundee at this time, despite attempts being made to spin what was a coarser fibre from the early 1820s, but even so in Dundee, Baxter's were careful to distance themselves from it. Jute was a lower grade of cloth which sold for less than linen or the canvas and other goods Baxter's supplied to the Admiralty – 'which was not renowned for its willingness to accept substitutes'.⁵⁸ Nor was it a straightforward matter when changing from jute spinning to flax, as James Carmichael discovered at Ailly when a sudden collapse in demand for jute led him to turn to flax, a substitution slowed by the need in the hackling stage to change the leather rollers 'every two hours' as whale oil essential for processing jute

⁵² Miskell, 'Civic leadership', p.65.

⁵³ Jackson and Kinner, *Trade and Shipping*, 6.

⁵⁴ Jackson and Kinnear, *Trade and Shipping*, 17-22.

⁵⁵ Miskell and Whatley, "'Juteopolis'", p.189.

⁵⁶ Gauldie, *Dundee Textile Industry*, pp.102-3.

⁵⁷ UDAS, MS 102/6/4/1 (9), Alex Monfries to Peter Carmichael, 5 March 1889.

⁵⁸ Gauldie, *Dundee Textile Industry*, p.xxviii.

contaminated the flax fibres.⁵⁹ It was not until the later 1860s that Baxter's in Dundee began a 'cautious' shift towards jute.⁶⁰ Whatever Peter Carmichael's reservations about jute in Dundee, it is clear that he was committed to the success of the French venture, proffering advice on a variety of matters to his brother James as he struggled with technical and labour problems at Ailly.

However, the Ailly business was potentially well placed. Picardy had been a textile region since the eighteenth century, with a series of areas that had specialised in this industry.⁶¹ Amiens, in particular, just five kilometres from Ailly, was a prominent cotton producing district and by the early 1840s John Maberly had two flax spinning mills going. From the same region woollen cloth was manufactured and sold in Brazil, Germany, Belgium, Switzerland, and the United States. In the Somme west of Amiens – Flixecourt in particular – jute was to play a prominent role, while hosiery was prosperous in the towns and countryside around Saint-Quentin. By 1847, there were some 10,000 spindles for spinning flax in Amiens. Along with Normandy and northern France, Picardy was – and still is – one of the country's best flax-growing areas, thanks to its wet and chilly weather. This meant that there was in the vicinity a large workforce with experience in the preparation of flax (retting and scutching) as well as an army of hand spinners who might become mill workers. Ailly, which numbered 510 inhabitants in 1836, then had 96 textile workers in its cottage industry, i.e. 45% of its working population. Most were velvet cutters, but in the early 1840s there were also linen weavers working with thread produced by Maberly. Ailly itself had specific locational advantages. The village was by the Somme on which shipping was possible all year long (provided the vessels were able to pass under bridges – which initially ruled out ships bringing coal from Newcastle to the Ailly works); it was near the Amiens to Boulogne road and close to the future railroad which went from Amiens to Boulogne, Calais and Dunkirk, from which raw material came. The centre of Amiens was only 8 km far from Ailly. The short distance that unprocessed flax had to travel from ship to processing plant was a major advantage to Dundee over its Leeds rival, which required to transport flax several miles from the coastal port of Hull.

The partnership that Baxters secured was with Parisian businessmen who were familiar with the market: Cohin, Bocquet, Dehesdin. The project was ambitious, with 700,000 francs being invested initially in the works, a comparatively high capital outlay.⁶² Although shared initially by the partners, over time the heaviest capital burden was assumed by the Carmichaels. Initially it seems, James Carmichael was an employee – and much irritated by his subservient status which required him to seek permission to take decisions on matters such as labour recruitment and worker pay from Baxters in Dundee, and being subject to close and

⁵⁹ UDAS, MS 102/9 (36), JC to PC, 16 December 1847.

⁶⁰ Cooke, 'Baxter Brothers', p.21; Eleanor Gordon, *Women and the Labour Movement in Scotland, 1850-1914* (Oxford, 1991), p.138.

⁶¹ Charles Engrand, « Concurrences et complémentarités des villes et des campagnes : les manufactures picardes de 1780 à 1815 », *Revue du Nord*, n° 240, Jan-Mar. 1979, p. 61-79.

