
*The Launching of an «Infant Industry»?
The Cotton Industry of Troyes under
Protectionism, 1793-1860*

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I

The mere suggestion that international trade should be liberalised was enough to create alarm and despondency in the ranks of the French cotton industry during the nineteenth century. The vast majority of *cotonniers* were convinced that all moves toward free trade involved a sacrifice of their interests to those of foreign competitors, and hence they fought tooth and nail for a protected domestic market. Over much of the period, official trade policy in France safely reflected their protectionist view. The first stirrings of trade liberalisation in the late eighteenth century were quickly swept aside by the political and military upheavals of the Revolution and Empire. The 1786 Eden Treaty with Britain was effectively abrogated in 1789, and for the next seventy years the French economy was one of the most heavily protected in Europe. The cotton industry in particular was almost immune from foreign competition on its domestic market, with outright prohibitions imposed on imports of cotton yarns, cloths and knitwear in 1793. These survived largely intact until 1860, when Napoleon III finally managed to drag his reluctant compa-

triotis into a period of relatively free trade.¹ In the meantime, the French cotton industry experienced a period of sustained growth. Indeed, it was one of the fastest growing French industries in the eighteenth century and first quarter of the nineteenth and was very much in the forefront of the Industrial Revolution.² This naturally provokes the question, central to this article, of whether it is possible to accept the claim by the *cotonniers* that their industry, and the economy in general, profited from the extended period of protection. A priori, three lines of approach present themselves, all of which can be gleaned from the existing literature.

The first might be termed the 'optimistic' approach, since it assumes that nineteenth-century France was well suited to cotton textiles, and that the nascent French cotton industry was strong enough by the 1780s to survive and even to benefit from exposure to the full force of British competition. It follows, according to authors like A.L. Dunham, that protectionist measures could only have retarded the development of the industry, particularly in peacetime conditions after 1815.³ The protectionist stance of the industry must then be seen as a symptom of entrepreneurial weakness, which cannot in retrospect be justified. The second possible interpretation is rather less optimistic about prospects for the industry. It still implies a comparative advantage in cotton textiles, but concedes that temporary protection was necessary to establish the new industry in the face of an experienced

¹ S.B. CLOUGH, *France: A History of National Economics, 1789-1939* (New York, reprinted 1964 (1939)), pp. 31-199; P. BAIROCH, *Commerce extérieur et développement économique de l'Europe au XIX^e siècle* (Paris, 1976), pp. 39-54.

² J. MARCZEWSKI, 'Some Aspects of the Economic Growth of France, 1660-1958', *Economic Development and Cultural Change*, IX (1961), 380-81; T.J. MARKOVITCH, 'L'industrie française de 1789 à 1964: Analyse des faits', *Histoire quantitative de l'économie française*, vol. V (Paris, 1966), 106-13.

³ *The Anglo-French Treaty of Commerce of 1860 and the Progress of the Industrial Revolution in France* (Ann Arbor, 1930), Ch. 10.

British rival.⁴ There is a strong current of opinion amongst historians that the French industry would have had little chance of sustained growth in the late eighteenth and early nineteenth centuries under free-trade conditions. A respite from British competition was therefore essential for its long-term development, and indeed for the launching of the Industrial Revolution in France.⁵ This line of approach gives some grounds for justifying the protectionist campaigns of the entrepreneurs. It shades off easily into the third, 'pessimistic' approach. It could be argued that nineteenth-century France was poorly endowed for specialisation in cotton textiles, her area of comparative advantage being confined to a few high-quality goods. Much of the expansion of the industry behind the protective barrier could then be considered a misallocation of resources, with unfavourable consequences for economic growth in France.⁶ This casts the *cotonniers* in the role of a sectional interest, using their political influence to prop up a high-cost industry by means of artificial trade barriers.

Uncertainty over the competitiveness of the French cotton industry before 1860, and the influence of protectionism on its development, is likely to continue until further research addresses itself to these problems. The purpose of this article will be to make a preliminary sortie, examining the case for and against protectionism as it affected the cotton industry of Troyes. The work falls into three sections. The first provides the basic context for the

⁴ P. BAIROCH, *Révolution industrielle et sous-développement* (4th ed., Paris, 1974) pp. 127-28.

⁵ Cf. L. BERGERON, 'Problèmes économiques de la France napoléonienne', *Revue d'histoire moderne et contemporaine*, XVII (1970), 495-504; F. CROUZET, 'Wars, Blockade and Economic Change in Europe, 1792-1815', *Journal of Economic History*, XXIV (1964), 575-87; M. LEVY-LEBOYER, *Les Banques européennes et l'industrialisation internationale dans la première moitié du XIX^e siècle* (Paris, 1964), *passim*.

⁶ This interpretation is not well elaborated in the literature; but see R.B. FORRESTER, *The Cotton Industry in France* (Manchester, 1921), p. 27; D.S. LANDES, *The Unbound Prometheus* (Cambridge, 1972), pp. 143-44, 164; R. PRICE, *The Economic Modernisation of France, 1730-1880* (London, 1975), pp. 100-04; and the comments by R. Tilly following CROUZET, *op. cit.*, 589-90.

study by outlining the development of the industry in Troyes and the Department of the Aube across the various shifts in trade policy, between 1780 and 1870. The second adopts the perspective of the local *cotonniers*, considering the justifications for protection which they put forward in the nineteenth century. The final section analyses, as far as is possible, the costs and benefits of protection for the local industry in the light of modern international trade theory.

II

A notable characteristic of French cotton textiles during the nineteenth century was its dispersed structure: although Normandy, Alsace and the North always stood out as the major centres, a number of other areas managed to sustain sizeable industries throughout the period.⁷ Troyes and the Department of the Aube was one such secondary centre, noted for its specialisation in cotton hosiery. Outlining the development of the local industry in any precise form is a hazardous task, given the rudimentary statistical service of the period, but the main lines of evolution are discernable.

Three key points emerge for the later discussion. Firstly, by the 1780s Troyes and the surrounding countryside had already accumulated a wealth of experience in the traditional forms of textile production, so that there existed solid foundation for industrialisation. The local cotton industry evolved from and eventually supplanted the ancient woollen industry of the lower Champagne. At the end of the *Ancien Régime* Troyes was best known for its *toilerie*, combinations of linen warps and cotton wefts, whose manufacture occupied approximately 3,000 handlooms.⁸ Ominously for the future, as it turned out, in 1782 it was reported that

⁷ Cf. S. CHASSAGNE, 'L'Enquête, dite de Champagny, sur la situation de l'industrie cotonnière française au début de l'Empire (1805-1806)', *Revue d'histoire économique et sociale*, LIX (1976), 351-54; C. FOHLEN, *L'Industrie textile au temps du Second Empire* (Paris, 1956), pp. 161-249.

