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Michael Alcock and the Transfer of Birmingham Technology to France before the Revolution

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While it has been known that the technology of the Birmingham hardware trades was one of those most keenly sought by the administrators and industrialists of eighteenth-century France, there has been little attempt at a detailed account or critical analysis of the transfer of that technology. In fact, there is a great deal of material about it in French archives, national and departmental. Some is not readily usable by economic or technological historians, some repetitive, but the deterring bulk and detail have led to a degree of superficiality in what has been written. For instance the achievements of the first and most interesting of the carriers of the technology, Michael Alcock senior, have been described as a straightforward success story.[1] On the other hand, while valuable

[1] The first useful account is in C. BALLOT, *L'Introduction du Machinisme dans L'Industrie Française* (Paris-Lille 1923) 8. "Le gouvernement français fit pendant tout la second moitié du xvii[e], siècle avec une perseverance remarquable les plus grands efforts pour importer en France cette industrie"; see also A. RÉMOND, *John Holker, Manufacturier et Grand Fonctionnaire en France au xviii[e] Siècle, 1719-1786* (Paris 1946) 18, 36-7; W.O. HENDERSON, *Britain and Industrial Europe, 1750-1870* (Second Edn. Leicester University Press 1965) 12, 22, 38; H.T. PARKER, *The Bureau of Commerce in 1781 and its Policies with Respect to French Industry* (Durham, N.C., 1979) 134-6, 190. A thesis by Linant de Belfonds, 'Les Techniciens Anglais Dans L'Industrie Français au xviii[e] Siècle (Univ. of Paris 1971) devotes a chapter to Alcock (238-268).

related studies have recently been made or are in progress, the mechanical and metallurgical innovations which led to the world leadership of the Birmingham light metal trades at the time of Alcock's departure for France in the mid-1750s have yet to be set out in full detail or exact chronology.[2] This is all the more difficult because the industrial archaeology of the subject is virtually non-existent, with no authenticated equipment surviving for the eighteenth century.

Alcock was born about 1714, and was probably the son of a brass founder. At his departure to France in the last weeks of 1755 or very early in 1756 he was a married man with a daughter and two young sons and was in a large way of business in partnership with William Kempson. He resided at Langley Hall near Sutton Coldfield, and occupied an attached farm; his wife seems to have been well-to-do in her own right. While their business was described as button making or pinchbeck manufacturing he and Kempson were sufficiently important to style themselves simply 'merchants'. They had an interest in an early patent file-cutting machine and in machine tools for clocks, and Alcock had an investment in a Birmingham steel works. Kempson, like his partner, had considerable landed property. The Birmingham 'toy' works was an extensive one, forming three sides of a square with good workshops and

[2] Older accounts of the rise of the light metal industries of Birmingham are to be found in HENRY HAMILTON, *English Brass and Copper Industries to 1800* (1926, second edn. 1967) Chapter V; W.H.B. COURT, *Rise of Midland Industries* (1938), chapter VI; G.C. ALLEN, *Industrial Development of Birmingham and the Black Country* (1926); more recently, in D.E.C. EVERSLEY, 'Economic and Social History of Birmingham 1500-1800' in V.C.H. WARWICKS, Vol. VII, 90 seq., and especially MARIE ROWLANDS, *Masters and Men* (Manchester 1975) Chapters VII and VIII. Dr. Rowlands is continuing her researches and I am grateful for a sight of her recent paper on the supply of raw materials to Midlands metal workers, 1690-1760. Maxine Berg has kindly allowed me to see a paper which has a valuable analysis of the late eighteenth-century trades and how far they can be reconciled with the proto-industrialization formula. On the commercial side see ERIC ROBINSON's "Boulton and Fothergill 1762-1782 and the Birmingham Export of Hardware", *University of Birmingham Historical Journal* (1959) vol. VII no. 1, 60-79, and his pioneering paper 'The International Exchange of Men and Machines 1750-1800', *Business History* Vol. 1 No. 1 (1958) 3-15, in which Alcock is mentioned.

stables and Kempson's "genteel and pleasant" house. They had three to four hundred workers, putting them in the top league of Birmingham employers. The knowledgeable Swedish visitor, Schroderstierna, met Alcock on several occasions in 1749 and visited "a big and famous manufactory which is the property of Mr. Michael Alcock where he makes all kinds of metal buttons, snuff boxes and all kinds of brass furniture... Alcock is a nice and polite man". He says that a local squire had invested in a thimble mill of Alcock's.[3] Alcock and Kempson were gazetted bankrupt by Febrary 1756, but Kempson declared the failure needless and seems to have been allowed to continue in business by the creditors. The settlements with them continued till 1779, suggesting a large and complex failure. Alcock took £ 1,000 with him to France, no doubt by rights the property of his creditors. The flight and consequent failure were probably brought about by an affair with a young girl worker, Sarah Green, to which Alcock eventually admitted, though his wife joined him in France within the year, and all three were reconciled.[4]

[3] For the Birmingham button manufacture at this time and its methods see MRS. D.P. WHITE, *"The Birmingham Button Industry", Post-Mediaeval Archaeology* Vol 11, 1977; there is clearly a danger in using nineteenth century accounts (e.g. Rees's *Cyclopaedia* of 1819) as a basis of the technology of the eighteenth, while accounts like that of Chambers' *Cyclopaedia* (edition of 1741) or even the *Encylopaedia Britannica* of 1797 clearly take no note of the eighteenth-century revolution in English methods of production. The Birmingham processes as introduced into France by Alcock are fairly fully listed in an account by ROLAND DE LA PLATIÈRE in 1769, see *Mémoires de la Société Académique du Nivernais* (1944) pp. 30, 31; SAMUEL SCHRODER, "Dag-Bok", Kungl Biblioteket, Stockholm, for help with which I am grateful to Mr. Kjellin and Dr. Benedikz.

[4] There are mentions of Alcock's affairs in *Birmingham Gazette* 8, 15, 22 Feb. 1742, 19 & 26 July 1742, 2 Aug. 1742, 2 Jan. 1744 mainly as an intermediary in property deals; 22 Oct. 1753; 9 Feb 1756 (bankruptcy). There are references to consequent sales of property and there were dividend payments or creditors' meetings advertised on 12 Sept 1757, 29 July 1765, 27 March 1775, 15 May 1775, 4 Dec. 1775 and 17 Mar. 1777. Alcock's death in Paris was reported at the age of 71 in 1785 "formerly an eminent manufacturer of this place". *Ibid.* for file cutting machine, 30 Mar. 1761, which must be that patented by TIMOTHY LIGHTOLER of Warwick in 1752, no. 670. For Alcock and Kempson's activities as intermediaries in the finance of a property deal, B'ham Ref. Library, Norton Colln. 1311. Alcock must be the manufacturer defecting to France who used to employ 300 or 400 men referred to in the evidence of JOHN TAYLOR and SAMUEL GARBETT in *House of*

Despite prohibitions of button imports, and pinchbeck in particular, Birmingham "toys" flowed virtually unimpeded into France;[5] Alcock would be well aware of this. That his flight was not long premeditated is indicated by the lack of reference to any correspondence earlier than that which he commenced with the French authorities in the spring of 1756.

At Alcock's departure the button trade had already achieved considerable technical sophistication. Metals, principally copper and zinc in varied proportions, were melted together to produce a range of alloys suitable, for instance, for pinchbeck or for gilding metal. The metal was cast into bars and then put through powered rollers to produce sheets. Sometimes this sheet was plated with silver, again by the use of rolls. The sheet was next stamped out by fly-press into the button blanks, and drop presses produced the domed shells, while if the buttons were to have patterned faces matrices for use in the presses had already been made by die engravers. The button edges were trimmed and turned over on a lathe, and burnishing and final polishing was done mechanically. The taking of multiple drives from a horse mill or water mill by Birmingham producers was presumably part of Alcock's packet of transferred techniques, for it is described as employed by one of those who defected early from his French works. The use of polished steel in buttons and other "toys", sometimes thought to date from the 1760s, was already known to Alcock when he left. However, gilt button production was the most popular branch, but, in contrast to silver plating, gilding was achieved by a complex craft process of several stages, and the use of mercury must have made it highly noxious. The gilding process involved nitric acid, while the considerable amount of waste in button making meant that precious metal recovery had become important, and sulphuric

Commons Journal 20 March 1759. For the unnecessary nature of Alcock's bankruptcy, see statement of Kempson to Swedish vistor, Ferrner, May 1760 in Bengt Ferrner, *Resa in Europa* ed. Lindbert, (1956), 249.

[5] Pinchbeck goods were prohibited in 1740, English metal buttons in 1749.

acid was needed. As we have said, the exact chronology of machines and processes has by no means been properly established for the Birmingham ornamental hardware industry, but the above processes we can tell were active by 1755, because Alcock then took them to France. Only occasionally is there hard evidence of an earlier date, as for instance when Samuel Schroderstierna visited Birmingham in 1749 and not only noted the use of rolls, fly press and drop stamp, but sketched them.

On arrival in France, probably at Saint-Omer, at the end of 1755 or the beginning of 1756, Alcock quickly informed the commercial administration of his capabilities. He was able to make gilt, silver plated and lacquered alloy buttons, and the newly fashionable ones encrusted with polished steel, buttons and buckles wholly of steel, mechanically cut files made with his new machine, and Staffordshire earthenware decorated by a new system. He asked for a privilege giving freedom from internal tolls, exclusive rights for the file-cutting machine, duty-free importation of some tools and materials, the establishment of a Paris warehouse, naturalization for the English people with him, the right to take pauper apprentices (perhaps he had had them in Birmingham) and a very long monopoly of the button business. At this point Alcock was petitioning entirely on his own behalf, and it is interesting that the only French connection mentioned is that of the Duc de Chaulnes, who apparently had a government coal concession in Britanny, but Alcock specifically left open the possibility of siting his works elsewhere.[6] We next hear of the existence of an associate called Cugnoni, almost certainly a man who is known to have run a Birmingham merchant house in the export trade. This association, as was the case with so many of Alcock's, proved fleeting, but

[6] Archives Nationales (subsequently A.N.) F12 1315A, Exposé de Michael Alcock, Entrepreneur de Manufacture en Angleterre. n.d. 1756. Attempts at printing designs on earthenware were made in England about this time, culminating in the Sadler & Green patent of 1756. For the Duc de Chaulnes coal concession on the Brittany-Anjou border see A.N. F12 1488A.

while it lasted interest seems to have moved to the province of Berry.

The move to Berry is not clearly explained in the documents. The local high quality iron was thought to be a potential basis of cementation steel production and the Loire had importance for transport. There was the very different argument that the province was regarded as poor and backward so that schemes for industrial diversity and development would be particularly favoured by government. Against these inducements, however, were the arguments that the supply of coal was deficient in quality and price and that there were no workers used to coal or the making up of hardware. Vierzon in Berry and its neighbourhood were seriously examined for large adaptable buildings, a water mill and cheap wood fuel. Perhaps Alcock was desperate to find somewhere before his money leaked away, for he had begun to have tools, machines and dies made to order in Paris, and he had been joined by his wife and children (two boys and a grown girl) and a former leading workman from England, and so had more mouths to feed. At the same time he sought both technical and financial associates in Paris.[7]

In the government privilege Alcock received in May [8] other sites were indicated as possible, as well as Vierzon. They included Angers, Rive de Gier and Roanne. The last two fit in with one of the reasons given for favouring the concern, that is, to "facilitate" the consumption of coal. The privilege was less wide than Alcock had sought, leaving out files and pottery. The failure to obtain freedom from internal dues for his products and material was a

[7]Archives Departmentales, Nièvre (subsequently A.D.N.) IC 12, Alcock and Cugnoni to Intendent (Dodart) 12 April 1756; IC 11, 14 and 17 April 1756; Alcock to Dodart IC 12, 8 May, 1756; IC 11, 24 July 1756; IC 12, John Holker (Inspector General of Foreign Manufactures) to Dodart 1 Sept.; Alcock to Dodart 12 Sept. and 16 Sept., Holker to Trudaine (Minister), 18 Sept., 1756. For Holker, See A. RÉMOND, *op.cit.* He was appointed Inspector General on 15 April 1755. He had been at the head of an English type cotton manufacture in the neighbourhood of Rouen since 1752. *Ibid.*, 54, 82.