⁶² Wiscart, 2007, p. 115.

regular scrutiny on the part of the Dundee-based partners.⁶³ By 1856, however, James Carmichael owned a sixth of the business; when he died in 1875, as one of Ailly's most prominent employers, his heirs owned 5/14th of capital; and from 1879, the Carmichael family were the majority shareholders.⁶⁴

Although the precise date when Carmichael moved to Ailly is not recorded, by the summer of 1845 he was in residence there, albeit that he was living in a rented room, while a house was made ready. Firm plans for the nature, size and operation of French plant had been laid some months earlier, with orders for preparing machinery, hackles and spinning frames and other equipment for the Ailly plant having been ordered from firms in and near Dundee in February.⁶⁵ Prominent makers included James Low, engineers in nearby Monifeith, one of the main supplies of spinning machinery for Dundee, and James Carmichael's own engineering works that was independent of Baxter Brothers. Lathes and other machine tools including even hand tools such as hammers and chisels and a 'time Clock' were ordered and sent from Dundee. And while progress was slower than anticipated, James Carmichael complaining that the 'Engineers here are as unfaithful to their promise as in Dundee', in October David Baxter was in Paris attempting to secure orders for yarns.⁶⁶ The move into production was slowed too by 'want of spinners'. Carmichael had managed to hire half a dozen or so from the nearby mill at Amiens but these early recruits were 'worth nothing', he complained; he hoped that other more experienced spinners who he had lured to Ailly from Amiens would do better.⁶⁷ Even the locally sourced oil proved unsatisfactory, by slowing the cylinders for the spinning frames. Yet by November Carmichael was able to report that he had nine spinning frames (of 36 originally proposed) with 476 spindles going, driven by water turbines, even though difficulties with the power supply meant that preparing work was taking place during the night, with spinning by day.⁶⁸ Recruiting and retaining labour for night work however was difficult – which acted to spur Carmichael on to reduce the works' dependence upon what was a highly erratic water supply and instead use steam power, as envisaged in the original proposal for the plant.⁶⁹

Critical from the outset however was the expectation that the Ailly works would achieve the levels of efficient production that Baxters were managing in their Dens works in Dundee. Carmichael was in constant communication with his brother – by letter as well as in conversation when they were able to meet – sharing minutely detailed technical information, and asking for advice and guidance on all sorts of matters, ranging from the best means of carding jute tow, through the quantity of coal that should be burned to heat the works (again compared with what was used in Dundee) and, above all, about issues relating to the works' productivity. Accurate measurements were crucial, with Carmichael sending orders to Dundee

⁶³ UDAS, MS 102/9 (27), JC to PC, 19 September 1846; MS 102/9 (30), JC to PC, 5 March 1847.

⁶⁴ Wiscart (dir.), *Les Patrons du Second Empire*. p. 116.

⁶⁵ UDAS, MS 102/9 (1), James Carmichael (JC) to Peter Carmichael (PC), 11 August 1845.

⁶⁶ UDAS, MS 102/9 (2), David Baxter to John Baxter (?), 13 October 1845.

⁶⁷ UDAS, MS 102/9 (4), JC to PC, 23 October 1845.

⁶⁸ UDAS, MS 102/9 (5) JC to Baxter Bros (BB), 8 November 1845, MS 102/9 (8), JC to PC, 22 December 1845.

⁶⁹ UDAS, MS 102/9 (8), Jc to PC, 22 December 1845.

– and Paris – for gauges, rules and other instruments; impressions were of little value to him.⁷⁰

The Ailly mill initially produced flax yarns of several numbers, including fine, as well as hemp and jute yarns. In 1857, it numbered 41 spinning frames for flax, 23 for hemp and 82 for jute (146 in total).⁷¹ Almost certainly this diversity of output enabled the business to cope with the 1847-9 and 1862-3 crises and with the competition of the Saint brothers, who established a larger works nearby, in the same trade. When cotton supplies were scarce, during the American civil war, linen came to the fore and generated bigger profits – as did Baxter’s works in Dundee, for which this was veritable golden age in terms of sales and profits.⁷² Over time however, jute became the main raw material: Carmichael mastered its production process and as a raw material it was cheap compared with flax and hemp. In the 1850s and 1860s, Ailly benefited from the burgeoning demand there was for bagging, coarse cloth and canvas sheeting – yarns for sail cloth had been produced from an early stage. Whereas in 1847 the Ailly mill employed some 220 workers, by 1871 there were 491 employees and, by 1900, 1,500. In 1867, a jute weaving workshop was set up. The last third of the nineteenth century was the venture’s most buoyant period, even though in 1867 a rival jute factory was built in the nearby village of Argroeuvres.⁷³