⁸ BRUSLE, *Mémoire sur la statistique du département de l'Aube* (Troyes, Year IX), pp. 22-23.

Troyes relied on high quality rather than on competitive prices for its sales.⁹ Hosiery, the second branch of the local industry, was still a minor activity at this point, with only 1,500 stocking frames to be found in the area. Nonetheless it was noticeably gaining momentum during the latter part of the eighteenth century, in both urban and rural areas.¹⁰ Supplying the weavers and knitters was a whole army of handsp spinners, totalling 15,000 according to one estimate,¹¹ making up the third branch of the industry. It was here that the first signs of technical change were apparent, the lower Champagne being one of the pioneers of Hargreave's spinning jenny in France.¹² A report of 1784 noted that the framework knitters were beginning to make use of cotton yarn spun *à la mécanique*, despite its uneven quality, as demand began to outrun supply.¹³ This initial phase of growth came to an abrupt halt in the mid-1780s, as the entire local cotton industry slid into a deep recession that outlasted the Revolution. Contemporary opinion was inclined to hold the Eden Treaty responsible, but with a severe agricultural crisis dampening domestic demand at this period, it is more likely that heightened British competition aggravated rather than caused the slump.¹⁴ Nonetheless, this combination of circumstances left unhappy associations in the

⁹ ARCHIVES NATIONALES (hereafter A.N.) F¹² 650, Taillardet, Inspecteur des Manufactures: Visite des fabriques de toiles et toileriers de la Généralité de Châlons (September 11-12, 1782).

¹⁰ J. RICOMMARD, *La Bonneterie à Troyes et dans le département de l'Aube* (Paris, 1934), pp. 19-37.

¹¹ A.N. F¹² 650, Mémoire de Bruyard sur les fabriques de la Champagne et de la Picardie, 1784. A lower estimate of 8-10,000 is given in J.J. VERNIER, *Les Cahiers de doléances du bailliage de Troyes* (3 vols., Troyes, 1909), I, p. XII.

¹² C. BALLOT, *L'Introduction du machinisme dans l'industrie française* (Lille, 1923), pp. 41-48.

¹³ A.N. F¹² 650, Mémoire de Bruyard.

¹⁴ Bruslé records that activity in the local cotton industry peaked in 1784, yet the effects of the Eden Treaty could not have been felt until at least mid-1787; *Tableau statistique du département de l'Aube* (Paris, Year IX), pp. 59-60. See also L. CAHEN, 'Une nouvelle interprétation du Traité franco-anglais de 1786-1787', *Revue historique*, LXIV (1939), 257-85; and W.O. HENDERSON, 'The Anglo-French Commercial Treaty of 1786', *Economic History Review*, 2nd ser. X (1957), 104-12.

minds of the local population between free trade and industrial recession.

The second point to note is that between 1793 and 1860, under a strict protectionist regime, the cotton industry of Troyes resumed its path of expansion and development. An examination of the Tables in the Appendix indicates that within this overall framework the various sub-sectors of the industry experienced very different rates of growth and technical progress. At the outset it was the spinning industry which provided the main impetus to growth. The spinning jennies continued to spread, in numbers impossible to determine, but apparently they were soon over-shadowed by mule spinning. A few tentative efforts were made in this direction before 1806, but as elsewhere in France, it required the tightening of the Continental system to coax out the main wave of investment between 1806 and 1810.¹⁵ Shortages of raw material, destruction caused by military activity in the area, and a period of foreign occupation interrupted this growth, but there was a proliferation of water-powered mills in the 1820s to round off the expansionary phase in the local industry. Subsequently it could only consolidate its position, the main tendency being a steady concentration of production in a smaller number of mills in Troyes. The industry came increasingly under pressure on its local market from competition in northern and eastern France,¹⁶ and eventually survived only by catering for some of the

¹⁵ The official figure of approximately 54,000 mule spindles active in the Aube between 1810 and 1812 must be considered a huge exaggeration: reports of 1808 and 1812 which give details of individual mills and groups of hand-spinners make it clear that large numbers of jenny spindles were included in the total given for mules. A.N. F¹² 1561, *Etat des filatures de coton établies dans le département de l'Aube, 1808* (May 8th, 1809); F¹² 1622, *Filature de coton, 1812*.

¹⁶ Outlets for the spinning industry of the Aube were almost entirely confined to the local market. In 1846 it accounted for 40 per cent of this market; subsequently the distribution was as follows:

	1860	1870
Troyes	30 per cent	25 per cent
Alsace	—	35 per cent

specialised needs of the hosiery industry.¹⁷ Over the same period, the first half of the nineteenth century, there was a clear shift in local specialisation from woven to knitted goods. The handloom weaving industry appeared never to recover fully from the crisis of the 1780s. Although it struggled on in the area for almost another century, it became more and more uncompetitive on the national market, and with the loss of its military contracts in the early 1830s its decline became precipitate.

By contrast the hosiery industry grew from strength to strength, deepening its penetration of Troyes, and the small towns and villages to the north and west.¹⁸ In the 1800s it doubled in size, so that by 1812 the Aube was firmly established as the leading centre for cotton knitwear in France.¹⁹ From the 1830s there were between ten and twelve thousand stocking frames in the Department, and at that point the industry began to diversify beyond the traditional caps and stockings into gloves, mittens, trousers, drawers, waist-coats, camisoles, petticoats, dresses, shirts, vests, and bathing costumes.²⁰ This was made possible by the introduction of 'wide' and circular frames, which boosted productivity in the industry without altering its essentially artisan character. Measuring the growth of the local hosiery industry at this period is not easy,²¹ but to give some indication it may be

Normandy	55-60 per cent	25 per cent
Switzerland	—	10-15 per cent
Various	10-15 per cent	5-10 per cent

Enquete parlementaire sur le régime économique, I, Industries textiles: Coton (Paris, 1870), p. 699 (hereafter, *Enquete 1870*).

¹⁷ *Ibid.*, pp. 510, 690, 695.

¹⁸ C.M. HEYWOOD, 'The Rural Hosiery Industry of the Lower Champagne Region, 1750-1850', *Textile History*, VII (1976), 90-111.

¹⁹ Official statistics attributed 43 per cent of stocking frames in France to the Aube; J.-A. CHAPTAL, *De l'Industrie française* (2 vols., Paris, 1819), II, pp. 145-51.