[8] A.N. F12 1315A, Arrêt de Conseil, 11 May 1756.

disadvantage to which Alcock seems not to have been immediately sensitive, but of which he was soon passionately aware. Concessions on export duties, eventual naturalization for himself and foreign workers, and exemption from the law on industrial fuel consumption, were nevertheless secured.

Alcock remained in Berry, but settled on the Loire at La Charité. He was there by November 1756, but fell so ill that he made a will in expectation of death. La Charité he claimed had superior access to material and markets and there was of course water-power, though it was some time before a water mill was operational and the power problem was never properly resolved. The basis of Alcock's factory seems to have been a large former iron warehouse together with a mill and housing, owned by a man called Everat, who was later an investor. The condition of the buildings, the confined site on an island where the river was bridged, and the high rental were later much criticized.[9]

Alcock now had French associates. For the fashionable patterned domed buttons an essential workman was a die engraver. Alcock had found in Paris one Paul Le Cour, son of the goldsmith to Stanislas of Lorraine and himself once apprenticed to the French royal engraver. Le Cour had worked for fourteen years in England and had married an English protestant wife. Presumably he had not been in Birmingham or he would certainly have claimed it among his advantages, to which he was not slow to point. Alcock and Le Cour entered into an association with a priest, Pimparé, who brought in 15,000 livres to supplement the 24,000 Alcock had invested.[10] Of the 20 shares Alcock got 9 1/2, le Cour 3 1/2 and Pimparé 3, while others were reserved to another man, Fresnais, a Paris notary's clerk, who had introduced Pimparé and was himself to handle Paris sales. Le Cour made no financial contribution,

[9] A.D.N. IC 12, Alcock to Dodart 14 Nov. and 24 Nov. 1756; 3E 4, 11q, Will of Michael Alcock, 19 Dec. 1756. For mills and buildings, A.D.N. IC 12, Alcock to Dodart 23 Jan., 4 Feb., 3 April 1757.

[10] A.D.N. IC 11 Agreement between Alcock, Paul Le Cour and Pierre Pimparé, 19 June 1757.

which highlights the importance of his skill, and he was allowed some degree of independence within the business. Alcock and Pimparé were entitled to interest at five per cent on their investment. The ink was hardly dry on the first documents of association when the associates agreed to sacrifice some of their shares to give a small interest to Adam Tinsley, Alcock's chief workman. This, like Le Cour's and Fresnais's, was to be without investment, indicating his technical importance, which he continued to justify for a least thirty-five years.[11] Tinsley's dividends, however, were merely to be paid as a bonus to salary. Fresnais was not mentioned by name in the general articles and was only named in a separate agreement, though the firm was to be Alcock, Fresnais and Co.[12] Alcock was to commit his trade secrets to paper and they were to be lodged, sealed, with a Paris notary.

The privileges which enabled Alcock to set himself up were granted by the Bureau of Commerce, effectively headed by D-C. Trudaine. Simultaneously that same brilliant minister was enthusiastically recruiting the talents and rapidly advancing the career of another Englishman, John Holker, a Jacobite refugee officer in the French army and former Manchester manufacturer. Created "Inspector General of Foreign Manufactures" Holker had special responsibility for bringing advanced English methods to France. Immediately on appointment he made tours of inspection and reports on French industry, and fortunately a report of 1756 [13] survives for Saint-Etienne. His strictures on the gun trade were limited to barrel welding, but he said general hardwares were badly made, the polish, which was given by hand, took ten times as much labour and was much worse than that of English polishing equipment. Power for boring and other operations was only partially used because water power was not efficiently installed and mills did not have water all year. Carrier, of Gerard and Carrier

[11] Ibid., Agreement of 24 Aug. 1757.
[12] Ibid., Agreement of 19 June 1757.
[13] A.N. F12 1315B. Further reports of Holker, 1756, St. Etienne.

Brothers, an important merchant and later head of the Manufacture Royale d'Armes,[14] an industry still largely organized on the domestic system, was aware of the great illegal import of English hardware and Holker said he would acquaint him with English products and prices. If Saint-Etienne manufacturers could not equal them at comparable cost Holker undertook to obtain English workers to show the proper methods. Trudaine took up his proposals with celerity and approval. Carrier wrote asking for premises, a mill (a convenient one was by coincidence in the possession of the Controller-General), English workers and a privilege. He had been convinced that the root of French deficiencies was in the working methods; the English were more commonly in small teams in workshop or forge, while the French worked individually; powered machinery gave a polish which human strength could not; powered rolls laminated metals accurately at one operation; grindstones did rapidly what the French did slowly with files; rolling mills could quadruple French output, grinding wheels centuple it.[15] As Alcock had just arrived on the scene with the latest Birmingham expertise, as Trudaine himself had expedited his privilege, and as he had given Holker a general watching brief over his activities, the Birmingham man was naturally turned to in order to help Carrier at Saint-Etienne.[16] Alcock dragged his

[14] A.N. F12 1309 for "Lettres Patentes... Manufacture Royale d'armes à feu à Saint-Etienne en Foret... en faveur de Sieur Carrier de Montieu", 5 Aug. 1769.

[15] F12 1315B. Memoire. Ville de St. Etienne, Manufacture de Quincaillerie. With letter to Trudaine received 16 Dec. 1756; note by Carrier concerning water mill n.d. (probably Jan.) 1757.

[16] Holker had not mentioned Alcock in his original report on Saint-Etienne, but he may then not have encountered him as he had been on extensive tours of inspection in the latter half of 1756. For Trudaine's rôle in the government's patronage of Alcock see F12 1315A, Alcock's memoir received by Trudaine 30 May 1759. Holker had recommended imitation of Birmingham hardware in France earlier, perhaps as early as 1754. See P. BOISSONNADE, "Trois Mémoires Relatif à L'Amélioration Des Manufactures de France Sous L'Administration Des Trudaines" (1754), *Revue D'Histoire Economique et Sociale* (1914-19) p. 70. For Daniel Trudaine see RÉMOND, *op. cit;* the latest view of his work is in Parker, *op. cit., passim*, esp. 101-3 and 134-5. Career and family details are given in E. CHOUILLIER, "Les Trudaines", *Revue de Champagne et de Brie* (1884) 5 seq. Trudaine de Montigny was his father's assistant and later successor at the Bureau of Commerce.

feet for a long time, understandably reluctant to go there while his infant manufacture was beset by teething problems and training crises, but eventually there was movement in both directions, Alcock and Tinsley taking machines and methods to Saint-Etienne, workers of that place receiving some training at La Charité. Trudaine soon saw that Saint-Etienne was really the best centre for all hardware production. Alcock conceded this for tools, but believed that La Charité was feasible for button manufacture, in which fuel demands were less heavy and less individual skill was required from most of the operatives because of mechanization. The official interest in improved technology in the hardware industry at the very time of Alcock's arrival in France was obviously favourable to him.[17]

Nevertheless by 1757 there had begun that continuous series of complaints and petitions to Government which marked Alcock's stay at La Charité, and made him unpopular, though it must be said that it continued just as much after his departure. Alcock chiefly complained of the insufficiency of his privilege, whose defects as a newy arrived foreigner he had not seen. "I had reason to hope that in dedicating to France myself, my wealth and my talents, I would receive all the protection necessary for me to prosper". He had not got free entry for imported raw materials, so that copper, tin, gold and silver were dearer than in England, and had also failed to secure freedom from internal tolls, which would entail either continual legal actions or duties which would make his goods as costly as English imports. He had mistakenly believed that the concern would become a Royal Manufacture, with great

[17] F12 1315B. Trudaine to Holker 24 Aug. 1757, Holker to Trudaine 2 Sept. 1757, Alcock to Trudaine 23 Sept. 1757. An undated letter probably of early 1757 indicates that Trudaine was sending Alcock to Carrier, and that he believed Alcock could help him in setting up iron flattening rolls and equipment for polishing steel and in getting workmen over from England "neglect nothing that could make his trip to St. Etienne as useful as possible". See also Ibid., Alcock to Trudaine 12 May 1757; Trudaine to Alcock 17 Sept. 1757; Fresnais to Trudaine 8 Feb. 1758; Alcock to Trudaine 12 May 1758; and F12 1315A Trudaine (?) to Alcock 9 May 1758.

prestige and advantages, like allowing nobles to invest without derogation of their nobility, which the English textile manufacture at Bourges had obtained. "I did not come to France to propose chimeras and... involve people in a business I knew nothing of". He had used his own funds. If he died in the three years before his naturalization was complete his family would be ruined, even though his wife was now on a third risky journal to recruit workers in England. Despite his efforts for France "it seems that people look on me as a man who is, so to say, useless".[18]

In the short run getting La Charité into good working order was more important than obtaining tax concessions, and Alcock was not doing well in that direction either. Disorder and suspicions seem to have enveloped the industrial community. There was a hilarious panic when an English servant girl left in a huff and went to stay with an elderly Englishwoman at St. Omer. The Lieutenant of Paris, a lettre de cachet, and the maréchausée were all employed to capture her on the unwarranted suspicion that she was returning to England to betray Mrs. Alcock's recruiting of Birmingham workers.[19] This recruiting drive had in fact been discovered without the maid betraying it, and even as the Minister was urging that Alcock strain every nerve to bring over English workers, not only for himself but for Carrier, Mrs. Alcock had been arrested and jailed, together with a group of emigrating workmen.[20]

The worst current distractions at La Charité were bitter quarrels between the small group of technologists, English and French. Early in 1758 Alcock, Fresnais and Pimparé bitterly attacked the disruptive actions of Le Cour and Tinsley. Le Cour was attacked because he had made very few dies, had disregarded Alcock's

[18] A.N. F12 1315A, Alcock to Trudaine 19 April 1757.

[19] A.N. F12 1315A, Letters of Montigny 29 Sept. 1757 and Van den driesche 23 Oct. 1757; note of 26 Oct. 1757.

[20] F12 1315B, Alcock to Trudaine 23 Sept. 1757; A.D.N. IC 12, Alcock to Trudaine, 19 Feb. 1758.

orders, was idle and would not train other workers in his trade. Deep animosity was shown in further accusations of drunkeness, violence, numerous arrests for disorderly behaviour, an attempt at bigamy, and serious indebtedness to his partners. The case against Tinsley was not so dramatic, but for reasons not entirely clear he had virtually gone on strike for a time and came to blows with Alcock. The rebels seem to have had a reasonable claim that Alcock had not paid them all that was due, and they petitioned to be able to leave La Charité and set up business elsewhere. There were arguments about the respective technical contributions of Alcock and Tinsley, and the dispensibility of the latter. He clearly had great skills in machine building and metal working. He was eventually persuaded to stay on, one justification being his usefulness in the arrangements for transferring Birmingham techniques to Saint-Etienne. No one profited from the mud-slinging at the time, in Alcock's case accusations of having his fingers in the company till seem to have been baseless, but better founded scandal about his English bankruptcy and his worker-mistress did him harm.[21]

The technical partnership was dissolved. Tinsley lost his shares but continued at double salary, Le Cour was bought out but also repaid what he owed the firm.[22] As we will see, he immediately set up elsewhere. There was much correspondence about getting English workers for both La Charité and Saint-Etienne and government payments for their being brought over. In this case English countermeasures against the transfer of technology meant that the

[21] A.N. F12 1315A, Dodart (Intendant) to Trudaine 2 Feb. 1758; Letter of Fresnais 8 Feb. 1758; Dodart to Trudaine 15 Feb. 1758; Alcock, Fresnais & Pimparé to Dodart (? Feb.) 1758.