British workers in Ailly-sur-Somme

Relatively little detail can be ascertained about the workers recruited to and employed by the Ailly company, but enough scraps of evidence survive to allow us to create a rough account of what happened. It seems that about some two dozen Scottish workers came initially: male hecklers and mechanics and some female spinners – the last-named group being a short-term expedient.⁷⁴ No information is currently available about how they were drawn to Ailly, although that in October 1845 Carmichael asked his brother to pay a bill for £1.10s (£1.50p) to an Arbroath shoemaker incurred by one of his ‘Scotch women’ suggests that financial gain was one of the inducements used.⁷⁵ Despite Carmichael’s early reservations about the quality of local labour – seven eighths of whom, he noted, came from ‘the fields’ and had ‘never seen a spinning mill before’ – within a few months he had managed to recruit spinners in France with some experience and who quickly adapted to the Ailly plant’s technology. Indeed in March 1846 it was the ‘Scotch people’ with whom he was most exasperated, as he was later in the year when it was his own ‘Countrymen’ who pressed hardest for a wage rise.⁷⁶ For instance, he lost a case in a “prud’homme” (labour dispute) court versus a certain Jess Young, who refused to “care for both sides of the spinning frame”, arguing she only cared for one side in Britain. The court argued she had never cared for both

⁷⁰ UDAS, MS 102/9 (21), JC to PC, 6 August 1846.

⁷¹ Wiscart, 2007, p. 117.

⁷² Whatley, *Diary of John Sturrock*, pp.6-7.

⁷³ Wiscart, 2000, p. 758.

⁷⁴ Gauldie, *Dundee Textile Industry*, 61-8, 106.

⁷⁵ UDAS, MS 102/9 (4), JC to PC, 23 October 1845.

⁷⁶ UDAS, MS 102/9 (12), JC to PC, 21 March 1846; MS 102/9 (23), JC to PC, 25 August 1846; MS 102/9 (26), JC to Baxter Bothers, 30 November 1846.

sides of the machine.⁷⁷ Carmichael also hired young girls from the locality and trained them – carefully – because, as he wrote to Peter Carmichael, ‘they are to be my great dependence.’⁷⁸ When Norbert Truquin, a self-taught worker from the area referred to a factory, he could be referring to the Ailly works: “While going to work, I went by a factory run by Englishmen. More than four hundred young girls were waiting for the bell to ring so as to enter. Among them, I noted there were some seven-year old children who stayed exposed to the harsh weather.”⁷⁹ There was another imperative. Such was the demand the Ailly plant was placing on the local labour market, the slower speed at which recruits from the neighbourhood were able to work at first and the number of trainee spinners, that within the space of two months weekly wages had doubled, while costs were rising too, with the mill going seven days a week, for 91 hours in all. Work was dangerous in the mill, as in all textile plants at the time.⁸⁰ James Carmichael thus noted in his diary:

“23 April 1849: Today, trial for ‘A. Bocquet and Cy. Jean-Baptiste Huet is claiming 8 000 francs in damage for the loss of his arm torn by the transmission shaft of the cutting machine, on 22 January 1846. [...]

3 January 1851: Accident for François Laurent, 22, hired here to measure tow in the carding room. Before the break, he went behind the machine and his hand was caught in the cogs of the wheel. He’s an orphan. I asked John Carvin to take him to Amiens hospital. He refused. He died. Mr Bocquet and Cy are going to pay for the funerals of this careless young man. [...]

11 March 1852 : An accident in replacing a bobbin caused the loss of a finger.

13 October 1852 : Joséphine Serre had her left arm completely torn this morning at 9.03 while she went behind the carding machine. [...]

11 June 1855 : Zoé Damervial, from Vignecourt, had torn fingers.”

⁷⁷ « 23 avril 1849 : Aujourd’hui procès pour « A. Bocquet et Cie ». Jean-Baptiste Huet réclame 8 000 F de dommages et intérêts pour la perte de son bras arraché par l’arbre de transmission de la machine à couper le lin, le 22 janvier 1846. [...]

3 janvier 1851 : Accident pour François Laurent 22 ans employé ici pour mesurer l’étoupe de la carderie ; un moment avant la pause il est allé derrière la machine et s’est pris la main dans les pignons de la roue. Il est orphelin. Je demande à John Carvin de l’emmener à l’hôpital d’Amiens. Le garçon refuse. Il meurt. M.M. Bocquet et Cie vont payer les funérailles de cet imprudent jeune homme. [...]

11 mars 1852 : Un accident en remplaçant une bobine occasionne la perte d’un doigt.

13 octobre 1852 : Joséphine Serre a eu le bras gauche complètement arraché ce matin à 9h03 en allant derrière la cardeuse.

11 juin 1855 : Zoé Damervial de Vignacourt a les doigts arrachés. »

Journal de James Carmichael, in Jean-Paul Delahaye, *op. cit.*, p. 14-15.

⁷⁸ UDAS, MS 102/9 (9), JC to PC, 5 December 1845.

⁷⁹ « En me rendant à mon travail, je passais devant une fabrique tenue par des Anglais. Plus de quatre cents jeunes filles attendaient pour entrer qu’on sonnât la cloche. Parmi elles, je remarquai des enfants de sept ans qui restaient exposées à toutes les rigueurs de la température. » Norbert Truquin, *Mémoires et aventures d’un prolétaire à travers la révolution*, Paris, Maspero, 1977, p. 52. Truquin worked in a woolen spinning factory “four miles from Amiens, on the road to Abbeville”, which makes sense.