²⁰ ARCHIVES DÉPARTEMENTALES DE L'AUBE (hereafter A.D.A.) M2331, Chamber of Commerce of Troyes to Minister of Commerce, December 26, 1843.

²¹ T.J. MARKOVITCH, *op. cit.* Tableau xvi. There was a long-term fall in the price of knitted goods at this period, which the wide variety and increasing diversification of products makes it impossible to index.

estimated that between 1803-1812 and 1855-1864 the value of output (at current prices) increased by an average of 3.5 per cent per annum, a little above the national figure for the industry of 3.0 per cent per annum.

Finally, it emerges that the 1860s saw no real break in previously established trends.²² The liberalisation of trade in Europe did not have the cataclysmic effects predicted by many French industrialists, but neither did it fulfil the expectations of free traders. Once again the timing of free trade was unfortunate for the French cotton industry. The 'cotton famine' of the 1860s provoked a serious crisis in the supply of raw materials,²³ and this was followed by the massive influx of North American cereals, which led to a contraction of demand for manufactured goods in the still large agricultural sector.²⁴ Under these conditions there was little danger of the cotton industry in Troyes being annihilated by foreign competition, but there is no evidence of accelerated development. The spinning industry underwent some further concentration of production, but the average size of mill remained small even by French standards.²⁵ Its share of the local market for yarns continued to dwindle, with the main thrust of foreign competition coming rather unexpectedly from the Swiss.²⁶ Prospects were more favourable in the hosiery industry, although its structures continued to evolve very slowly. The move to replace the traditional narrow frame with larger

²² Cf. J. COUSSY, 'La politique commerciale du Second Empire et la continuité de l'évolution structurelle française', *Cahiers de l'Institut de Science Economique Appliquée*, CXX, December 1961.

²³ The crisis is exhaustively covered by FOHLEN, *op. cit.*

²⁴ Presumably falling agricultural demand was at least partially offset by an increase in urban demand, but Bairoch usefully stresses that the former sector still accounted for half of the active population in France during the 1860s; *Commerce extérieur et développement économique*, pp. 230-231; and 'Free Trade and European Economic Development in the Nineteenth Century', *European Economic History Review*, III (1972), 228-29.

²⁵ FOHLEN, *op. cit.*, p. 452.

²⁶ See above, p. 558, n. 16.

frames and machinery continued, and the industry began to concentrate in the towns of Troyes and Romilly, but the transition to steam power and mechanisation did not begin in earnest until the 1870s.²⁷

Thus before 1810 Troyes was notable for its pioneering efforts to acclimatise new British spinning machinery, but subsequently the trend in France to relocate basic industries such as spinning and weaving on the coalfields undermined these sub-sectors in the lower Champagne. Ultimately more successful was the local hosiery industry, which grew rapidly over the period, although as in its British counterpart, there was a marked absence of technical progress before the second half of the century.²⁸ By specialising in a labour-intensive, fashion industry such as hosiery, Troyes was able to capitalise on traditional French aptitudes for skilled artisan work, and this form of development placed it in the mainstream of French industrialisation.²⁹ The question which must now be answered is why contemporaries felt it necessary for these various industries to be protected.

III

The modern history of international trade has always revealed a painful divergence between the almost Utopian world of the theorist, in which each country maximises its income through peaceful trade with its neighbours, and the harsh real world of businessmen and politicians, of vested interests and national prejudice, in which tariffs, war and other trade restrictions have tended to prevail. The *Troyens* of the mid-nineteenth century were clearly in no mood to savour the logic of free trade: when the

²⁷ RICOMMARD, *op. cit.*, pp. 52-56.

²⁸ Cf. F.A. WELLS, *The British Hosiery and Knitwear Industry* (Newton Abbot, 1972), Ch. 7; S.D. CHAPMAN, 'Enterprise and Innovation in the British Hosiery Industry', *Textile History*, V (1974), 28-32.

²⁹ Cf. LEVY-LEBOYER, *op. cit.*, pp. 63-66, 169-75, 409-14; and 'Les processus d'industrialisation: le cas de l'Angleterre et de la France', *Revue historique*, CCXXXIX (1968), 281-98.

the theory began to establish roots in France during the 1840s, a meeting of five hundred leading *commerçants et notables* of the Aube unanimously condemned any move to modify the existing protectionist regime. A committee was formed in Troyes to affiliate with the central 'Association pour la défense du travail national', consisting of prominent local merchants, industrialists and landowners.³⁰ From the 1830s, the cotton interest in Troyes used a series of official enquiries, the local press, and the *Mémoires* of the Société d'Agriculture de l'Aube to record its arguments in favour of protection. These fall into two broad categories, the one implying permanent protection for the industry in Troyes, the other temporary protection only.

Among the former, the 'pauper-labour' argument was especially potent: complaints that cheap labour in Saxony and Switzerland ruled out successful competition under free-trade conditions ran like a red thread through the polemical works of the *cotonniers*. The hosiers, being in a labour-intensive industry, felt themselves particularly vulnerable on this score; one of them asserted in 1870 that 'Our products are more expensive, because our labour costs are twice as high as in Saxony, and labour represents 60 per cent of the value of our hosiery'.³¹ Elaborate calculations were made, notably by Gréau aîné in 1846, to show that the industry in Troyes could not be competitive unless its wage levels were cut by a half.³² There can be little doubt that wages in the Saxon industry, the main Continental rival, were substantially below those paid in the Aube. The cheapest labour available to employers in the lower Champagne was provided by the peasant workers of the villages, who were prepared to accept between 6F and 7.50F per week during the first half of the nineteenth century, whilst the more

³⁰ *L'Aube*, Nov. 30–Dec. 1, 1846. The hosiery town of Romilly-sur-Seine formed its own committee soon afterwards.

³¹ *Enquête 1870*, Guivet, p. 508. (This and subsequent passages translated by the author).