[22] A.D.N. IC 12, Holker to Trudaine 29 Jan. 1758; De Charand to Trudaine 17 Feb. 1758; Alcock and Fresnais to Trudaine 17 Feb. 1758; Alcock to Trudaine 19 Feb. 1758; Alcock to Trudaine 10 March 1758. At this time the works was said to be at a standstill for want of materials, and the workmen had to get bread from the town bakers on credit notes from Alcock (De Charand to Trudaine 17 Feb. 1758). Holker was present at La Charité when the dissolution of partnership between Le Court and Alcock was arranged (De Charand (to Intendant?) 26 April 1758).

flood was temporarily dammed. Nevertheless there were some arrangements for technical transfer between La Charité and Saint-Etienne, and the authorities even envisaged Alcock, once he had imparted his trade secrets to his La Charité associates, moving more or less permanently to Saint-Etienne.[23] La Charité itself seems to have progressed, good machines were mounted, and the labour force increased from 30 to 45 between March and May 1758.[24]

Fresnais now brought in six new investors and much more capital, while the Intendant at Bourges sanctioned by-laws for improved discipline at the factory.[25] Alcock for his part complained to Trudaine of his sacrifices, of losses in England because of "a league formed between my partner and my enemies in the same profession and place where I used to live". No doubt Kempson, who had stayed to face the music, had entered into a composition with the firm's creditors to allow him to resume business, while making sure the effects of his runaway partner were seized. Alcock gave great detail of his wife's arrest for suborning workers, her imprisonment, huge bail and eventual acquittal.[26]

[23] A.D.N. IC 12, Montigny to Dodart (?) 8 Feb. 1758; F12 1315A, Holker to Trudaine recd. 6 May 1758; Montigny (?) to Holker 9 May 1758; F12 1315B Alcock to Trudaine, 12 May 1758.

[24] A.N. F12B, Holker to Trudaine recd. 6 May 1758; A.D.N. IC 12; Holker to Trudaine 31 March 1758; F12 1315B, Alcock to Trudaine, 12 May 1758.

[25] The regulations covered hours of work — a thirteen hour day in the depth of winter, a fifteen hour day between April and the end of August (!) with two hours per day for meals, and fines for absenteeism, bad work, drunkenness, swearing, insubordination, combinations and inducement to workers to leave. Those going away without permission could be imprisoned for 15 days. The rules, however, also forbade the entrepreneurs or officials to strike or illtreat workers, and required that they should pay the workers regularly, and take disputes with the workers to Charand, the sub-delegate of La Charité. The sub-delegate felt that the rules on absence and hours were too severe, believed Alcock had been violent and beaten workers and paid workers irregularly. A.D.N., Rules of Intendant for La Charité, 12 June 1758; De Charand to Intendant 16 July 1758; A.N. F12 1315A, Memoir from La Charité Manufacture to Trudaine 30 May 1759.

[26] A.N. F12 1315B, Alcock to Trudaine 12 May 1758. Mrs. Alcock was arrested in June 1758 after Ann Partridge, her servant, had abandoned four Birmingham workers in London while she took Tinsley's wife and son over to France. She apparently refused to take all six together. The four workers were arrested in London and sent to Warwick

The plant and workforce at La Charité expanded, but the internal administration did not improve much and made Holker and Trudaine anxious. The management seems to have been impossibly divided: the new investors sent young men from Paris to act as departmental managers who failed to fit in with local people and customs. Fresnais and Alcock had begun to fall out, and Frenais started to interfere with Alcock's control over the workers and to blacken his character in the district, where both were disliked. They were accused of counterfeiting coin, arising from their use of base metals and alloys for gilt and silvered goods. Trudaine ignored the counterfeiting stories, but was amazed by the "peu d'ordre qui regne dans l'administration interne de cette manufacture". He undertook to warn the investors, who included financial officers of his own administration, while soothing Alcock, advising him to conciliate local opinion and assuring him that his enterprise would be supported.[27]

Once production began there were technical teething troubles, largely due to a raw labour force unaccustomed to light metal

gaol, and Mrs. Alcock was then apprehended for having arranged the emigration of workers. Mrs. Alcock was imprisoned for three months but then her accusers sought additional time to gather evidence and she was released on the huge bail of 1000 guineas. This may seem an exaggeration, but Birmingham newspapers recorded a bail of £ 4000 exacted for a similar alleged offence of enticing workers to emigrate. When tried, the "judgement" (presumably the retirement of the jury is meant) lasted over 4 1/2 hours, but Mrs. Alcock was acquitted, congratulated by the court, and encouraged to prosecute her accusers, and the foreman of the Grand Jury took her home in a coach and six, accompanied by forty of the nobility and gentry. Considering her guilt, the self-righteousness of the Alcocks about her "honourable acquittal" is delightfully hypocritical. For the new infusion of capital into La Charité, A.N. F12 1315A, Memoir of Alcock (Jan. or Feb.) 1759.

[27] A.N. F12 1315A, Holker to Trudaine 17 Dec. 1758; Trudaine to Holker 21 Dec. 1758. A.D.N. IC 11, Alcock to Dodart 19 Jan. 1759; A.N. F12 1315A, Alcock to Trudaine (? Jan.) 1759. He described the counterfeiting calumny as "one which hell itself could not think of a more frightful" and was bitter that his local detractors described him as "sans religion, sans moeurs et sans monde", while he was keeping the local community prosperous by paying out 1000 to 1200 livres a week in wages. "I work as hard as a slave every day from 4 or 5 o'clock in the morning till 8 of every night, I never meddle with any affairs of what nature soever but my own, and if it is in my power to render anyone a service I do it with all my heart even at the hour of midnight".

work. This led to wasted materials and many spoiled products. There were losses of silver plate (and not merely that inevitable with stamping out and clipping operations) and of gilt metal. Alcock had to try to apply the precious metal recovery process normally used in Birmingham, but was hampered by the local monopoly of goldsmiths, who in any case could not work on a large enough scale, and the high costs of sending goods to Paris refiners for separation. He asked permission for an air furnace and a cupellation furnace and later for the import of acids from England.[28]

Alcock did not complain much of the nature of the buildings he used, though he thought the rent extravagant. The new investors however insisted they were decrepit, ill assorted for the progressive stages of manufacture and both too liable to flooding and too great a fire risk! With rare exceptions like Boulton Birmingham manufacturers did not go in for highly planned and elegant buildings, but the La Charité investors later embarked on ones which were criticised as over-ambitious and expensive. The new investors perhaps purposely exaggerated the problems of the site, for they were attempting to get free land from the government for extensions.[29]

The deteriorating relations between Fresnais and Alcock led to attacks on the largest group of English workers, the Green family. The elder daughter had been Alcock's mistress and had brought over her parents and two brothers. The father was a founder, and two sons assisted him. The liaison between Alcock and the daughter had been ended by Mrs. Alcock when she came over, after which (to French surprise) the Alcocks and "La Green" maintained the greatest harmony. Alcock understandably favoured the

[28] A.N. F12 1315A, memoir of La Charité manufacture recd. 17 Jan. 1759; note of Montigny on metal separation and arranging interview with Holker, same date. Though La Charité was in an area of primary iron production and much naval iron was produced in Berry and the Nivernais this seems to have given no help to hardware production.

[29] A.N. F12 1315A, Memoir of La Charité partners to Trudaine recd. 30 May 1759. See also A.D.N. IC 11, Trudaine to Dodart 13 Feb. 1759.

family and there was a long attempt to get them to bring over more sons, relatives and friends, all in the Black Country metal trades. This had government support because of Trudaine's and Holker's wish to strengthen the tiny group of English hardware workers. On the other hand Alcock's enemies wrote to officials belittling the skill of the Greens and stressing Alcock's affair with the daughter. The upshot was that the father refused to write home to persuade his other sons to come to La Charité.[30]

The new group of investors, headed by Billard de Monceaux, had committed 200,000 livres and soon began to worry about their investment. Billard was much concerned that the land was leasehold, the rent expensive and the site restricted and difficult to supervise, and again pressed for land concessions for the rebuilding and reorganization of the manufacture. Alcock and Fresnais as the entrepreneurs joined a concerted pressure on the Ministry. It was claimed that some of Alcock's difficulties had been due to wartime conditions, but now the new investors had enabled the erection of new buildings, the installation of new machines, and purchases of materials. Previous difficulties had included Tinsley's personal strike, the problems of training a very raw labour force, and the failure to get more workers from England. Their buttons were superior in terms of robustness and convenience in wear, but the anticipated large scale orders for the military, the Indies and colonies had not come in, and the potential output of 300 gross of buttons a day could not be realised, though the new investors were prepared to raise their investment, now 300,000 livres, to a million if the trade warranted it.[31]

[30] A.D.N. IC 12 is the best source on the Greens. See 16 Feb. 1759, De Charand to Trudaine and further letter with additional detail of 17 Feb; William Green senior to Dodart, 28 Feb. 1759; Trudaine to Dodart 17 March 1759; Alcock to Dodart 28 March 1759; Alcock to Trudaine 30 Dec. 1759. There is some overlap with material in A.N. F12 1315A; see Holker to Trudaine 11 March 1759, Holker to Dodart 17 March 1759.

[31] A.D.N. IC 12, De Monceau to Trudaine 5 June 1759; F12 1315A, Alcock to Trudaine, received 30 May 1759, talks of a 300,000 livre investment. Alcock's letter is much in the spirit of an earlier one of Jan. or Feb. 1759 when a 200,000 investment by new investors was referred to, and Alcock claimed that he was training La Charité people in an

With the button manufacture claimed to be fully set up, Alcock began to divert some of his energies to small-scale experiments to produce cementation steel, though these did not go very well at first.[32] He may have found increasing time for this because by December the demand for buttons was so bad that production was reduced, and he tried to get rid of workers, breaking contracts and shifting to piece work to reduce labour costs.[33]

This demand crisis provoked a quarrel in the firm, and began the process by which eventually led Alcock to break with the enterprise he had founded. Fresnais went to Paris to blacken Alcock's reputation with the investors, once again attacking his favourites, the Greens.[34] Alcock replied that Fresnais had been extremely wasteful and expensive in his operations. He had moved rapidly between departments so as to try to learn the secrets of each, but was otherwise idle.[35] Fresnais for his part made sure that

entirely new kind of work, though the nature and rent of the premises were complained of, and new building land asked for. In his letter of May Alcock stressed that while he had made great efforts to get English workers he had also trained artisans, peasants, boatmen, women, girls and children of the locality to do entirely new tasks.

[32] A.D. IC 12 Alcock to Montigny 11 June 1759. The concern was fully developed and was employing 150 persons and there were machines and tools capable of employing 1000 (some no doubt as outworkers), "there is not (a firm) in England more perfect in all its branches". Alcock was already experimenting with furnaces of increasing size to make steel and if successful would send to England for workers who made scythes, saws etc., to satisfy Trudaine's plans at Saint Etienne or elsewhere.

[33] Frenais wrote to Trudaine about the steelmaking on 15 July 1759, saying that Alcock was having trouble getting fireclay resistant enough for the cementation chests. His mentioning of fluxes of iron, sulphur and salt suggests that Alcock was deceiving him, for such fluxes were not used in England, though they were involved in Réaumur's failed methods of thirty years before. For the button trade depression, A.D.N. IC 12 Alcock (To Dodart?) 6 Dec. 1759.

[34] A.D.N., IC 12, Alcock to Trudaine 30 Dec. 1759. Fresnais had said Alcock did not understand his business and had "occasioned a monstrous unnecessary expense to the Company", though Alcock claimed he had "discovered my secrets; having been as perfect a slave as any in Europe to bring the manufacture to perfection". Ibid., Alcock to Trudaine 7 Jan. 1760, shows that Fresnais had told all about Alcock's affair with Sarah Green, which Alcock said was now over. He in turn accused Fresnais of making improper advances to his daughter.