⁸⁰ See Jamie Bronstein, *Caught in the Machinery: workplace accidents and injured workers in nineteenth-century Britain*, Stanford (Calif.), Stanford University Press, 2007.

Adding further to the pressure for higher wages was the continued requirement for night work, even in the spinning department, which ‘the people do not like’.⁸¹ Problems had intensified with the opening of another competitor mill in Amiens in the early spring of 1846, with Carmichael’s spinners being offered two francs a week more if they left him, and others including a foreman substantial bonuses. Those who remained became more difficult to manage.⁸² Nevertheless – and often guided on labour relations matters by his brother as well as David and William Baxter – Carmichael managed to gain the upper hand. His success in dismissing one of his Dundee spinners – a ‘poor Creature...brought almost to starvation’ – an action he was gratified to find that was supported by the local court, caused him to reflect with some satisfaction that he had ‘little fear from the remaining people I have.’⁸³ Over time he was able to be more selective about whom he retained and those he could dispense with.

There were challenges too involved in integrating himself, his family and workers from Dundee in a foreign country; Carmichael therefore had to be sensitive to local cultural values – and moral standards – in what was a rural district, in order not to cause alienation amongst the indigenous community. Thus early on he considered he ultimately had to dispense with the services of a French clerk who had had ‘an improper Connexion with the Porter’s wife’.⁸⁴ On hearing of the incident Carmichael quickly recognised the need ‘to walk Circumspectly’ as ‘in a Village people speak upon very little’ – although whether it was this that caused the offender to throw himself in the Somme or his unhappiness with Ailly, ‘being accustomed to Paris’ (or perhaps both) is impossible to say.

Even so it was not long before Carmichael was able to report that he had ‘20 Spinners able to keep on a frame’; of these six had come from Amiens, and only two from Dundee. And although he was exasperated by the local practice of turning to turf digging (for winter fuel) which put pressure on the local labour market during the early summer months, he was not unfamiliar with the irregular attendance of workers at this stage in the industrialisation process. In Baxter’s mills in Dundee there were falls in output and a rise in costs per spindle during the weeks when local fasts were called, at fair times and new year – opportunities for breaks from the routine of regulated work – while still in the 1840s in Dundee as elsewhere in Scotland many handloom weavers went off to the countryside to engage in the harvest.⁸⁵ There is however just the hint of a difference in expectations about what a modern works should look like. Ironically, given Baxter’s reputation in Dundee for the smooth running of the company’s well laid out Dens mills, the Paris partners were less than impressed by what they saw at Ailly, both in the works’ offices and the mill. Carmichael recognised the problem, but having put in more spinning frames than had been anticipated, he protested, ‘we have no

⁸¹ UDAS, MS 102/9 (10), JC to PC, 5 January 1846.

⁸² UDAS, MS 102/9 (12), JC to PC, 21 March 1846.

⁸³ UDAS, MS 102/9 (14), JC to PC, 22 April 1846.

⁸⁴ UDAS, MS 102/9 (16), JC to PC, 23 May 1846.

⁸⁵ UDAS, MS 102/9 (16), JC to PC, 23 May 1846; MS 102/2/4, Peter Carmichael’s notebook, on output, costs and wages, Lower and Upper Dens Mills, 1838-9; Lenman, Lythe and Gauldie, *Dundee and its Textile Industry*, p.57; Christopher. A. Whatley, ‘Work, Time and Pastimes’, in Elizabeth. A. Foyster and Christopher. A. Whatley (eds), *A History of Everyday Life in Scotland, 1600 to 1800* (Edinburgh, 2010), pp.289-90.

room to be orderly'; and if he was to increase production, 'to make our Works like a Show Room' would 'be...difficult'.⁸⁶ Even so, once the steam engines were operating well, he was intent on 'improvement in every respect', that is 'Cleanliness & order, in production and in reducing the number of workers'.⁸⁷ Indeed so impressed by the efficiency in terms of coal utilisation of the French-made engines was Peter Carmichael that after a visit to Ailly late in 1846 he wrote a paper for the *Practical Mechanic & Engineers' Magazine* that extolled the virtues of the type used at Ailly and 'in general use throughout France', where coal tended to be more expensive than in Britain.⁸⁸