³² 'Statistique de la production de l'arrondissement industriel de Troyes', *Mémoires de la Société d'Agriculture de l'Aube* (hereafter M.S.A.A.), XIV, (1847–48), 218–22.

skilled urban artisans of Troyes and a few other centres could command rather more, between 7.50F and 12F per week.³³ Contemporary estimates of weekly wages in Saxony vary between 3.75F and 5.50F.³⁴ This line of argument for protection is frequently raised by industries fearing competition from less developed economies, but it does not receive a great deal of sympathy from modern trade theorists.³⁵ It leaves open questions on the quality of labour, and in fact the *Troyens* themselves were quick to point to the (allegedly) better training and greater technical skills of the British worker when the question of higher British wages was raised. Moreover, the high level of wages in an advanced economy reflects advantages with other factors of production, and again in the context of British competition, hosiery manufacturers from Troyes always shifted attention away from wage comparisons towards such topics as their alleged inferiority in machinery, fuel and capital supplies.³⁶ One is tempted to suspect that much of the argument was an exercise in pure propaganda, playing on the fears of Governments and the labour force. Who, after all, would relish living on 'potatoes, old herrings, cabbages, salads and beer', as the Saxon knitters reputedly did?³⁷ Yet it remains true that at the lower end of the hosiery market, where cheap, unskilled labour was the main requirement before mechanisation, both Troyes and Nottingham suffered heavily from Saxon com-

³³ A.N. F¹² 1622, *Statistique*, 1812; C946, *Enquête sur le travail*, 1848; A.D.A. M2330-31, *Statistiques industrielles*, 1815-1840; MINISTÈRE DE COMMERCE, *Enquête relative à diverses prohibitions établies à l'entrée des produits étrangers, commencée le 8 octobre 1834, sous la présidence de M. T. Duchâtel* (3 vols., Paris, 1835), I, pp. 345-47 (hereafter *Enquête Duchâtel*).

³⁴ GREAU AINE, *op. cit.*, 223; W. FELKIN, *History of the Machine Wrought Hosiery and Lace Manufacture* (Centenary Edition, Newton Abbot, 1967), pp. 519-41. A recent history of the Saxon hosiery remains to be written.

³⁵ Cf. G. VON HABERLER, *The Theory of International Trade* (London, 1936), pp. 250-51.

³⁶ MINISTÈRE DE L'AGRICULTURE etc., *Enquête: Traité de Commerce avec l'Angleterre*, Vol. IV, *Coton* (Paris, 1861), Berthier-Roblot, pp. 717-18 (hereafter *Enquête 1860*).

³⁷ *Enquête 1870*, Guivet, p. 510.

petition,³⁸ and the industrial employment of many rural knitters was in jeopardy. It is therefore reasonable to conclude that fears of being undermined by cheap labour in Central Europe were genuinely felt,³⁹ and prohibition or high tariffs would have appeared to the cotton interest as a practical, not to say highly convenient, response.

At the end of our period, the spinning industry in Troyes had also moved to a position which implied the need for permanent protection, the justification being that it could not survive unless heavily protected. A leading cotton spinner observed in 1870: 'If we consider the particular situation of cotton spinning in Troyes, which is placed in more difficult conditions than anywhere else in France, we will be led to demanding much higher tariffs'.⁴⁰ As well as the relatively high cost of labour, the spinners complained of the high costs of their raw cotton and coal (a function of the distance from the main sources of supply and high transport costs), and the irregular flow of water for powering their mills.⁴¹ All this was substantially true, Troyes being poorly located for cotton spinning by the latter half of the nineteenth century. Its only advantage was the close contact with the substantial local market for yarns in the hosiery industry. Otherwise, it was a long way from Le Havre and Marseilles, the principal sources of raw cotton in France. Poor communications with the coalfields led to Troyes being one of the most expensive areas in the whole of France for coal;⁴² and although an ancient system of tiny canals leading off from the Seine through Troyes gave the rare facility of urban

³⁸ Cf. WELLS, *op. cit.*, p. 111; R.A. CHURCH, *Economic and Social Change in a Midland Town: Victorian Nottingham, 1815-1900* (1966), pp. 28, 265-66.

³⁹ For Britain, see L. BROWN, *The Board of Trade and the Free Trade Movement 1830-1842* (Oxford, 1958), pp. 200-03, 162; A.E. MUSSON, "The 'Manchester School' and Exportation of Machinery", *Business History*, XIV (1972), 18, 22.

⁴⁰ *Enquête 1870*, FONTAINE, p. 690.

⁴¹ *Ibid.*, FONTAINE, pp. 689-96; Douine, pp. 696-702.

⁴² A.D.A. M2039, Report of October 1, 1839; ARCHIVES MUNICIPALES DE TROYES, F169, Coal Consumption, May 5, 1841; *Enquête 1860*, FONTAINE, p. 350; LEVY-LEBOYER, *Les Banques européennes*, p. 320.

sites for water power, by the 1840s severe overcrowding was much in evidence.⁴³ But this approach provided no scope for appealing to the general interest; rather, it emerges as an uninhibited claim by a high-cost industry to a permanent subsidy from the rest of the community. In relation to economic theory, it obviously flies in the face of the law of comparative advantage; the only conceivable case for protection would be a 'non-economic' one, such as supporting the industry for reasons of prestige, but this is hardly what the *Troyens* had in mind. It would best be considered a neat illustration of the 'existence principle', recently noted by W. M. Corden, 'by which any industry which has in one way or another come into existence should be protected'.⁴⁴

Sometimes the demand was for temporary protection only — although, very prudently, there was never any commitment to a specified time limit. One line of attack was to demand that protection be maintained until Troyes had achieved identical conditions of production with its main rivals. For example in 1834 the Chamber of Commerce observed, when defending prohibitions on foreign knitwear, "To concede that our industry could without danger compete with the English industry, it would first be necessary to establish that the two possessed more or less the same means of production, and certainly nobody contests the immense advantages which the English industry possesses over our's".⁴⁵ The modern trade theorist would counter that this justification for protection makes little sense because the whole basis of international trade rests on the diversity of conditions of production across the world.⁴⁶ However, the argument does reveal the widespread and very genuine feelings of inferiority before the British cotton industry, which underlay the opposition

⁴³ DENIEL, *Recherches sur le régime ancien des taux de la rivière de Seine, dans l'étendue du territoire de la ville de Troyes* (Troyes, 1841), *passim*.

⁴⁴ *Trade Policy and Economic Welfare* (Oxford, 1974), p. 90.

⁴⁵ *Enquête Duchâtel*, I, p. 346.

⁴⁶ HABERLER, *op. cit.*, pp. 251-53.

to free trade in Troyes before 1860.⁴⁷ Local businessmen vied with each other in piling on lists of conditions in Britain which the French could not yet match. Of these, the most commonly cited were: amortized fixed capital; abundant credit; low customs duties on imported raw materials; economies of large-scale production; colonial outlets protected by the State; perfected, up-to-date machinery; and again, highly-trained labour, and low transport costs.⁴⁸ These assertions were often unsubstantiated and not entirely rational — if literally true, there would have been little hope of a cotton industry surviving for long in France — but it is important to grasp that the *cotonniers* saw themselves in the front line of a struggle with an immensely powerful and dynamic industrial rival. Since their whole livelihoods were at stake, it is understandable that they were reluctant to experiment with the untried and untested assumptions of the free traders.