[35] The idleness had included writing poetry and playing the fiddle in working hours! Fresnais, now possessed of all Alcock's secrets, was intriguing to set up a firm of his own. A.D.N. IC 12, Alcock to Trudaine, 11 Aug. 1760.

personal scandal about Alcock reached Trudaine. The greatest difficulty, however, was that the investors had only a fraction of the equity, though they had put in the vast majority of the capital - Alcock with a mere 24,000 livres had half the shares, Fresnais had a quarter interest without investment and those who had put in 300,000 livres the other quarter. Under new proposals at a Paris meeting the new investors were to restrict Alcock's share; he was eventually awarded roughly 5 out of 32 shares instead of 10/20ths as before. They were concerned about the lack of return on their capital, and found the reality very different from the highly optimistic and "chimerical" statistics of future prosperity with which Fresnais had persuaded them to invest and to discharge the expenses of Alcock and Fresnais up to that time. They complained of a poor production flow from shop to shop, of poor gilding, of a long delay by Alcock before he would communicate the gilding secret to Fresnais. Then, however, had come the grave deficiency in sales. One answer was to diversify production into buckles and buckle chapes, tinder boxes, thimbles and sleeve buttons. Though this was well advanced there were problems, the need for some skilled men from England, especially filers, and the disputes with the Greens. The men of the family now had their own workshop and operated semi-independently, though the daughter was very useful, her skills "extended over all the branches of button-making" and Tinsley who "par son génie et son activité peut être regardé comme un excellent sujet", managed the forge and built the machines.[36]

The Company had explored the home market and the export one, as far as Russia, but found the English entrenched everywhere. They could only break into their preserves by reducing prices, but then would be operating at a loss unless subsidized by the state. The quality of La Charité produce was lower than the English, and it was recognized that the raw workforce, drawn

[36] A.N. F12 1315A. Memoir of Investors, in Dumonceaux to Trudaine, 15 Feb. 1760. Trudaine consulted Holker about it (Holker to Trudaine, 26 Jan. 1760).

from many sources, meant that this must be the case for some time. Naturally thoughts turned to the need to give the firm protection in its home market. It was recognized that English hardware poured across the land frontiers and even the Channel almost unhindered, and that the evasion of the prohibition of 1749 imposed little extra cost on English traders. A firm, however, in which the two entrepreneurs were at enmity, and where the immigrant English workers now felt outcast and unwelcome, had to put its internal affairs in order before much improvement could occur.[37]

One problem resolved itself. Fresnais was found to be investigating other places, Paris, Saint-Etienne and Tallende in the Auvergne, where he might set up on his own, and the suspicion that he had been only concerned to learn all the processes of manufacture in order to desert his associates was confirmed.[38] Eventually, late in 1760, the Company dismissed him at Trudaine's instigation and he went off, eventually to found a rival concern in Paris, whence he tried to recruit La Chárite workers by clandestine means. Alcock wrote to Trudaine to express his pleasure at losing a distasteful partner, claiming that "there is such a change that everything goes on well". The market was now improving, and production was rising while costs were falling below the English ones.[39] By early 1762 Alcock was also expanding the range of his products to include some items in gold and silver, which he thought were included under his privilege in the term "bijouterie", but a mint official ruled that he could only carry on such sale through an accredited local goldsmith, who would demand a slice of profits

[37] Ibid., memoir of Investors and Holker to Trudaine, 6 March 1760.

[38] A.D.N. IC 12; Alcock to Trudaine 11 Aug. 1760.

[39] Ibid., Alcock to Trudaine 16 Nov. 1760. In fact Fresnais was still intervening in the Company's affairs early in 1761, so the break was not a very tidy affair, but his attempts to suborn workmen soon put him out of favour; ibid., Alcock to Dodart (?) 21 Feb. 1761. Fresnais was still enticing workmen away in July (ibid., Alcock to Dodart 29 July 1761) and the problem worsened in the following year, A.N. F12, 1315A, Dodart to Trudaine 1 April 1762; enquiry of 29 March 1762; statement by workman Farrier, 13 March 1762; Fresnais to Lieutenant of Police n.d. 1762; De Sartine to Trudaine 28 April 1762.

which would make the sale uneconomic. It was claimed that La Charité's new success was leading to a combination between Birmingham merchants to sell in France at prime cost in order to put La Charité out of business, a kind of combination Alcock cheerfully admitted he had joined in with other Birmingham men in the past in order to eliminate rivals.[40] Holker supported Alcock by pointing out the Birmingham manufacturers' almost effortless penetration of French Customs at trivial cost. He hoped that there might be tariff revisions, and pointed out the nuisance of the duties faced by Alcock's products within France in "provinces reputed foreign".[41] Freedom from such duties was included in an appeal for a new set of privileges, including that of "Manufacture Royale". This was wrecked by the Farmers General objecting to the loss of internal duties. These, they argued, were less than the duties on foreign produce coming in, but they of course were answered by the evidence that prohibited articles entered by direct smuggling or as low-duty German hardwares. Thus the Birmingham merchants' combination could be crushing to La Charité though "in truth, the worry displayed by the English merchants is the justification for the existence of La Charité manufacture". The Farmers General viewed the Birmingham combination as "une Terreur panique", refusing to believe that merchants would abandon profit, or take a loss, to ruin a foreign concern, but became highly illogical as they tried to relate the letter of the law to the reality of hardware imports. They also said that if German hardware imports were prohibited this would include German tools, many of which were absolutely essential to French workmen, being unavailable in France.[42]

[40] A.N. F12 1315A, Alcock to Trudaine 4 April 1762. "When I lived at Birmingham, I entered into a league with Mr. Taylor and Mr Birch to prevent one Mr. Dalloway succeeding in our branch of trade, which cost us at least 30,000 sterling in less than 4 years". For similar combinations against Birmingham brass producers, J.R. HARRIS, *The Copper King* (1964) pp. 15-17.

[41] A.N. F12 1315A, Holker to Trudaine recd. 19 May.

[42] A.N. F12 1315A, Dodart (?) to Montigny 16 June; Holker to Trudaine, 16 June 1762. Petition of La Charité Co. concerning duties n.d. June 1762, and reply to Farmers General, comments by Dodart in same month.

Alcock later claimed that La Charité had become profitable and had made 40,000 livres between the end of 1762 and September 1763 and that he had accomplished all that needed doing technically. There can be little doubt that he was bored and disgusted at La Charite, where those favoured by the investors increasingly called the tune; their support of Frenais had been followed by a new preference given to two young managers, Sanche and Hyde, who for their part were only too anxious to supplant Alcock. Sanche, the protégé of Billard, was also in league with the investor Everat who owned the main buildings of the Company and was going in for lavish construction schemes. Sanche continually told Alcock that he had the Company's authority to override his decisions, dismissed an English workman without consulting him, tried out a new gilding method which spoiled a thousand gross of buttons, and spitefully showed Alcock a letter from Everat containing 'insultes indecentes'.[43]

This background helps to make the end of 1762 and the beginning of 1763 a period of confused and contradictory statements. Alcock demanded to have stronger and clearer authority at La Charité if he stayed, to have a right to know the state of the Company's finances, to receive half the profits relating to his share, with only half being retained to discharge his debts to the Company, and to have a right to develop a new steelmaking and filemaking business approved by the Council of Commerce. This resulted in a new agreement signed by Alcock and the Company in December 1762. Alcock was duplicitous in this as he signed in the belief, founded on the opinion of Trudaine de Montigny (the son and aide of D-C. Trudaine who was present at the discussions), that it would be overthrown by the government. He claimed that he had completed the setting up of the manufacture, and wanted to get on with projects of his own quite separate from the Com-

[43] A.N. F12 1315A. Reasons for Alcock wanting contract with Associates cancelled, n.d. 1762; new articles between Alcock and investors 6 Dec. 1762. A.D.N. IC 11, Alcock to Dodart 18 Nov. 1762.

pany's. He would resign his salary of 3000 livres and reduce his share from a little over 5 thirtieths to 2 thirtieths. He would recover the 24,000 livres he originally put in and would retire from 1 July 1763. He could set up his manufacture of "acier brut d'Angleterre" (cementation steel) and files, though, as they were part of the original privilege of La Charité manufacture, the Company did not preclude themselves from manufacturing these things. Alcock could produce new manufactures which were nationally desirable, but must not take Company workers away without agreement, retain company documents, or use a similar name for any new company.[44]

It is remarkable that it was at this time, in visiting Paris for the drawing up of the new contract, that Alcock was first personally received by Trudaine, and initially all went well, both in the interview and subsequent correspondence. He was asked to see Trudaine again in Paris in the spring. They discussed the setting up of an establishment at Saint-Etienne which should be supplied with Alcock's steel from La Charité, where he could still act as consultant to the hardware firm "though I believe I have put everything on such a footing that it will not fail to do very well without me". He wanted Trudaine to help with his elder son's education. He sought Manufacture Royale status for his steel making and an annual state pension to tide him over with his living expenses while he pioneered his new developments, which would be a recognition of his past achievements for France. Trudaine's main purpose was that Alcock should assist with developments at Saint-Etienne to achieve production on the lines of "Birmingham and other places in England". Alcock persisted with the view that the making of steel was a priority for the making of files and tools essential for Saint-Etienne, and that this was best done in Berry. He would successively train those at Saint-Etienne in such branches as glass-decorated sleeve buttons, new types of decorative

[44] Ibid., Alcock to Dodart 22 April 1763 and enclosed memoir. Trudaine de Montigny was the son, aide and eventual successor of Trudaine.

door locks, watch chains and a variety of steel goods for which an expert English polisher would be obtained. Later suggestions about recruiting English immigrants included makers of cabinet makers' tools and cutlery. The immigrants should receive travel expenses and a pension, Alcock should see each of them established at Saint-Etienne and then make periodical visits. He claimed his new methods of production at La Charité were now being imitated in many parts of France and not only by the defectors from La Charité and those in the button trade. La Charité already employed 250 workers and this might soon double.[45]

However Trudaine, after discussions with the La Charité investors, was soon out of patience with Alcock. The investors had rejected Alcock's various complaints as unjustified and those opposed to him accused him of being ignorant, lazy and debauched, of possessing much less knowledge than that needed for the enterprise, which had been dependent for it on other workers, of costing vast sums by mistaken operations, and of neglecting the concern. All his schemes "or rather chimaeras" were only embarked on to support "the illicit relationship with a woman he brought over from England".

Trudaine's change of attitude to Alcock was manifested by his total shift of mood between two visits paid him on successive days by Holker and Alcock to explain Alcock's new proposals. On the second visit he was received "as you would naturally receive a man whom you judged totally unworthy of your favours", and Alcock felt he had lost the protection on one who "ne l'accorde qu'au mérite et au vertu". He described the scene in a letter to the Intendant whom he begged to separate him finally from the Company "for really my Lord I would choose to live upon bread and water in a cottage, than have anything to do with such secret enemies, even though living in the highest affluence". He had earlier rejected heading an enterprise in which he was without

[45] A.N. F12 1315A, Memoir Alcock to Trudaine, March 1763 and attached notes; A.D.N. IC 11, Alcock 11 Nov. 1762 to Trudaine.

"power or management, and had no other role than that of the hardest worker", where all that went wrong was blamed on him and he got no credit for his achievements. He began to collect testimonies to send in justification to the authorities, from English workers, Tinsley, William Green and his son, George Orton, and even from Sanche and Everat, who had been his enemies, and from French workers.[46] Sanche and Everat were perhaps prepared to support him at this point in order to get him out, for he now wished to withdraw totally, and give up even his small remaining share interest. Not all of the testimonies survive, and we must assume that Alcock had put pressure on the writer of each. Tinsley wrote that "Mr. Alcock is a perfect master of the business which he came to establish and it is to him only that the said manufacture owes its being": if his advice had been taken rather than that "of those who were placed with him the Company instead of losing would have gained very considerably but to my certain knowledge he has been secretly counteracted in everything and his orders contradicted". Yet he had saved it from ruin and "put it in a most flourishing condition". The elder Green said Alcock was "a man of Strict Honour" posessing "a general perfect knowledge of almost every branch of business which is carry'd on at Birmingham in England and in particular the pinchbeck business". He had saved the firm from the disasters threatened by the conduct of the French "deputies" by "the excessive labour and pain which he took to prevent it". As for the attacks on Alcock as a "libertin" with "no other views than to run after my Daughter", his daughter now lived with him and he had no complaint of her or Alcock's conduct. Mrs. Alcock had secured the daughter's agreement to stay with the firm, without which she would not have herself returned to England... "being well asured of my daughter's capac-

[46] A.D.N. IC 11, Alcock to Dodart 22 April and 8 May 1763; A.N. F12 1315A, Alcock to Trudaine 5 May and related papers; Trudaine to Alcock, 21 May 1763; Statements of Wm. Green senior and Wm. Green junior 18 April 1763; of George Orton 20 April 1763; of Adam Tinsley 12 April 1763. Alcock's submission at this time shows that he had now been to Saint Etienne, seen Carrier and made a report.

ity, industry and fidelity". Green's elder son attested the correctness of the statement. George Orton wrote that Alcock had wanted him to be chief gilder at the works, but Sanche had refused this saying he had in his pocket an order from the Company giving him final authority.