According to the census records, 35 British people lived in Ailly in 1851, although by this time most of the original female spinners had left, with a local, cheaper workforce having by then been successfully created, while only the foremen and managers were British. However even as late as 1872, there were still 20 British subjects in Ailly – the Carmichaels and their household and a couple of mechanics and some foremen. Good employees of this kind were at a premium. Among them, William Dalgleish Young, a mechanic and deputy manager, born in 1822, and William Bates, a foreman aged 55 in 1872, had come to Ailly in the early stages of the business: their elder children, then in their twenties, were both born in Ailly.⁸⁹ Young succeeded William Wilson (as foreman mechanic), who was single, became ill and after a couple of years in France left to go back to Dundee.⁹⁰ Those who stayed preserved strong links with Dundee and Scotland, with Young for instance joining Carmichael in taking the Edinburgh-based *Scotsman* newspaper, and announcing the death of his nine-month old son in the Dundee press, twenty years after he had left the city.⁹¹ Nevertheless, he never returned to Scotland on a permanent basis and he died in Ailly in 1889.⁹² Carmichael too remained in Ailly until his sudden death at the age of 57 in August 1875.⁹³ However he went to Dundee on a regular, probably annual basis, and was in frequent contact with family and friends in Dundee, some of who visited (and were impressed by the grandeur of his house, his quality of life and French cuisine, Peter Carmichael declaring in 1846 that he had lost his taste for 'good Scotch fare'). To close family in Dundee he sent fruit as well as French brandy and wine, along with meticulous instructions on how it should be bottled from the barrels in which it arrived. There were on the other hand downsides for a Scot living and working on the European continent, not least the instability of a country (France) in the aftermath of the 1848 revolutions. With fears of further conflict, Carmichael was advised 'to invest a considerable portion of your savings here [in the United Kingdom]...so to provide against the worst.'⁹⁴ Twenty year later, during the Franco-Prussian war, Carmichael had for a citizen of Britain

⁸⁶ UDAS, MS 102/9 (29), JC to PC, 18 February 1847.

⁸⁷ UDAS, MS 102/9 (30), JC to PC, 5 March 1847.

⁸⁸ UDAS, MS 102/1/2, Peter Carmichael, Life and Letters, II, pp.71-2.

⁸⁹ Recensement de la population d'Ailly-sur-Somme, 1851 and 1872, Archives départementales de la Somme, 6M11. The man listed in 1851 as « William Beste, contremaître » is most likely to have been William Bates, foreman.

⁹⁰ UDAS, MS 102/9 (31), JC to PC, 27 May 1847.

⁹¹ DUAS, MS 102/9 (36), JC to PC, 16 December 1847; *Dundee Courier*, Thursday 1 June 1866, p. 4.

⁹² His wife died in Ailly too, in 1882.

⁹³ Gualdie, *Dundee Textile Industry*, p.220.

⁹⁴ UDAS, MS 102/1/2, Peter Carmichael, Life and Letters, II, pp.115-6.

(where the last major battle had been fought in 1746), the unusual experience of military occupation, his house having been commandeered by German officers, a period during which several of his family fled from France to the security of Peter Carmichael's household in Dundee.⁹⁵

Another example of a long-term resident Scot in France was that of Robert Fairweather, a mechanic born around 1829, who was registered in Ailly in 1851; according to the UK 1881 census, he was living in Dundee again, but his five children were all born in France between 1855 and 1876.⁹⁶ This suggests that relatively long periods of emigration on the part of skilled mechanics and management complemented the shorter-term stays in France of the female spinners in particular, although both categories of worker had been recruited because they had skills and attributes that were unavailable – or scarce or insufficient – locally. But albeit as a trickle, Ailly continued to draw some Scots such as John Strachan, a mechanic and a foreman, who had been born in Dundee around 1839 and who lived in Ailly in 1872.

This process of migration, sometimes temporary, was by no means unusual. In the case of the Maberly factory in nearby Amiens, for example, John Maberly's supplier of machines, Thomas Marsden, from Salford near Manchester, responded to a series of questions from members of the 1841 Select Committee on the export of machinery:

“1146. Did you, in 1838, contract with Mr Maberly, as director of a large joint-stock company at Amiens, to make flax machinery to the amount of about 30,000l? – Ys [...]

1149. Did you contract to go over to France, taking with you all tools, workmen and raw material necessary for making the machinery? – Yes.

1150. Did you do so? – I did.

1151. How many men did you take with you for that purpose? – I took 100 from Manchester and other parts of England.

1152. Did you employ any Frenchmen besides? I employed 30 or 40 French men, principally as inferior workmen and labourers to assist the English”⁹⁷

A similar process applied for the Ailly plant, though in lesser proportions.

We know very little about the political views of the Dundee workers in Ailly, although we might expect that these would manifest themselves in the workplace. Dundee in the 1830s and 1840s was a particularly active Chartist stronghold. Chartists were active at Baxter's, in part the result of depressed economic conditions generally but also owing to Peter Carmichael's opportunism in seeking to take advantage of the situation to secure efficiency gains in the weaving sheds.⁹⁸ His confrontation with the flax dressers had assured a strong presence of men from this dying trade amongst Dundee's Chartists, support for which may have spilled

⁹⁵ UDAS, MS 102/1/3, Peter Carmichael, *Life and Letters*, III, p.24.