Similar hesitations were apparent when their final justification was aired: the line that temporary protection was required to sustain the local cotton industry during its early stages, in the face of competition from its more experienced British counterpart. This anticipated a competitive cotton industry in certain areas of specialisation, but in the meantime emphasised its shallow roots: in 1860 the hosiers, somewhat brazenly, insisted that their industry had only recently been established in France, and so was particularly vulnerable to foreign competition.⁴⁹ Foreshadowing the arguments of low income countries today, the *Troyens* asserted that free trade was an ideological weapon available to the strong for the coercion of the weak. In the 1840s a local newspaper warned, with some justification: ⁵⁰

⁴⁷ Cf. P.N. STEARNS, 'British Industry Through the Eyes of French Industrialists, 1820-1848', *Journal of Modern History*, XXXVII (1965), 50-61.

⁴⁸ *Enquête Duchâtel*, I, Chamber of Commerce of Troyes, p. 346; ANNER-ANDRE, 'Rapport sur la théorie du libre échange', *M.S.A.A.*, XIV (1847-1848), 34-42.

⁴⁹ *Enquête 1860*, Berthier-Roblot, pp. 715, 720.

⁵⁰ Cf. MUSSON, *op. cit.*, 18-22, 42.

England is calling for the suppression of the protectionist system by which she has so handsomely profited, because at the stage of development which she has reached, prohibitions would conflict with her interests, and be in opposition to the present needs of her industry. She wishes to draw other states along her path although she knows perfectly well that the conditions for success are far from being equal, and let it be said, because she is certain that she would precipitate our ruin and enjoy the spoils.⁵¹

Here at last there is a case for protection which finds a sympathetic echo in the thinking of a wide range of economists. Even staunch nineteenth-century free traders like J.S. Mill were prepared to concede an exception to the rule for an 'infant industry', and modern trade theory has developed the theoretical foundations for this, although in the process narrowly defining the circumstances in which it might apply.⁵² But if the *cotonniers* were on respectable theoretical grounds, the depth of their sincerity must be open to doubt. By appearing to demand only temporary protection, and sometimes confidently predicting the emergence of a competitive industry, they made their case more acceptable to the legislature. Yet it may well have been largely a ruse, used repeatedly from the 1830s, to delay for as long as possible the easing of protection.⁵³

All of the arguments used by the *cotonniers* from Troyes have been common currency amongst protectionist groups in all parts of the world, but their presentation invites a number of comments. Firstly, it is very striking that general theories or even the welfare of the French economy as a whole were never invoked. It was invariably a matter of pure self-interest: free trade would threaten the survival of their industry, their livelihoods, their profits.⁵⁴ Secondly, there was a certain consistency in the cases presented,

⁵¹ *E'Aube*, Nov. 26-27, 1846.

⁵² These will be developed in the section that follows.

⁵³ Cf. HABERLER, *op. cit.*, p. 284.

⁵⁴ Cf. C. FOHLEN, 'Bourgeoisie française, liberté économique, et intervention de l'état', *Revue économique*, III (1956), 414-28.

insofar as deep gloom at the short-term prospects of the industry under free trade was always expressed, and the maximum protection considered realistically attainable was always sought: complete prohibitions on foreign cotton goods before 1860, high tariffs afterwards. But otherwise a variety of potentially contradictory arguments was assembled, despite the fact that all of the spokesmen were drawn from a narrow élite of industrial and commercial families. The main difficulty was to draw up a case for protection which would hold for two types of foreign competition: arguments used to justify protection against the less developed Saxon and Swiss economies could rebound awkwardly when seized on by members of official enquiries and applied to the context of competition from the more highly-developed British economy. Finally, many of the assertions made were either downright misleading, or entirely unsubstantiated. For example, on a number of occasions the *cotonniers* gave the impression that British and French wage levels were about the same,⁵⁵ which was quite untrue; and the spinner Fontaine surprised his contemporaries by disclaiming all knowledge of cotton spinning in England.⁵⁶ Doubtless these narrow, unsophisticated (though often shrewd) polemics were to be expected in an age when businessmen spent many of their formative years in the counting-house, so to speak, rather than at school or University.

IV

It remains to analyse the costs and benefits of protection for the cotton industry in Troyes, applying recent trade theory to the problem. Taking first the possible benefits, before 1860 these would all come under the heading of the 'infant industry' argument. For a genuine case which would lead to an increase in real

⁵⁵ For example, GREAU AINE, 'Statistique de la production', 221-22; *Enquête 1870*, Guivet, p. 510.

⁵⁶ *Enquête 1860*, p. 353; *Enquête 1870*, p. 696.

incomes, two basic conditions must be fulfilled. Firstly, the new industry must be suitable to the country, the justification for state intervention being a certain misallocation of resources (a divergence between private and 'social' costs) by the market. Secondly, firms must be shown to experience falling costs through time as output proceeds, sufficient to compensate the community, through higher income, for the income lost during the period of subsidy, so that protection need only be temporary.⁵⁷ Within these boundaries there is some scope for applying the 'infant industry' argument to the case of the local cotton industry. However, it should be recognised at the outset that this theory is extremely difficult to apply in practice, for, as H. Grubel warns, there is a lack of operational instruments for identifying infant industries, given 'the elusive nature of external effects, estimates of private and social risk, the interdependence of investment projects and the divergence between private and social cost of labour'.⁵⁸ Even when the historian plays his trump card, the wisdom of hindsight, a strongly speculative element must inevitably creep into his assessments in this field.

One possibility is that protection permitted dynamic economies within the individual firms, as they learnt from their experience of production, thus fostering the early stages of development in the local industry. A likely obstacle to firms in Troyes benefitting from these economies under free-trade conditions would have been imperfections in the capital market, which could prevent new firms being launched, or discourage long-term investment. This could hardly be applied to the hosiery industry during the first half of the nineteenth century, given the small scale of most firms and the negligible requirements of long-term credit in a

⁵⁷ HABERLER, *op. cit.*, pp. 281-85; J. MEADE, *The Theory of International Economic Policy*, Vol. II, *Trade and Welfare* (1955), pp. 255-71; M.C. KEMP, *The Pure Theory of International Trade* (Englewood Cliffs, N.J., 1964); H. GRUBEL, 'The Anatomy of Classical and Modern Infant Industry Arguments', *Weltwirtschaftliches Archiv*, XCVII (1966), 325-42; W.M. CORDEN, *op. cit.*, pp. 248-79.