While the recriminations between Alcock and the Company were no foundation for future co-operation, they seem to have cleared the air with the authorities. Trudaine wrote directly to Alcock, stating that his grievance against Sanche was misplaced; he had been sent down by the Company to secure more systematic working, and had succeeded. The Company would keep their agreement if he would. Nevertheless, Trudaine said he was ready for Alcock to form a new firm and he would support him in every way.[47]

Alcock now strove to get out, needled by the conduct of Everat now "charged with the Direction General of the manufacture as well as the correspondence" who pretended friendship to Alcock while denouncing him to the Minister, stopping his letters of credit, attacking the Greens, and sending daily orders to the French "managers" at La Charité which destroyed Alcock's authority. The resulting quarrels Alcock "would not suffer even to gain a million". He concentrated on getting his 24,000 livres investment out at once, so as to set up his new enterprise, which it became increasingly clear would embrace a rival button-making concern as well as steel-making.[48] The efforts of his partners to impede him were probably weakened by the apparently prosperous situation of the Company. They were endeavouring to rebuild the works on a new site, they had increased the investment to five hundred thousand livres, and claimed to employ 500 people. Once again they rubbed in the point about ineffective duties, effective

[47] Ibid., Trudaine to Alcock 21 May 1763.

[48] A.D.N. IC 11, Alcock to Dodart 8 May 1763. The Greens, entirely disillusioned, returned to England; ibid., Alcock to Dodart 21 Nov. 1763.

ones being necessary as long as "the established prejudice in favour of the English merchandise" persisted.[49]

While in 1764 Alcock tried to get away from La Charité and establish his own button making firm his former associates understandably put obstacles in his path. But his main problem was financial, for his 24,000 livres would not go very far. First he tried to raise money in Birmingham through his wife, who seems not to have returned to France after her imprisonment. She wrote to the eldest son that she found it hard to understand her husband's bitter relations with his associates "his character is such that we lived together for 22 years without the slightest difficulty". But the quarrels at La Charité had been heard of in Birmingham where it was believed her husband had been driven from the firm, and she and her friends would have to know that the new firm was on a secure foundation before they could put money in it. The idea was already in the air that the new button concern, to avoid problems with the privilege of La Charité, would be launched in the names of the sons. If this could be done, Mrs. Alcock would come to visit her sons, and their father "whom I hope to embrace with all my heart after being so long separated".[50] Alcock declared that if a new concern could not be mounted he would leave France, and despite Trudaine's continued emphasis on Saint-Etienne, where he emphasised the cheap coal and the existing concentration of metal workers, Alcock entered negotiations to go to Languedoc, where the authorities made great efforts to pursue an active industrial policy and attract new concerns. By June 1764 it was agreed that the sons, not the father, should be granted an arrêt with suitable privileges. The father meanwhile tried to carry out tests on iron of various localities so as to find an iron which he could convert to

[49] A.N. F12 1315A, Investors in La Charité to Trudaine, 7 July 1764, partly repeating memoir of Sept. 1763; further memoir, replied to 9 Dec. 1763.

[50] A.N. F12 1315B. Copy of letter of Mrs. Alcock to Joseph Alcock (elder son) 21 March 1764. An attempt to obtain 16 further workers from Birmingham had been frustrated, and the men seized, *Birmingham Gazette*, 7 Feb. 1763.

steel at a site near enough to his young sons to be able to help them start their button-making firm. Eventually he claimed that the steel-making methods he was developing allowed him considerable flexibility in the iron used and consequently in the site of operations.[51]

Alcock at this period was showing much of the volatility of mood and decision which may have been his handicap as an entrepreneur. We can only guess how far his changes of mood and frequent depressions were brought on by an industrial disease, mercury poisoning, worsened by keeping the gilding process under his own supervision. The goods and equipment, including stamping machines, tools and lathes "in a word all that is required for the manufacture of English hardwares" were cleared for free transit to Montpellier, when it was decided to go instead to Roanne in the Forêt, fairly close to Saint-Etienne. Through the Intendant at Lyons the sons asked for a privilege for Roanne containing all their father had been granted for La Charité and "everything that their father was accustomed to make at Birmingham in England". The French opposition to the use of what was thought of as minting machinery outside the mint was avoided by a specific permission to use stamps and fly-presses. The right of a Manufacture Royale, nationalization for themselves, freedom from taxes for themselves and foreign workers, permission to bind workers to contracts, free imports of Cornish tin and avoidance of local dues on St. Etienne coal were all sought, and the right of toll-free passage of their goods within France.[52]

Writing to Trudaine in December Alcock confessed that the trouble at La Charité had resulted in a depression ("chagrin mortelle") which had turned into a long and dangerous illness, led to a delay in his steel experiments, and a situation where he had been

[51] A.N. F12 1315B. Alcock to Trudaine 14 June 1764 and 6 Dec. 1764.

[52] Ibid., Anon. to Alcock, 4 Aug. 1764; Archbishop of Narbonne to Trudaine 18 June 1764; Trudaine to Archbishop of Narbonne 26 June 1764; Alcock to Trudaine July 1764, replied to 27 July; Trudaine to Alcock 11 June 1764.

about to return to England. His euphoria about everything at Roanne was at the other extreme and probably equal evidence of his instability. Trudaine thanked him for the steel specimens he sent from small-scale experiments but said he would support the Roanne venture if Alcock would "give it his attention without distractions".[53]

From this point there is a series of stories; that of Alcock and his sons and their operations in Roanne and the vicinity; that of La Charité as it continued on a pretentious and unstable course after Alcock's departure; and that of the various imitators of Alcock, or independent introducers of Brimingham methods to France. The last can only have the merest mention and must be the subject of another paper.

The La Charité investors were concerned at Alcock's departure and the loss of his "lumières", one result being that they obtained a state pension for Tinsley to secure him to their firm, another being reluctance to give Alcock a copy of his arrêt of 1756 on which his sons' privileges at Roanne were to be based. Trudaine and the Intendant at Lyons would not increase those privileges, the Roanne concern did not get free imports of materials or free passage of goods through France, and Manufacture Royale status was to be withheld until the concern was well established. The new concern was very much on probation. While wating for the arrêt Alcock again fell into one of his states of depression, but rejoiced when it came, assuring Trudaine "le bon ordre sera toujours chez nous sans distraction". Holker hoped that the sons would not be denied a privilege as they were "sufficiently unfortunate in having lost by the caprice of their father the manufacture at La Charité".[54]

By June Alcock sent Trudaine samples of the products at Roanne. The main problem was working capital. He had already

[53] Ibid., Alcock to Trudaine 6 Dec. 1764 and notes of Trudaine 17 Dec.

[54] A.N. F12 1315B. Draft arrêt, arrêt, its publication at Lyon, 4 and 19 May 1765; sub-delegate, Roanne, to Trudaine 21 May, Alcock to Trudaine 20 May, Holker to Trudaine, 11 June 1765; F12 25, note of 13 Fb. 1766 for Tinsley's pension grant; F12 2332 has another copy of arrêt, 4 May 1763.

committed all he had, the hoped-for investment from English friends had not come once they knew of his problems at La Charité, and Trudaine and the Intendant endeavoured to find partners for the Alcocks and investors were in fact found.[55]

It must however have been immensely galling to Alcock that no sooner had he left than two important privileges were granted to La Charité which he had long sought, the designation as a Manufacture Royale and freedom of its goods from internal tolls. Alcock protested bitterly, he claimed to have trained 200 persons in the new trades at Roanne including "a large number of youngsters", some "almost emerging from infancy have both the opportunity of occupying themselves and obtaining their living and of spreading comfort into the parental home". But the advantage given to La Charité would destroy their business, for wholesalers would not deal with Roanne. Alcock weakened his argument by saying that La Charité was selling a more costly article which could stand duty better - i.e. their markets were rather different: logic, however, was rarely a strong point in industrial petitions to the French government. He was more rational in pointing out that a manufacture which was completely established should be in less need of such help than a "manufacture naissante".[56]

Alcock was still nagging on this issue in February 1768. Roanne now employed about fifty men and youths, fifty girls, and outworkers in the town, and all the workers through the long succession of complicated processes had been trained by Alcock. Only buttons were made, mainly cheap ones, which probably showed the growing influence of the sons. The Intendant did not think the request for a Manufacture Royale urgent, and it could wait till the firm was further developed. But he pressed for an equality of internal dues with La Charité in agreement with the

[55] Ibid., Alcock to Trudaine 20 June 1765; Alcock to Trudaine 2 July 1765; Baillon to Trudaine 16 July 1765.

[56] For La Charité privilege A.N. F12 1315A, Arrêt (printed) 3 Feb. 1766; F12 1315B, two undated memoirs from Alcock Bros.

swelling national tide of argument against special privileges to manufacturers. Again the Farmers General, probably supplied with ammunition by La Charité, attacked Alcock's "inconstance dans ses establissements". This might also have some reference to his current desperate and unavailing efforts to get steel manufacture off the ground in the Charollais, and his necessarily giving less attention to Roanne. Papers were produced promoting Roanne's case which made lofty flights into the principles of free competition against privilege and pressed the view that protection should be confined to infant manufactures, only to descend from the heights to sling mud at La Charité's new managers for building themselves expensive apartments at company expense.[57]

Unfortunately the subsequent evidence on Roanne is less continuous and detailed. But there is a fine description of 1774 by a Birmingham merchant, Thomas Ingram, who wrote to Mathew Boulton about both Roanne and La Charité. He thought Birmingham had most to fear from Roanne. The brothers had talked freely to him but would not break "a sworn rule" and show him the works. "These two young men are such that you would admire... I never saw men better calculated for the undertaking they are engaged in". Though the patterns were no better than Birmingham, and their advantages in labour and material costs were not significant, they produced wire buttons at a price which with discount undercut Birmingham and "the best tin silvered buttons I ever saw", for which there were huge orders. Ingram believed that given the carriage and insurance costs of Birmingham producers the young Alcocks could become "in time powerful adversaries". They questioned him closely about Boulton's and other Birmingham works, and wanted to buy steel in Birmingham. Their inexpensively built and single-storey works were at least as good as La Charité's expensive buildings. Their good sense extended to a careful parade of their Catholicism, and to starting by mastering

[57] A.N. F12 1315B, Memoir 15 April 1768; Alcock to Montigny 4 June 1768, Barbancon to Montigny 1 July 1768.

one trade... "they have buttoned themselves to buttons was their phrase, as they sencibly (sic) observed their father's misfortune arose from pursuing too many things at once... they seem to have all the knowledge of their father with prudence to shun the mistakes he fell into".[58]

An important episode for Joseph Alcock was his journeys to England in 1777 to 1778. These were partly private, but he was commissioned to look not only into ornamental hardware but rolling and slitting mills for iron, tin plate and nail rods, where France was behindhand and time and costs could be reduced. For his own purpose Alcock concentrated on buckles, candlesticks and silver plated goods, and applied for privileges to set up works for such things at Beaulieu near Roanne. Buckles seem to have been the main product, but there were problems over making the chapes, and some were even imported from Mathew Boulton (via Ostend at a 1% insurance!) whom he had met on his English travels.[59]

That acquaintance had another and most interesting aspect. Immediately on his return from his 1777 visit Alcock drew the attention of the French government to the Boulton and Watt engine as a means of mine draining, particularly (he thought) for coal mines, for this was a period when there was acute worry about fuel supplies in many parts of France, and the first commercial role of a Watt engine in Britain had been at a coal mine. Individuals might not be able to pay for imported engines, but the state might buy one to replace the famous Machine of Marly, to drain a major mine, "or for the supply of water to a large town". Once installed it could be imitated at leisure, far better than trying industrial espionage through hastily taken sketches and rough dimensions. He thought Boulton could be induced to erect one or more in

[58] Birmingham Reference Library, Boulton (A.O.) Collection, Box 1 26, Ingram to Boulton, 11 March 1774.

[59] A.N. F12 1315A. J. Alcock to Tolozan 14 Feb., 25 March 1779, to De Cotte 14 Jan. 1780.