⁹⁶ Recensement de la population d'Ailly-sur-Somme, 1851 and 1872, Archives départementales de la Somme, 6M11 ; UK census records, 1861, 1871 and 1881.

⁹⁷ *Select Committee appointed to inquire into the Operation of the Existing Laws affecting the Exportation of Machinery*, 1841, 11 March 1841, questions 1146 to 1152.

⁹⁸ Christopher A. Whatley 'Altering images of the industrial city: the case of James Myles, the "Factory Boy", and mid-Victorian Dundee', in Louise Miskell, Christopher A. Whatley and Bob. Harris (eds), *Victorian Dundee: Image and Realities* (East Linton, 2000), p.79.

over into the ranks of the firm's other employees.⁹⁹ While in Dundee, the “hecklers were avid readers of the *Northern Star* which was read aloud in heckling houses”¹⁰⁰, the same was done in Landerneau in 1849, as a French newspaper article and picture testified.¹⁰¹ In 1841, an editorial in the Scottish *Chartist Circular* noted that the paper circulated in France “whither a number of our countrymen have gone to fill situations”, including linen works.¹⁰² In 1849, a report, probably by Max Radiguet, a publicist who happened to be the son of the manager of the plant, was published in *L'Illustration*. The article included the unique picture of the public reading of a Chartist newspaper (the *Northern Star*), “from the date to the name of the publisher”,¹⁰³ to 50 British workers, during the twelve hours of the working day in the heckling workshop.¹⁰⁴ At Ailly hecklers from Dundee had had to be recruited – Peter Carmichael's self acting machines not having been patented let alone perfected by 1845. And with the Dundee recruits came problems familiar to Peter Carmichael in Dundee. Thus the first foreman of the heckling department caused concern, not because of the quality of the work that was done, but rather because of his unwillingness to communicate with Carmichael about the heckling operation, as well as his ‘going so much to the people in Amiens’, perhaps in the cause of worker solidarity, and to share information.¹⁰⁵ He was soon replaced by William Bates who – after his initial reservations - was more amenable to Carmichael's requirements, so much so that by August 1846 he was credited with having got ‘every thing going regular with the Dundee people’.¹⁰⁶ Even so, continuing difficulties with the hackling machinery led Carmichael to request Baxter's to identify and send him a hackle maker from Dundee and whose (good) behaviour and skills broke through the production bottleneck in the preparing department.¹⁰⁷ Problems too arose elsewhere in the preparing room, with some workers – recruited locally - being discharged in September 1846 as allegedly high levels of dust from the codilla tow (‘ten times more disagreeable than the jute’) had caused them to take short cuts in the carding process, which resulted in poor quality yarn; the better the yarn the stronger the demand.¹⁰⁸

From James to Robert Carmichael: Presbyterianism and paternalism

James Carmichael frequently returned to Dundee. This was for personal as well for technical and commercial reasons. He had eight children by his wife, Helen Stewart. Two of his sons, Robert and William, were involved in the business, as part of the management of the

⁹⁹ W. H. Fraser, *Chartism in Scotland* (Pontypool, 2010), p.192.

¹⁰⁰ James Myles, *Rambles in Forfarshire, or Sketches in town and Country*, Dundee, 1850; quoted in Dorothy Thompson, *The Chartists. Popular Politics in the Industrial Revolution*, London, Temple Smith, 1984, p. 109, and in Carol Sue Bebb, “The Chartist Movement in Dundee” (unpublished B. Phil thesis, St Andrews, 1977).

¹⁰¹ [Max Radiguet ?], « Grands établissements industriels de la France (1). Filature de lin », *L'Illustration*, 27 octobre 1849, p. 141.

¹⁰² *The Chartist Circular*, 18 September 1841.

¹⁰³ Max Radiguet, *A travers la Bretagne. Souvenirs et paysages*. Paris, Michel Lévy Frères, 1865, p. 247.

¹⁰⁴ Fabrice Bensimon, “British workers in France, 1815-1848”, *Past and Present*, n° 213, November 2011, p. 177.

¹⁰⁵ UDAS, MS 102/9 (7), JC to PC, 21 November 1845.

¹⁰⁶ UDAS, MS 102/9 (13), JC to PC, 31 March 1846; MS 102/9 (21), JC to PC, 6 August 1846.

¹⁰⁷ UDAS, MS 102/9 (28), JC to PC, 5 February 1847; MS 102/9 (35), JC to PC, 4 September 1847.