⁵⁸ *Op. cit.*, p. 338.

dispersed, artisan industry. From the 1850s there was some pressure to invest in new technologies, but the still modest requirements would have been well within the capacity of the expanding capital market of the Second Empire. A more plausible case could be made for the mechanised spinning industry in the Aube during the unsettled conditions of the early nineteenth century. Evidently the tightening of the Continental System in 1806 did encourage a rather nervous investing class, with the result that merchants, bankers, even an army officer, came forward with substantial funds at the moderate interest rate of six per cent.⁵⁹ But by the mid-1820s there was no sign that protection was encouraging further investment in the industry, and from then onwards, with the individual firms having acquired several years experience of production, any claims to 'infancy' in this respect become increasingly difficult to sustain.

Alternatively, dynamic economies can be external to the firm, or rather reciprocal between a number of firms in a growing industry. In particular there are benefits to be gained from the creation of a pool of skilled labour and technical knowledge, which all firms would contribute to and draw from. Some form of protection for an industry would be beneficial if private interests did not consider it worthwhile bearing the cost of such a pool. Again it is impossible to envisage such an argument applying to hosiery before 1860, since everywhere in the world the industry relied on traditional labour skills and handtool methods. As late as 1870 a local hosiery manufacturer could state, with fair accuracy,

⁵⁹ The best-documented local firm of this period is Worms et Compagnie, which spun, knitted, bleached and dyed cotton goods in the Chateau of Romilly-sur-Seine. It was launched in 1804 with capital to the value of 360,000 F (£ 14,400 at the prevailing rate of exchange), of which the Parisian banker Orly Hayem Worms and his Italian associate Sommariva each provided two fifths, and the local hosiery manufacturer, Payn, one fifth. It was not a typical firm: it was bankrupt by 1808 with heavy losses and bitter acrimony amongst the partners. See the dossier in A.N. F¹² 2310; and L. BERGERON, 'Banquiers, négociants et manufacturiers parisiens du Directoire à l'Empire', (Thèse lettres, Paris, 1974), I, 122-23; II, 809.

'For manufacturing, for frames, for machinery, we are in exactly the same position as Saxony and England'.⁶⁰ Contrarily, in the spinning industry during the early nineteenth century, the problem of training labour in the ways of mechanisation and factory production, and of acclimatising new technologies to local conditions, must have been acute. Unfortunately official sources of the period did not concern themselves with this area, and it goes without saying that there is no possibility of measuring any fall in costs caused by external economies. But it is significant that to encourage the diffusion of new spinning technology the Government resorted to more direct means of subsidy than prohibitions (the latter a very clumsy instrument for solving the problem, according to recent thinking). In 1806, while on a visit to Troyes, Napoleon offered bounties of 4,000F (£160) to the first ten entrepreneurs investing in new spinning machinery worth 20,000F or more.⁶¹ Such measures could be given some justification because of the need to overcome powerful initial resistance, but once the main cluster of spinning inventions was introduced in the 1800s, the 'borrowing' of technology from abroad slowed down, and the likelihood of protection encouraging a larger pool of common technical knowledge in turn diminished. As for labour, it is well established that French industrialists found it extremely difficult to recruit and train skilled machine operatives for factory work,⁶² and the mushrooming of the local spinning industry during the first quarter of the nineteenth century must have strained the labour market to the utmost. But subsequently the industry began to shed some of its labour, while concentrating in Troyes, which presumably eased the problem, and by 1830 (let alone 1860) the long experience of mechanised spinning made nonsense of claims

⁶⁰ *Enquête 1870*, Guivet, p. 509.

⁶¹ A.D.A. M 2344, Industrie, Statistiques et enquêtes.

⁶² LEVY-LEBOYER, *Les Banques européennes*, pp. 171-72; B. GILLE, *Recherches sur la formation de la grande entreprise capitaliste* (Paris, 1959), pp. 39-43.

for additional time under protection to improve the quality of labour.

An extension of this argument, still relying on external economies, concerns the 'atmosphere creating' effects achievable under protection. The clustering of various firms or industries in one area can bring substantial benefits of this kind, facilitating communications and the transport of goods between firms involved in successive stages of a manufacturing process, as well as the creation of a pool of skilled labour and technical knowledge. It is not difficult to envisage a retrospective justification for protection based on these 'economies of conglomeration'.⁶³ With sizeable handloom weaving, framework knitting, and related finishing industries in the Aube, there were grounds in the early nineteenth century for encouraging the development of large-scale cotton spinning, rather than for importing yarns from elsewhere in France or from abroad. Evidently wartime conditions before 1815 virtually dictated such a strategy, but underlying conditions were in any case favourable. The major economies of scale in spinning could be reached at a relatively low level of output, so that some dispersal of production in the world was feasible. High transport costs and poor communications gave certain advantages to suppliers of yarns in Troyes, able to respond quickly to orders from the local market. And relatively cheap supplies of labour and water power, combined with the advantages conferred by long experience of traditional industrial and commercial activity, meant that the local factor endowment was, to say the least, not entirely discouraging. All of this adds up to the strong likelihood of a genuine 'infant industry' case. A further example of 'atmosphere creation' achievable under temporary protection is the heightening of interest in things mechanical in the wake of a new industry. It may well be that the efforts made to develop new knitting machinery in the Aube from the late 1820s owed some

⁶³ Cf. MEADE, *op. cit.*, pp. 258-71.

thing to the example of mule spinning. One of the pioneers of power-driven circular frames in Troyes, Hippolyte Douine, was in fact a cotton spinner.⁶⁴ But again this type of justification did not require an open-ended commitment to protection. By about 1830 the structural changes which protection could encourage were largely achieved in the Aube: with the spinning mills firmly established, the 'infant industry' card becomes more difficult to play.

Against these possible benefits of protection must be set the cost, for according to the free-trade school the interference with market forces risks a misallocation of resources. Protection in the form of trade barriers, on which French Governments generally relied, is highly vulnerable to such charges: tariffs and prohibitions cannot deal directly with 'divergences' in the domestic economy, and they have a tendency to become permanent. These drawbacks were particularly important for Troyes, because for much of the time before 1860 their effects were reinforced by a further barrier to trade in the form of high transport costs.⁶⁵ The cotton interest was naturally reluctant to confront the disadvantages of protection, but from time to time they were compelled to discuss the key issues of international specialisation, markets, and competition.⁶⁶

The principal argument from the free-trade school is that protection inhibits international specialisation along lines of comparative advantage. In the case of the Aube, there is strong evidence to suggest that the various trade barriers hindered specialisation in the most competitive branch of the local cotton industry: hosiery. On the one hand the support they brought to the han-

⁶⁴ *L'Industriel de Troyes*, Jan. 5, 1853; ANNER-ANDRE, *op. cit.*, 100-01; M. DUBUISSON, 'La Bonneterie', in *L'Histoire générale des techniques*, Vol. III, *L'Expansion du machinisme* (Paris, 1968), pp. 688-703.