France. It was the report of Alcock "mechanicien anglais" which was the basis of the report of two celebrated members of the Académie des Sciences, Macquer and Montigny, who were frequently called on for technological reports to the Government. They were most interested by the idea of a steam as compared with an atmospheric engine, and thought one should be installed for the Paris waterworks to replace the hydraulic pumps at Notre Dame. Alcock's report reached the French government, it seems, just before D'Herouville's, often thought to initiate interest in the engine. It was the first to attract attention at the highest administrative and scientific level, and it anticipated D'Herouville in the proposed use for a water supply from the Seine and it foreshadowed the Perriers' Chaillot works which installed Watt engines, legitimately at first, in order to pirate them later.[60]

In the next few years the Alcock sons seem to have been doing well, helped by the adverse effect of war on English imports, though their own imports of Boulton's chapes shows that they were not impeccable. Joseph Alcock, the dominant brother, petitioned to have permission to open his own Paris salesroom in defiance of the former monopoly of the Paris buttonmakers; he got the same privileges for Beaulieu as for Roanne, and arrangements with local goldsmiths allowing him to make silver buckles there.[61]

During the eighties difficulties began to multiply. Once the Alcocks began to make silver-plated and gilt buttons they had disputes with the Farmers-General as these goods were taxed more highly. They claimed their business, steadily expanded on moderate profits, would be extinguished, though they provided work to 600 families and competed with England in Spain, Italy and the

[60] A.N. F12 2205, J. Alcock to Tolozan 10 Jan. 1778; Report of Macquer and Montigny minuted 14 Jan. 1778. See also J. Payen, *Capital et Machine à Vapeur au XVIII^e Siècle* (Paris, 1969) 102, 104.

[61] B.R.L. (A.O. Papers) J.F. Box, M. Alcock to Boulton 7 Sept. 1780; A.N. F12 1315A, J. Alcock to Tolozan, 18 Aug. 1778 and memoir.

colonies. With the same privileges as La Charité and its newer rival at Amboise Joseph Alcock claimed he could "cover the countryside with workers", but now he was proposing to sell up. After Government promises of equality of treatment he declared he was encouraged, and 'would redouble his efforts. Manufactures, he thought, should be encouraged in places outside the great towns, where he felt the vivifying effect on the economy would be greatest. Fuels could be used more cheaply there "which are in general the driving force (moteur) of manufacture and especially hardware". The provincial entrepreneur had to unite skill, energy and capital, the last harder to obtain outside great towns. His manufacture was like a watch, a heap of metal until by putting each piece in its proper place it was given life.[62]

From late 1783 the business fell off rapidly, which Alcock blamed jointly on the unfavourable internal duties and on British imports which were smuggled in with a 5% insurance via Dunkirk, Ostend and the Flanders frontier. In the mid-eighties he was involved in a dispute about English workers who had fled to Roanne from the Paris works of Orsel, a former French merchant in Birmingham, who had now set up large hardware works in Paris and Sedan.[63]

As late as 1791 there were said to be 100 workers at Roanne, but the works was then said to have suffered heavily from English competition under the Eden Treaty terms of 1786. The great fuel enquiry of 1789 found the works nearly at a standstill, having done little for two or three years. Nevertheless Alcock was the leading

[62] A.N. F12 1315A, J. Alcock to Tolozan 18 Aug. 1778; Le Noir to De Cotte, 23 Sept. 1778; Alcock to Tolozan 10 Sept. 1778; Document marked "Arrêt of 28 March 1780"; ibid, "Comité duin 13 March 1779" and "Comite du 29 Juin 1779", J. Alcock to Tolozan (? 19 May) 1779; De Cotte to (De Flesselcs?) Jan. 1780, J. Alcock to Tolozan (?) 14 Jan. 1780; Couturier to De Cotte 16 Feb. 1780; Alcock to (Tolozan ?) 14 Feb. 1779; F12 1315B, J. Alcock to Montaran, 5 Nov. 1782.

[63] F12 1315B. Resolution of Council of 19 Dec. 1785, Decision of Minister 24 Jan. 1786; F12 722, Opinion of the Deputies 10 Feb. 1784; F12 723, Opinion of the deputies; F12 1315B, Orsel to Calonne, n.d. 1785. Agreements with English workers 13 Nov. 1784, 12 Feb. 1785.

figure in the preparation of the Roanne cahiers for the States General in that year. In the early nineties the works had a short period when it made blanks for the Revolutionary coinage, and then coined briefly itself. In 1793 Alcock received a certificate of naturalization as a reward for trying to find work for the poor. The evidence for button making is conflicting, one report has it as being over in 1809, but both brothers were still described as button manufacturers at their deaths, and notice of the death of one in the next decade was given by a clerk at the works. An attempt at setting up a steel works at Moulins in the 1790s is known, but there are no later references to it. While Vial mentions the family as important ironmasters in the early nineteenth century, the one notable member I have been able to trace was an important lawyer and politician.[64]

His sons had been having some measure of success in the button trade, but how did Michael Alcock senior fit in? He was certainly involved in the early negotiations with local partners, but he eventually seems to have withdrawn from an active role and simply drawn a 2000 livres annual pension from the firm.[65] His industrial career had come to the end of the road with the collapse of his steel ventures, the first being at Guegnon, not far from Roanne. Typically Alcock was trying to start more than one enterprise at once, the second being for English heat-resistant pottery. He made extensive requests for privileges at the end of 1767, but there were serious troubles. Some of the buildings were burnt down when Alcock's steel furnace went out of control, and after continuing to work exposed to bad weather he became ill for

[64] Gournay, *Tableau Général du Commerce* (1789/90); A.N. F12 680; E. Fournail and J.P. Gutton (eds.) *Cahiers de doléances de la Province de Forez* (1975) 404, 424; F. Pothier, *Roanne pendant la Révolution* (Roanne 1868) 155-6; M. Dumoulin, *En Pays Roannais* (Roanne 1892) 178, 190; E. Brossard, *Les Elections... du Département de la Loire* (St. Etienne 1889) 47 seq; *Dictionnaire de Biographie Francaise*, Vol. 1 (1933); J. Vial, *L'Industrialisation de la Sidérurgie Française 1814-1864*. (1967) Vol. I, 10, 171, 194, 430. A.N. F14 4234, Project for steel works.

[65] M. Dumoulin, *op. cit.*, p. 178.

almost a year. At the end of 1769 Alcock produced enough steel to have it tested with enthusiastic results by skilled workers at Saint-Etienne, but he was not yet able to produce it with certainty. Further tests at Paris were equally approving, and the administration urged him to progress from cementation to cast steel. But Alcock's difficulties in personal relations manifested themselves, and as his technical problems increased he fell out with his associates. In fact the technical problems Alcock faced were probably insuperable. He had great difficulty in obtaining good refractory clay for the cementation chests. He was trying to use French iron for steelmaking when in England Swedish iron was alone employed in conversion. It was far into the nineteenth century before there was successful commercial use of French iron, if we except a brief period of expensive wartime production. Alcock was also trying to use wood instead of coal as fuel. Why he used wood is not clear; he was fairly close to coal. Perhaps, as so often, the main value of the forge site owned by his associates was in its use of otherwise nearly valueless woods. Many other experimenters were able, like him, to produce occasional chance batches of good steel which gained the interest of nationally important technologists and administrators. Alcock clung to the favourable reports on his steel specimens but his partners dismissed the workmen and closed down the operations. He briefly hoped to renew operations nearby at Dijoing on the Loire on lands owned by the Marquis d'Equilly. The Marquis was discouraged by Montigny who realized the failure of the operation so far, and doubted if the product could ever compete with imported English steel. This depressing failure seems to mark the end of the older Alcock's French enterprises, as he was even eased out of the Roanne manufacture by his sons. Of the years until his death in Paris in 1785, we know nothing.[66]

[66] A.N. F12 1302, Barbancon to Trudaine 23 July 1767; Montigny to Amelot 7 Aug. 1769; Document communicated to Farmers General 7 Aug. 1767; M. Alcock to Trudaine, Sept. 1767; Memoir communicated to Deputies of Commerce 19 Oct. 1767; Avis des Députés 23 October 1767; Holker to Montigny 8 Nov. 1767; Draft arrêt of 22 Dec. 1767O F12 1304, 6 Sept. 1769, report on trials of steel at St. Etienne; 1 Oct. 1769, Avis du

What other concerns besides the Alcock's existed in France before the Revolution based on Birmingham methods? Which can be regarded as stemming wholly or partially from Michael Alcock? There is now a mass of information on this subject, which can only be sketched here. La Charité continued after he had left, still predominantly based on button production and on his methods. At the time of his departure his former associates had increased their investment to 600,000 livres and their work force to 600.[67] Sanche and Hyde, the new managers, proved effective propagandists with the Government, though their stock with their associates fell quickly. Having once deprecated Alcock's skills, they now proudly claimed to be his trainees. In gilding however, they were deficient, which they blamed on Alcock, and Hyde went to Birminham to spy out the methods, a piece of espionage described in ludicrously laudatory terms. A memoir refers to "those secrets of which the English are so jealous that they have cost the lives of all those enquiring foreigners who tried to penetrate the laboratories of Birmingham, either being denounced to the legal authorities to submit to the final penalty, or being assassinated on the spot... a bold and enterprising man but also wise and prudent was needed to discover the secrets and one whom a life continually in a thousand dangers would not worry or deflect... such a unique person was Sieur Hyde". Having reached Birmingham alone and ignorant of the place, "after preliminary observation he got down to the essential task of gaining the confidence of a worker entrusted with

Sr. Alcock; Alcock to Montigny 23 Sept. 1769; Draft letter, Montigny (?) to Alcock senior, 3 Oct. 1769; Note of Montigny 10 April 1770; Report on Alcock's steel by Montigny (for Acad. of Science) 17 July 1770; Montigny to Alcock senior 17 July 1770; Memoire à M. de Trudaine concernant Mr. Le Marquis d'Equilly (? July) 1770; Alcock senior to Montigny 30 July 1770; Memoir of Alcock, sent to Montigny 1 Oct. 1769; testimonials of Paris craftsmen 10 July 1770; "Acier de Gergnon (sic) en Charolais, Fabrique du Sr. Alcock", sent to Trudaine de Montigny 11 July 1770; *Birmingham Gazette*, 4 July 1785. This evidence on his steel operations extends that in my "Attempts to Transfer English Steel Techniques to France in the Eighteenth Century", S. MARRINER (ed.) *Business and Businessmen* (Liverpool 1978) pp. 188-232.

[67] A.N. F12 1315A. Memoir of La Charité partners 7 July 1764.

the secret, but six weeks of increasing danger passed, punctuated by attacks of fever". "He had everything to fear from the men he had to confide in, who, willing to betray their masters, would betray him without scruple. However, by good luck he found a discontented foreman. After several appointments in different taverns at which he usually failed to turn up, a last meeting won over the worker". They agreed to set out immediately for London where he would demonstrate the process to Sieur Hyde "and train him in it, but they were just thirty two miles from Birmingham when Sr. Hyde was taken by a violent fever, stopped his journey and retired to bed. They were soon joined by two men sent after them at full gallop". Hyde "only had time to grab his pistols which he always kept under his pillow, and seeing two armed men approach his bed at such an unseemly hour, for it was after midnight, he fired a shot which grazed the first man who appeared, and received a similar graze from his comrade which went through his nightcap and slightly wounded him in the head". Hyde and his workman escaped to London, where Hyde was taught the secret of gilding.[68]

The La Charité managers were reluctant to support Government initiatives to obtain English techniques for making polished steel toys, possibly because they wished to show that they could succeed in their present business without further dependence on English technologists. They sensibly pointed out that one first needed to make the steel and doubted whether contemporary techniques could make the steel needed except from Swedish iron. Even if English workers were brought over to make steel goods

[68] Hyde's journey was made in late 1764, A.N. F12 1316, De Guerchy to Trudaine 23 Dec. 1764; A.N. F12 1315A, Petition of Hyde 27 July 1765: Partners of La Charité in support of Hyde, n.d. late 1765. Hyde was seeking legal naturalization through the privilege granted to the company, and he had lived in France since being three years of age, which suggests his family may have been refugees of 1745, as they claimed. See *Mémoires du Baron Hyde de Neuville*, Vol. I (Paris 1888-92) 1-3, where the family is said to be descended from Edward Hyde, Earl of Clarendon. Hyde's son was a notable nineteenth-century French politician.