¹⁰⁸ UDAS, MS 102/9 (23), JC to PC, 25 August 1846; MS 102/9 (24), JC to PC, 16 September 1846.

mill, which was later called “Carmichaël”, as well as in the channels of communication that were sustained between Ailly and Dundee.

In some respects Carmichael remained staunchly British. He sent his daughters to boarding schools in Scotland and as has been seen was an avid reader of news from Scotland. He also requested UK magazines such as *Chambers' Journal*. He actively worked on behalf of his workpeople and their ‘numerous’ children for whom there was no suitable schooling. There was a village school in Ailly but allegedly the master and priest had ‘tried every means to get them to Kiss the [Roman Catholic] Church’ which had caused the Scots to withdraw their children from it.¹⁰⁹ However, the Carmichaels did become partly assimilated in French society, soon becoming advocates of French wines, brandy and clocks. Carmichael invested in the Amiens-Boulogne railroad and was active in its management. His sons learned French from the Ailly schoolteacher and then attended the Lycée imperial in nearby Amiens. His son Robert married the daughter of general Guépratte. His daughter Rachel espoused Louis Sagebien, a *sous-préfet* (senior civil servant), while another daughter, Helen, married George Tellier, a judge.

From the outset Carmichaels made public their staunch Protestantism. As for the Dicksons in Coudekerque, Presbyterianism was most important to them. James Carmichael lost little time in becoming involved in the local Protestant community in Amiens, which went through something of a revival. This owed much to the prominent part Carmichael played as a member of the Protestant congregation, not only as a devout Christian but also a benefactor to the church and local charitable societies.¹¹⁰ Charity however was conditional on good behaviour. He had no sympathy for the disobedient spinner girl he had dismissed in April 1846. She had left Carmichael’s mill to work at another nearby mill but had been turned off there after a fortnight ‘from some quarrel’ with the foreman’s wife. Carmichael as we have seen was by no means unhappy, nor that she had now left for Boulogne in search of work.

He sat too on the council of the consistorial assembly of the Somme and Pas de Calais, which was created in 1853. He insisted on attending a religious service every Sunday in Ailly along with his Scottish workers, most if not all of whom were Presbyterians.¹¹¹ This may well have been good for their souls but it is clear too that Carmichael was convinced that regular church attendance made them better, more dependable employees.¹¹²

In this as in other respects Carmichael’s Presbyterian background goes far in explaining his social policy in the factory. After a time he reduced night working and allowed no Sunday work – even though his competitors did - insisting on church attendance. A letter he sent to the mayor of Ailly in 1853 explained that the mill’s working hours were 5.30 am to 7.10 pm from Monday to Friday and to 3 pm on Saturdays.¹¹³ His motives were not wholly benevolent: workers still worked 73.5 hours a week and, Carmichael boasted, “every Monday,

¹⁰⁹ UDAS, MS 102/9 (35), JC to PC, 4 September 1847.

¹¹⁰ Gauldie, *Dundee Textile Industry*, pp.220-1.

¹¹¹ Souvenirs de Louise Vergnault, née Sagebien, non datés, intitulés « Le clan Carmichaël, une branche fixée en France », archives privées. Registres paroissiaux de Knockando (Ecosse).

¹¹² UDAS, MS 102/9 (35), JC to PC, 4 September 1847.

¹¹³ Archives départementales de la Somme : 99 M 106 987, lettre du 15 juillet 1853.

not a single worker is missing”.¹¹⁴ Carmichael’s approach to industrial relations appears to have been strongly influenced by what he knew of Baxter’s in Dundee. From the time of the struggles of the 1840s with the hecklers and Peter Carmichael’s efforts to introduce double-loom working for the females weavers employed by the company, paternalism was the model adopted – and, for two decades at least, with pleasing results in that by and large employer-employee relations in the Dens works appear on the whole to have been relatively devoid of major disputes. With the provision of schooling for the company’s workers, some housing and in 1863 the gift by Sir David Baxter of a park, and the remarkable prosperity of the textile trades in Dundee in the 1850s and 1860s, there was little worker-company conflict, and much evidence of mutual respect, affection even, on both sides.¹¹⁵ Indeed hinted at earlier, it was David Baxter, who in Dundee masterminded the firm’s aggressive paternalist strategy, who (with William Baxter) was the main source of guidance on how workplace relations were to be negotiated at Ailly. But on the ground it was Carmichael who recognized the importance of getting a suitable teacher – his preference was for a Scot – and that a works school would require to be subsidized by the company, a decision that would have to be sanctioned by the Baxter’s. He seems to have been successful, having a ‘class instruction school’ in the mill complex and being able to offer free classes for boys and girls from the nearby villages. He set up a dining room for the workers and provided some lodgings, which was similar to what was provided in Dundee. In 1856, he created a free medical and pharmaceutical service and a “*maison du refuge*” (shelter house) for people with contagious diseases. Even allowing for the tendency of obituary writers to omit the less flattering aspects of the characteristics and achievements of their subjects, there does seem to have been genuine sorrow at Carmichael’s death, with workers as well as the wider community (most of whose members seem to have attended his funeral) paying tribute to his role as a friend, benefactor and father.¹¹⁶