⁶⁵ The decisive changes came at mid-century: in 1846 the completion of a canal linked Troyes directly with Paris by navigable waterway, and, more importantly, in 1848 the railway era began for the town with the opening of the Montereau-Troyes line.

⁶⁶ Cf. HABERLER, *op. cit.*, pp. 222-24.

loom weaving industry, an ailing, high-cost industry in Troyes during the nineteenth century, retarded the shift of capital and labour into hosiery.⁶⁷ On the other, they restricted the sources of yarn available to the hosiery manufacturers. This was more serious, for with most of the competitively priced British yarns excluded from the French market, the cost of their main raw material was artificially inflated.⁶⁸ Moreover, the hosiers complained that British fine yarns were of superior quality to the French counterparts, with the result that their position at the top end of the market for knitted goods was weakened.⁶⁹ For their yarn supply, they were therefore obliged to concede the benefits of free trade, and this conflict of interest with the local spinners became increasingly obvious in the mid-nineteenth century. In 1834 the Chamber of Commerce of Troyes smoothed over the issue by demanding prohibitions on all types of foreign cotton goods, but by 1860 the hosiers were taking an independent line, with the admission, "Imports of English yarns, with a moderate tariff, would no doubt help us to keep up the struggle".⁷⁰ In sum, although the tariff system was partially rationalised before 1860, with measures to make imports of key raw materials and semi-manufactures more easily available,⁷¹ it remained a distorting influence on the development of the cotton industry in Troyes.

A second drawback to trade barriers is that they limit the availability of markets, and the possibilities of large-scale production. From the perspective of the local industry, the main symptom to be expected is a lack of success in the export field when

⁶⁷ As late as 1837, the handloom weaving industry employed a labour force of 2,100 in Troyes, compared to the 1,500 employed on hosiery work in the town; A.D.A. M2331, Conseil des Prudhommes to Prefect, August 10, 1837.

⁶⁸ Raw materials accounted for between 20 and 40 per cent of total costs in the hosiery industry according to a number of estimates.

⁶⁹ *Enquête Duchâtel*, Chamber of Commerce of Troyes, I, pp. 345-46; *Enquête 1860*, Berthier-Roblot, pp. 711, 513.

⁷⁰ *Enquête Duchâtel*, I, pp. 345-46; *Enquête 1860*, Berthier-Roblot, p. 711.

⁷¹ Cf. C.H. JOHNSON, 'The Revolution of 1830 in French Economic History', in J.M. MERRIMAN (ed.) *1830 in France* (New York, 1975), pp. 167-68.

producing inefficiently in the 'hothouse' conditions of a protected market. Certainly outlets for the cotton industry in Troyes were almost entirely confined to France before 1860: the only branch to export at all was hosiery, and in 1834 it was estimated that sales abroad amounted to no more than one twelfth of total output.⁷² This lends a measure of historical support to the view that protection via trade barriers risks limiting the horizons and confidence of entrepreneurs: they are tempted to look inwards on a secure domestic market, rather than to carve out new markets abroad. Even Fontaine-Gris, an official spokesman for the local cotton interest in 1834, observed: "It is desirable that our merchants should be more audacious, and deal directly with foreign buyers"⁷³ Evidently the lowering of tariff barriers in France would not in itself have guaranteed further exports, but it is reasonable to suppose that opportunities to increase the exports of medium and fine quality hosiery goods were lost before 1860.⁷⁴ Given yarns and finishing processes that were competitive in price and quality, this was where the skill and good taste of French artisans could be expected to satisfy a fashion-conscious market.⁷⁵

The third argument is that protection removes the stimulating influence of foreign competition on an industry, sanctioning obsolete methods and general inefficiency. This is difficult to test in specific cases, since technologies that are obsolete in one country may not be so in another at any given time. The relatively small scale of plant in the spinning industry of Troyes, and the continuation of artisan handtool methods in the hosiery industry well into the second half of the nineteenth century, may partly be explicable in terms of regionalised markets and relative factor costs: cheap labour, particularly in rural areas, and

⁷² *Enquête Duchâtel*, III, p. 340.

⁷³ *Ibid.*

⁷⁴ This was the area where hosiery exports from Troyes were concentrated.

⁷⁵ On the reputation of French artisans, see E. BAINES, *History of the Cotton Manufacture in Great Britain* (2nd ed., 1966), p. 512.

relatively high costs of capital and fuel. At the same time, it is interesting to note that representatives of the hosiery industry met with a hostile reception when they demanded further protection from an official enquiry in 1860. With some justification, they were accused of failing to import machinery of proven value from England, making massive protection for their industry a necessity. It was also observed by a member of the Commission:

It is much easier to run an industry without large outlays of capital than to do so on the basis of substantial advances. You had this situation in Troyes; you profited from it, and I do not blame you for this; but it is not the normal condition for an industry.⁷⁶

The replies are unconvincing.

The main victim of the inefficiencies in this system was the French customer. It was his choice that was limited, and it was he who had to bear the additional costs which burdened French cotton goods. In 1834, the Chamber of Commerce of Troyes informed an Enquiry, somewhat ingenuously,

They (the consumers) do not complain about the inferiority of the products of French industry, nor about its difficulty in satisfying their tastes and needs, nor even of the high prices; they know very well that, if our neighbours can provide at more agreeable prices, it is only fair to the French manufacturer to take into account the causes of this difference.⁷⁷

The consumer, of course, did not have the political organisation to secure the ear of the Government, and in any case most would probably not have understood the mechanisms at work.

All conclusions on the costs and benefits of protection must necessarily come in the form of 'practical hunches', since shortcomings in the data and methodology available preclude a more rigorous approach. On this basis it appears that the benefits of

⁷⁶ *Enquête 1860*, p. 720.