"one must always presume that a man who leaves his own country, and is in some measure seduced into leaving, is likely to be a bad lot" as most of those at La Charité had been. A document in the file of unknown origin similarly says "there need to be very good reasons to get a good worker to leave his country". It pointed out the intense division of labour and the separation into many different workshops in Birmingham, which protected the entrepreneurs there from having their workmen seduced away, for few could produce a complete article, and suggested that for steel toy production one needed to recruit a "chef de manufacture" who had failed in business - was Alcock the example in mind? But it pointed out that the machines used in making English steel jewellry were all known in France, if for a different purpose, "since they are the same that one makes use of in mints"; what was needed was to have workers, mainly women and children, trained by those used to the commercial use of such machines at La Charité or Lyon.[69]

In the same year Sanche and Hyde were notably successful in reviving the expiring privilege of La Charité, gaining the additional status of manufacture royale and the right to duty-free internal transit of goods within France. A list of that year shows 100 workers at the factory itself, of whom many probably lived in, 25 being specialists in military buttons. As contemporary accounts talk of a total work force of around 600 one can only presume that non-resident workers and outworkers are not included.[70]

Though at a peak of favour after Alcock's departure, Sanche and Hyde were thrown out by 1771. Then they skilfully memorialized the Government. They emphasised their noble blood, their expertise as trainees of Alcock's, to whom they had been apprenticed, the daring industrial espionage of Hyde, and their rise to

[69] A.N. F12 1316. Correspondence between De Guerchy, Trudaine and La Charité entrepreneurs, early 1766.

[70] A.H. F12 1315A. Intendant of Bourges to Trudaine 25 Jan. 1766; Arrêt for Sanche and Hyde 13 Feb. 1766; Letters Patent signed 12 March 1766; A.D.N. IC 13, List of officials and employees at La Charité, 7 Oct. 1766.

being salaried works managers, non-contributory shareholders and even partners. Agreeing that there had been vast waste and extravagance they claimed to have been the advocates of economy and the plough-back of modest profits; the vast buildings and overstocked warehouses were not their fault. The other La Charité investors replied that the pair had indeed gained their modest skills from Alcock, but their pretensions to nobility were spurious. Hyde began as a watchmaker's apprentice and Sanche as the clerk of a large investor, Billard, who sent him to La Charité as a departmental manager. Billard then used Sanche and Hyde as his creatures to eject Alcock. The plot gained momentum when Hyde abjured Protestantism, and the pair started to discredit Alcock as a heretic. Their dismissal had been for mismanagement and misuse of funds; their lack of skill had led to Hyde's extravagant espionage trip to England, after they had wasted large sums on experimentation. Their managerial errors involving great losses of material would have wrecked the concern if the investors had not pumped money in. The La Charité investors deeply resented Sanche's and Hyde's attempt to establish a firm of their own with the status of manufacture royale and with equal privileges. Surprisingly this was granted, and a works was established at Amboise under the patronage of Choiseul in 1771. The departure of Sanche and Hyde made the remaining English technologist, Tinsley, even more essential. His salary was raised to 1500 livres, exclusive of his state pension.[71]

The path of the La Charité firm was steadily downhill thereafter; there had clearly been an investment far too large to be justified by any foreseeable commercial return. In 1766, the existing investors brought in ten others raising the investment to nearly a million livres. But about 1769 the chief investor, Billard, died insolvent, followed quickly by another. Then the treasurer, Everat, failed for 900,000 livres. The largest remaining investor, De Nogent, asked

[71] A.N. F12 1315B. Sanche and Hyde to Montigny, Dec (?) 1771; ibid, Reply of the Partners, 3 March 1772; F12 1315A, Agreement of 20 Dec. 1772.

for a six months' moratorium on the firm's debts. In 1770 it was found that assets were greatly overvalued and in 1773 the creditors forced the firm to be sold up. It was bought in by De Nogent, backed by a Brussels financier, De Pestre. De Nogent moved to La Charité to give the firm his full attention, but further calamities befell. De Pestre died, and then the death of Louis XV produced a period of mourning during which the fashionable world bought no gilt and silvered buttons.[72]

In 1774 Thomas Ingram reported to Mathew Boulton on a visit he had made to La Charité, getting inside the works "by the assistance of money and some craft". The machines were exactly like those at Birmingham, but there were differences in the use of boxwood shapes for some buttons and in the high proportion of cast buttons for the military market. Furnaces had bellows and not merely natural draught, charcoal instead of coal was the fuel, the only mill was horse-powered and used merely for rolling metal, and not for multiple drives to machines. The buildings were elegant ones of two or three stories and De Nogent had a handsome house. La Charité made well-gilt buttons, but now employed under 300 workers, making only 1000 double gross of buttons a week, and any rivalry with Birmingham came much more from Roanne.[73]

In 1775 the Intendant noted "the establishment has languished for a long time".[74] For a few years De Pestre's widow [75] continued to support the concern; but bad management when De Nogent was away and unsatisfactory bookkeeping led her to sell out to De Nogent in 1778. He had made a loss of 84,000 livres in the previous

[72] A.N. F12 1315A. Memoir of De Nogent, 24 Aug. 1778. Goldsmith's work, polished steel and iron goods, edge tools, silverplate, candlesticks, sconces, clock mountings in engraved and ormolued metal, swords (probably hilts?) and ornamental metal facings for officers' uniforms were among the products; former investors to Director-General of Finance (Necker) n.d. and other petitions of 1778-90.

[73] B.P.L. Boulton (A.O.) Collection, Ingram to Boulton, 11 March 1774.

[74] A.N. F12 1315A, see letter of sub-delegate, La Charité, 16 April 1775.

[75] Now the Comtesse de Vargemont.

two years, all the investors together had by then lost a million and a half livres. A series of desperate arguments was put forward by De Nogent to try to obtain help and to induce the government to continue La Charité's privileges when they again came up for renewal in 1781. He emphasised La Charité as the fount and origin of the methods now followed by an "infinite number" of other firms, and the producer of a high grade article, unlike its rivals who tried to undercut English competition by making a cheaper and nastier product.

In 1785 Hyde seems to have at least partially separated from Sanche and the Amboise concern. Sanche had increasingly taken that firm into the steel business in a vast operation, attracting much government attention, intended to put France on a par with England; by this time the hardware side of the firm was apparently in low water, like La Charité. Hyde may have been supplying iron for Sanche's operations as he now called himself "maitre de forges". He produced a scheme to take over La Charité. He claimed it would have still been flourishing if left to him, without the costly buildings, the surplus of officials, expensive Paris offices, the over-complex structure. It had been "a concern entirely founded on finance, knowing neither the calculation nor the economy of commerce". Like Orsel, another of the French imitators of Birmingham toys, Hyde sought the order of Saint-Michel, sometimes bestowed on those who had performed important commercial and industrial services - including espionage in his case. It was very important that someone should take over La Charité, as it had been decided to "send away the few remaining workers and close the gates". Hyde demanded generous government favours as the price of his taking the works over, and asked to see "the Minister" about his proposals. He would be conscious of the almost feverish urge of the Controller-General, Calonne, to establish new industrial enterprises on the English model.[76]

[76] April 1785. Also A.N. F12 1315B, numerous letters between De Pestre, Tolozan, De Villeneuve and Hyde of 1785; letter to Tolozan 18 March 1786 on Calonne's wish to buy La Charité.

No stronger indication of the extent of Calonne's interest could be possible than that conveyed to Boulton and Watt when they were invited to visit France in 1786 so that the Government could pick their brains on industrial matters. "Besides the Machine of Marly", they were told, "the Minister (Calonne) wants to consult you about La Charité, which he has bought for himself and wishes to know what to do with".[77]

Boulton was willing to help, but not to the extent of personal investment, which he considered would be unpatriotic. He visited the works with the Abbé Calonne, the Minister's brother, in December 1786. He was struck by the great, commodious buildings, in which all button and buckle production for the French armed forces could be concentrated, but opposed too much production occurring in one vast room, and wanted subdivision. There should be a managing-partner whose remuneration depended on profits, and a good book-keeper, partly to watch the manager. The workers in each branch should be hired and paid by a senior workman; goods at each successive stage of production should be sold to the supervisors of that stage at set rates. Such a system "Mr. B. hath adopted since he became so much engaged in the Engine business". It suited production of stock articles, which La Charité should be confined to, leaving fashion articles to firms near Paris. We should remember, however, that Boulton's own hardware operations were not profitable. In technical matters the existing horse rolling mill should be scrapped and replaced by a water or steam mill according to cost, or Boulton could supply ready-rolled metals at cheaper rates than they could be had at La Charité; coal costs were too high and some of that used was unsuitable. He ended "If a person who had half the knowledge of

[77] B.P.L. Boulton (A.O.) Collection, Argand to Boulton 13 Sept. 1786; A.O. Incoming letters, P1/19. Boulton recommended training skilled artisans of respectable "lower class" background rather than those with ideas of gentility. "They will be better than those who aspire to be gentlemen, a common workman has no need of education except in his business, nor those in the next class anymore than to read and write, it requires much good sense to restrain ambition in a man of knowledge".

human nature, half the force of mind which M. L'Abbé possesses was at the head of that manufacture it might be an establishment of consequence (otherwise) the best situated manufacture, the best machines, mills and tools would only tend to produce loss rather than profit".[78]

The fall of the Controller-General and the new policies of the Bureau of Commerce, where there was an anathema on all the plans of the disgraced Minister, put paid to his schemes for La Charité. Hyde returned, and bought the firm from Calonne, no doubt cheaply. In 1788 and 1789 silvered and gilt buttons were still being made and a Paris shop maintained. That is virtually the end of the story, though a document of the Year 6 shows that the concern lived into the 1790s, but by 1809 the premises had become, ironically, a poor house.[79]

The other concerns imitating Birmingham goods which derived from Michael Alcock's original initiative began with those of Paul Le Cour. He broke away from La Charité, as has been shown, in 1758 and obtained an arret allowing him to establish a works at Tallende near Clermont in the Auvergne. The arret allowed duty-free exports, the contracting of native and foreign workers and the naturalization of his English wife.[80] Fournier, a former resident of La Charité, was Le Cour's partner. They were in difficulties by 1759, having to cut back production, being threatened with legal proceedings, and quarrelling with a local landowner. "The inhabitants of this province are so prejudiced against strangers that the manufacture has need of continuous protection", wrote the Intendant. He endeavoured to obtain capital for the concern from a

[78] Ibid., Paris Journey by Boulton and Watt 1786-7.

[79] Gournay, *Almanac Général du Commerce* (1788, 1789); Bonnassieux and Lelong, *Conseil de Commerce et Bureau de Commerce 1700-1791* (1900) 13 June 1789 and 20 June 1790; A.N. F12 680; L. Leboeuf, *Histoire de La Charité* (La Charité 1897) 116-118; *Mémoires de la Société Académique du Nivernais*, Tome xxxvi (1944) 31; A.N. F12 1559.

[80] A.N. F12 879. Intendant to Minister 14 July 1759; Draft arrêt of 28 July; original arrêt registered 9 Jan. 1759 is in F12 1317.

Lyons hardware merchant, as the partners were seriously inexperienced on the commercial side.[81]

Their indebtedness caused Le Cour and Fournier to fall out and they asked the Intendant to dissolve the partnership. The partners faced actions in several courts and the workers were leaving "for lack of bread". Le Cour was a very clever workman, but "Sans conduit, et d'une humeur insociable, il s'est fait des ennemis". Fournier believed he could find resources to carry on alone, the machines were in good order, and the workmen might be got back. Le Cour departed for Lyons, where he initially worked as a craftsman for other button works, and Fournier tried to carry on. In August 1762 [82] the Council allowed him a year's protection from his creditors. In 1766 he requested similar concessions of duty to those enjoyed by La Charité and Amboise. He claimed that the Tallende works was well sited, with spacious and convenient buildings, excellent year-round water power and in a countryside of towns and villages "très peuplées et sans industrie". Workers had been trained, the employment of young children had a good income effect and Tallende now enjoyed an unaccustomed prosperity. However, in a "province reputed foreign" he was crippled by duties both on incoming material and goods for sale, and this double passage "à travers la fataleschaine" was ruining him. His request does not seem to have been granted.[83] The firm was in existence in 1778, but said to be still adversely affected by internal duties and about to fail; the war was stopping exports through Cette and Bordeaux.[84]

There we lose sight of Fournier. Le Cour had founded his own firm in Lyons, for which he obtained an arrêt for "privileged"

[81] A.N. F12 897. Trudaine to Ballainvilliers 9 March 1760 and related items.