His son Robert Stewart Carmichaël (1849-1925) expanded the business and between 1873 and 1896, he built a working-class housing estate of a hundred houses in Ailly, for which he was awarded a medal in the 1900 Paris Exposition universelle.¹¹⁷ However, by the turn of the century, the Carmichael complex had earned a reputation as a harsh place of employment, at least if we can believe the comments reported in November 1902 in *Le Cri du Peuple*, the local newspaper of the far left:

I know of no other plant in the department [of the Somme] where the worker is chased more than at Carmichael’s. He is the king of the area. From the mayor to the garde-champêtre [village policeman], they are all kowtowing once the Great Master has spoken. They are all the lackeys of the Great Exploiter. There, there is no organization to wage the good fight.”¹¹⁸

¹¹⁴ « chaque lundi, il n’y a pas un seul ouvrier qui manque à son travail », *ibid.*

¹¹⁵ Whatley, ‘Altering images’, pp.78-9.

¹¹⁶ Gauldie, *Dundee Textile Industry*, p.221.

¹¹⁷ Jean-Marie Wiscart (dir.), *Les Patrons du Second Empire. Picardie*, Paris, Picard, 2007, p. 117.

¹¹⁸ « je ne sais d’autre centre dans notre département où l’ouvrier soit plus traqué que chez Carmichael. Il est le roi de la contrée. Tous sont à plat ventre quand le Grand Maître a parlé, depuis le maire jusqu’au garde-champêtre. Tous sont les larbins du Grand Exploiteur. Il n’y a là-bas aucune organisation pour mener le bon combat. » *Le Cri du peuple*, November 1902, quoted in Wiscart, *op. cit.*, 2000, p. 766.

And in April 1904, Carmichaël had to cope with the anger of 400 workers, who unsuccessfully went on strike for a month, rioted, broke some windows of the factory and cut the mooring lines of Carmichael's pleasure boat on the river. The same Carmichael was the founder of an employers' union (Syndicats patronaux des Industries textiles de France), as well as the chair of Amiens' Chamber of Commerce after the Great War. He also held positions in the Union régionale des Eglises évangéliques du Nord –Est. He was succeeded by his son James IV Carmichaël (1875-1954) for the management of the Ailly business, which went on until the early 1980s. But such conflict was by no means confined to Ailly. Back in Scotland too, the Baxter's and Dundee's other textile firms, faced with intense competitive pressures, experienced the demise of the industrial harmony that had prevailed until the 1870s and a transition to an era of wage cuts, strikes, employer combinations and unionization.¹¹⁹

Conclusion

The Baxter's model of technical and capital transfer was not unique. Sometimes, French businessmen bought British machinery and relied on connections with manufacturers in Britain for the importation of skilled workers to operate them. In such cases, e.g. Landerneau, it seems that the British workers stayed longer and as a result assimilated more easily. Yet the example of the Ailly flax spinning mill, managed by James Carmichael, is one where the input was mainly imported from the UK. This produced different challenges which over time appear to have been largely overcome. Such cases inform us on the practicalities of technical transfer as well as on those of the migration of workers in the early stages of the industrialization of the continent, at a time when Britain's technical leadership was critical. Yet as we have seen the process was not always uni-directional nor was it solely confined to machinery and equipment: there was also an unsuspected cultural dimension the effects of which were felt in both France and Scotland, albeit that these were highly localized. Although by the 1870s, the star of British engineering was starting to wane in France, Belgium and Germany (and the USA), the number of British professional engineers grew from about 1,000 in 1850 to some 40,000 in 1914, and it was common for them to spend at least part of their careers abroad. This diffusion of British technology and engineering know-how was instrumental in the expansion of Britain's formal and informal empires. In Canada, Central and South America, the Middle East, central and southern Africa, Australia and most of Asia – including non-colonial countries such as Japan – the period 1850-1914 was the heyday of British engineering.¹²⁰ It was in enterprises such as the Dundee-Ailly one that lay the foundations of such activity.

¹¹⁹ Tomlinson,

¹²⁰ R. A. Buchanan, "The Diaspora of British Engineering", *Technology and Culture*, vol. 27, n° 3, July 1986, pp. 501-24; Shelton Stromquist, "Railroad Labor and the Global Economy: Historical Patterns", in Jan Lucassen (ed.), *Global Labour History. A State of the Art*, Bern, 2006, pp. 623-647