[82] A.N. F12 24, Arrêt of 18 Aug. 1762.

[83] A.N. F12 1317. Fournier to Trudaine 13 Jan. 1766. It seems that Mercklein, a very celebrated craftsman, and court mechanican to Louis XVI, carried on works in the Auvergne at Clermont, making English toys and military buttons, said to be flourishing in 1780 (A.N. 0[1] 1293). As the places are very close it may be a continuation of Fournier's.

[84] A.N. F12 659A.

manufacture in 1764". Though permitted by it to build all needful machines and tools, (including a drop press striking five or six blows a minute, two sets of rolls, several lathes, a forge and two furnaces), a fly-press was now needed, but Le Cour did not dare to build a machine so closely connected with coining without another arrêt of 1766. He was only allowed to build it if it were subject to inspection by the officers of the Cour des Monnaies, in which inspection of the rolling mill, stamping-out machine and a furnace were to be included.[85]

In 1768 Le Cour and his wife had gained a partner, Jean Jacques Millanais, a bourgeois of Lyons, in making goods "in imitation of English". There were complicated arrangements for Millanais' investment and training in the manufacture. At the end of the first 3 1/2 years the Le Cours undertook to tell him the secret which was the "basis and essential part of this manufacture". A long dispute between the partners and the button-makers guild of Lyons cannot be detailed here. During it Le Cour stated that he had created "vast workshops" in Lyons, which as they grew had required new and larger premises and he was now sited in the lower buildings of "the public library of the College of the Trinity", which had cost him 80,000 livres. We do not know the origins of all his foreign workers, though one was certainly Saxon. He claimed that he possessed the knowledge of powered machines like rolls, drop presses, shears and cutting out machines, but had brought in others who were acquainted with metal preparation, casting and gilding. Le Cour boasted that he had given Lyons a new industry, for already eleven other works had been set up on the pattern of his own. He provided the Lyons trade with goods formerly got from England, he supplied the royal troops and those of Switzerland, Sardinia and other neighbouring states, and was at present making uniform buttons for the Neapolitan navy.[86]

[85] A.N. F12 25 Arrêt of 5 June 1764.

[86] A.N. F12 877. "Mémoire, Le Cour contre les boutoniers de Lyon, 1772" and much other information on his disputes; F12 768 also for the quarrel with the Lyon buttonmakers' guild.

In 1777 the royal engineer De Saudray was sent on an official industrial espionage expedition to Birmingham by the foreign minister, Vergennes. He brought back drawings of a water-powered machine of Boulton's which took from a single shaft multiple drives which operated a large number of different metal-working machines. On his return he sought to exploit the machine himself, helped by Birmingham workers. He was briefly given some state support, but it was pointed out that Le Cour at Lyon had exactly the same system except that he used horse and not water power and it would be wrong to prejudice him by giving an exclusive privilege to De Saudray. Le Cour had been one of the first in the field in the use of English machines and had gained large sales. Unfortunately, there occurs a break in archives at this point. The last we know of Le Cour is that his works were used for official experiments in the use of coked coal at the end of 1777 and the beginning of 1778 with the implication that they were regarded as notable and well equipped.[87]

How widely were Birmingham hardware techniques diffused in eighteenth-century France? First of course we have already recited the concerns which stemmed from Alcock senior and the initial firm at La Charité; Frenais (and a partner Rickard) at Paris and Essonne, Le Court and Fourier at Tallende, Le Court at Lyons, the Alcock sons at Roanne and Beaulieu, Sanche and Hyde at Amboise, Carrier at Saint-Etienne. But outside this direct succession there are many concerns the strength of whose technical indebtedness and succession to Alcock is unclear, the "infinite" number of imitators of whom the La Charité proprietors spoke, the eleven at Lyons alone cited by Le Court. There is De Saudray [88] who was certainly commercially unsuccessfuly himself

[87] A.N. F12 136. Observations on the Proposal of M. de Saudray OF12 1506, Report of Brisson, February 1778.

[88] There is a mass of material on De Saudray, especially in A.N.F12 994 and F12 1316.

after having spied directly in Birmingham for the local technology on behalf of the French government, but he seems also to have had connections with the Orsels,[89] Frenchmen who had been merchants in Birmingham before returning to France. Before the Revolution they had large operations and British workers in Paris and the Sedan district. There are Cheret de Montmignon [90] in Rouen and Bordeaux, Dauffe [91] and Daudiron [92] in Paris, the former heavily subsidized by Government, Merklein in the Auvergne [93]; Ballot gives yet further examples.[94] Some of these were both technologically and commercially frail, but some certainly survived for a decade or more — the archival disruption caused by administrative fragility on the eve of the Revolution, and the abolition of the industrial inspectorate and the other changes of the Revolution itself, make it hard to tell whether firms survived. During periods of war with England French metal button makers did better; by contrast the Eden treaty caused bitter criticism of government, but it is doubtful if it really made the current industrial depression in hardware much worse.

Prohibition had been notoriously a failure, so that long before the Eden Treaty the French government had considered sacrificing the French hardware manufacturers in trade negotiations, and the costs of smuggling were less than the Eden treaty duties. Even revived prohibition in the year 5 did not give secure protection; Paris metal button makers were afraid of the effects of the possible end of war in 1797. In the Napoleonic period button making flourished in Paris and it was a booming trade when others were in difficulties — providing the button makers took the trouble to mark their buttons 'London'.[95] The technology seems to have

[89] There is a good deal on the Orsels, principally in A.N. F12 1316 and 1309.
[90] A.N. F12 1316, F12 680, F12 26, Marine D. 4, 9.
[91] Gournay, *Tableau de Commerce* 1789/90 A.N. F12; 1317 F12 2230.
[92] A.N. F12 1317.
[93] See above.
[94] Ballot., *op. cit.*, 487-8.
[95] A curious incident occurred in 1790 when Paris and Lyons buttonmakers complained that the National Guard were getting their uniform buttons from England, A.N.

been successfully transferred and no later transfusions seem to have been needed. From some other centres there is yet no evidence; in Saint Etienne, where the heavier end of the hardware business was sited, it is mixed; we hear of one of Alcock's machines being used there in 1792 in the manufacture of gun parts; on the other hand it is said that the disruptions of the period led to the abandoning of newer methods and the falling back on those using only hammer and file.[96]

On Alcock himself the verdict cannot be as clear-cut as has sometimes been stated. Commercially he seems to have been inept, his entrepreneurial judgement ruined by faults of character, unstable, with strong variations between optimism and pessimism, prone to depression, violent. He was clearly bad at personal relations, though he was involved with associates often equally bad. Certainly he did not play the major part in the general history of French metallurgy described to him;[97] after the failure of his steelmaking in the late 1760s he was discredited and in obscurity. Some of the later imitations of Birmingham methods, of varied success, were not dependent on him for technology and the en-

F12 652. A petition of 1797, however, said that button firms formerly employing 20 or 30 hands now had in some cases more than 200. The National Convention had prohibited the import of metal buttons but a current prohibition of 10 Brumaire AN 5 was not fully enforced (A.N. F12 1559). A report recording the generally depressed state of French industry in 1810 says, nevertheless, that "the manufacture of metal buttons is in full activity, thanks to the magic word 'London' engraved on the edge". See Odette Viennet, *Napoleon et L'Industrie Française* (Paris 1947). 119. Her edition of Nemnich's travels in France of 1809 (*Une Enquête Economique dans la France Impériale*, (Paris 1947), 65, says English metal buttons are a main object of imitation in France, and are marked 'London'. For the unhindered entry of English hardware under the Ancien Régime, Ministère des Affaires Etrangères, Mémoires et Documents Angleterre [49], letters of June and November 1751 ('la demande de la quincaillerie est exhorbitante'). Memoire of Trudaine 4 Jan. 1752.

[96] Linant de Belfonds, thesis cit., 252; L-J Gras. *Le Conseil de Commerce de Saint Etienne* (Saint Etienne 1899) 21.

[97] Rémond, *op. cit.*, 37, "from about 1730 to nearly 1789, the Alcocks retained a sort of practical monopoly of metallurgical industry". Linant de Belfonds, thesis cit., p. 238 is nearer the mark in saying "the acclimatisation of light metal working ("métallurgie legère") in the modern sense of the term was principally the work of Michael Alcock".

trepreneurs recruited Birmingham workers for themselves. Nevertheless he clearly had something approaching genius in designing and setting up machinery and in getting raw workers to operate it; those who quarrelled with him were prepared to declare their expertise as his trainees. He was the first inspiration and the great early influence in the transfer of Birmingham technology to France.

That technology as he brought it to France is described as completely new there, and we can accept this because none of the many rivals asserted a prior introduction, which would have been a key inducement in seeking government favour. It was noted however on many occasions that several of the key components of the new technology had already been used in France, but not in a normal commercial context. Rolls, fly-presses and drop stamps had long been employed in mints, but their use outside had been strictly prohibited, and some of the early producers of Birmingham hardware in France had to seek specific privileges allowing them the use of such machines, or were asked to take their materials to be worked on in a mint, or were subjected to the inspection of mint officials, or were prevented from using relevant machines. That these precautions were not idle can be told from the freer situation in England, where Birmingham had some notoriety for counterfeiting. The degree of derivation of Birmingham methods from those of mints seems not to have been discussed by historians, nor why the use of such machines outside the mint should have allowed without fuss in England, when it aroused such concern in France.[98]

[98] For instance, A.N. F12 1317 for Le Court's problems with mint officials and the arrêt obtained to overcome this. Also F12 1316, Observations on the Memoir communicated by the La Charité manufacture c. 1765. De Givry and De Wendel in their information gathering visit to England in 1784 noted the extent of mechanization. "One does not take a step without seeing machines, which all tend to shorten the processes in the works... One of those which is used most commonly is the fly-press. It is known that in France the fear we have of counterfeit money has only so to speak proscribed its use (i.e. that of the fly-press) however it is to this simple machine that the town of Birmingham owes its rapid and astonishing prosperity". They thought that there were more than 60 fly-presses in use there, probably an understatement.

Two important questions are raised by the comparative evidence from France. In two previous cases studies of technological transfer, dealing with glass and steel, the use of coal and the techniques of employing it can be shown to be central to the transfer of British technology in furnace-based industries. While coal was important to many Birmingham trades it was not required in such great quantities (particularly at the lighter end of the 'toy' trade which was what was mainly being transferred) as it was in furnace industries. Even so, while Alcock tried to justify the siting of the button trade at La Charité, the supply of coal was indifferent and the quality low, and he had to admit that if the heavier end of the trade, for instance tool making, were taken up, it would have to be on the Saint-Etienne coalfield.[99]

An important aspect of the new Birmingham technology was its ability to bring about an extreme division of labour, and thus abridge it, and in so doing to de-skill operations. While Alcock was sure he could introduce processes which could be operated by unskilled and even child labour, and labour unused to industrial work, let alone production of metal goods, this did not apply to all products. Equipment he designed for making buckle parts was such that "the most ignorant peasant will be capable of doing them, as well as the best workman". The button trade could be set up with a workforce including farmworkers, bargees, women and children, though there was great difficulty in getting efficient production despite the fact that "the workmanship of the Articles is very easy". But there were other articles for which turners, polishers and filers were wanted and at La Charité "these will never be done to advantage; they must be carried on in a place where the inhabitants have been brought up to such kind of work, and who can work hard; not like those of this place who are

[99] "It is impossible to do more here to advantage, coal being so extravagantly dear, if his Lordship (Trudaine) wishes to have the remainder of his views accomplished he must send me to St. Etienne, the only place where they can be accomplished", A.N. F12 1315A. Alcock to Holker, Jan. 1760.

frightened to death at the appearance of labour". For filemaking Saint-Etienne not only had the necessary cheap coal, but "very good workmen as there is in England" needing only good steel "and the English manner of finishing their work". Gilding of goods, we have seen, was very much a craft process. Consequently, in transferring Birmingham technology to France, labour-saving machinery only solved part of the problem; some of the work needed the craft skills best recruited in an existing industrial culture,[100] and the accompanying work habits.

[100] A.N. F12 1315A, Alcock to Trudaine 25 Feb. 1760; II May 1760; Intendant to Trudaine 1 April 1762.

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