⁷⁷ *Enquête Duchâtel*, I, p. 346.

protection for cotton textiles in Troyes were limited to the spinning industry during the early nineteenth century, as it made the transition to power-driven, factory-housed production in the shadow of its more experienced British rival. Otherwise, it was never a positive influence on the development of local hosiery, and from about 1830 it became increasingly pernicious in its effects, even on the spinning industry. At this point, with war and its aftermath safely left behind, there was scope for a more radical scaling down of tariffs than actually occurred. Experience after 1860 was to show that free trade was no panacea for the cotton industry of Troyes, nor for the French economy generally, and prohibitions were not the only braking force at work before then. Regionalised markets; limited factor mobility; and a reluctance by consumers to purchase knitted goods on the market (since they could easily be produced at home), also inhibited the growth of the industry in Troyes. But with hindsight it can be seen that a more audacious trade policy during the second quarter of the nineteenth century could have accelerated the adaptation of the cotton industry in the Aube to a changing world economy, with favourable effects on *per capita* incomes. As Bairoch points out, at this early period Continental industries could have been eased gently into a more competitive environment, since there remained some protection from high transport costs; this was no longer the case after 1860.⁷⁸

V

How then do we assess the growth of the cotton industry in Troyes under protectionism? The 'optimistic' approach mentioned at the beginning finds little support in this case: to suggest that the entrepreneurs could have overcome their obstacles and competed on an even footing with the British is to under-

⁷⁸ *Commerce extérieur et développement économique, passim.*

estimate the problems. High fuel and capital costs, shortages of skilled labour for factory work; and distance from the main centres of innovation could all be circumvented, but they ruled out successful competition with Britain (and other regions of France and Europe) in much of the basic spinning and weaving industries. The reluctance of *cotonniers* in Troyes to enter into open competition with the British, particularly in the unsettled conditions of the late eighteenth and early nineteenth centuries, is readily understandable — although this is not to deny that opportunities from free trade were lost. At the other, 'pessimistic' extreme, to write off French cotton textiles as a high cost industry is not entirely helpful. The availability of cheap but skilled artisan labour, combined with an accumulation of mercantile capital and entrepreneurial experience, placed relatively labour-intensive industries like hosiery in a potentially strong competitive position throughout the nineteenth century. And even in Troyes there was some scope for a cotton spinning industry, relying in the early stages on water power, and later on a prompt response to orders from the local hosiery industry. The continued development of the hosiery and spinning industries after 1860 indicates that the earlier growth under protection was not simply a misallocation of resources — although some such misallocation probably did occur. This leads to the conclusion that a retrospective case can be made to show a fairly successful launching of an infant industry, in line with the recent reaction against describing French economic growth in the nineteenth century as 'slow' or 'retarded'.⁷⁹ But one of the main aims of this article is to demonstrate that protection could only benefit the cotton industry of Troyes in certain limited circumstances (infancy in itself it not a justification for protection), and could therefore easily be overdone. In the event, protection of the

⁷⁹ Cf. F. CROUZET, 'French Economic Growth in the Nineteenth Century Reconsidered', *History*, LIX (1974), 167-69; R. ROEHL, 'French Industrialisation. A Reconsideration', *Explorations in Economic History*, XIII (1976), 233-81.

French cotton industry was too heavy, with absolute prohibition on many foreign goods seriously undermining market forces; it was indiscriminate, covering (with some exceptions) raw materials, semi-manufactures, competitive and uncompetitive industries alike with a heavy hand; and it went on for too long, being ripe for a more liberal system than was actually attempted from the 1830s onwards.

More generally, the case study lends further historical support to those economists who consider protectionism, particularly in the form of tariffs and prohibitions, a risky, double-edged weapon in the armoury of the State. On the one hand, it shows how temporary protection can give relatively undeveloped economies a chance to emulate their more experienced rivals (even if tariffs are rarely 'first-best' policy). On the other, it highlights the distortions of the economy which interference with market forces so easily risks, and the practical problems associated with implementing a tariff policy. The *cotonniers* of Troyes provide a typical example of a vested economic interest, with the usual political muscle, applying pressure for temporary protection to be extended, apparently indefinitely. It being difficult to measure the costs and benefits of protection, the finer points of economic theory are easily swept aside, leaving the way open for powerful pressure groups to defend their monopoly by a combination of threats and cajolements. Governments attempting to nurse an infant industry must run the risk of clutching a viper to their bosom.

TABLE 1

MECHANISED COTTON SPINNING IN THE AUBE, 1806-1870

Year	No. of Mills	Operatives: Total	Operatives: Average per mill	Spindles: Total	Spindles: Average per mill	Output: Total Value (m. francs)	Output: Total Weight (kg.)	Output: per spindle (kg.)	Output: per operative (kg.)
1806	8	150	19	7,950	994	—	29,400	3.7	196
1808	10	373	37	13,738	1,374	—	59,000	4.3	158
1810	—	—	—	54,234 (?)	—	—	226,000	4.2	—
1812	16	415	30	—	—	1.3	—	—	—
1825-1826	48	2,574	54	82,800	1,725	—	385,000	4.7	150
1840-1843	22	2,200	100	85,500	3,800	5.1	1,553,788	18.6	706
1846	18	1,690	94	65,000	3,600	2.2	862,500	13.3	510
1860	—	—	—	71,716	—	3.0	1,530,000	21.3	—
1870	14	837	60	81,406	5,815	5.0	1,900,000	23.0	2,270

TABLE 2
THE HANDLOOM WEAVING INDUSTRY OF THE AUBE, 1784-1846

Year	Handlooms: Total Active	Output:		Output:		Consumption of yarns	
		Total Volume (pieces)	Output: per loom (pieces)	Total Value (m. francs)	Output: per loom (francs)	linen (kg)	cotton (kg)
1784	3,240	81,000	25	5.7	1,750	260,000	650,000
1786	2,600	—	—	—	—	75,000	132,400
1791	1,000	—	—	3.3	2,260	132,110	239,120
1800	1,480	32,000	22	3.8	2,560	145,321	263,032
1806	1,621	—	—	—	—	—	—
1810	2,200	42,000	19	5.4	2,450	—	—
1825	2,463	71,425	29	3.5	1,950	—	—
1834	2,500	—	—	3.0	1,200	—	—
1846	1,100	—	—	1.1	1,000	—	190,200

TABLE 3
THE HOSIERY INDUSTRY OF THE AUBE, 1784-1860

Year	Frames: Total Active	Output:		Output:		Consumption cotton yarn (kg)
		Total Volume (doz. pairs)	Output: per frame (doz. pairs)	Total Value (m. francs)	Output: per frame (francs)	
1784	—	30,000	—	0.9	—	—
1787	1,500	75,000	50	2.3	1,500	—
1791	1,000	42,750	43	1.6	1,600	55,000
1800	2,120	—	—	—	—	—
1806	3,000	127,500	43	3.0	1,000	150,000
1810	3,830	127,500	33	3.6	950	—
1825-1826	5,250	350,000	67	6.5	1,250	—
1834	10,000	—	—	7.0	700	—
1846	10,401	—	—	13.0	1,250	2,000,000
1860	12,000	—	—	18.0	1,500	—

Note: All of the figures in these Tables must be treated as broad approximations only, reflecting the dispersed structure of the industry and the secretiveness of entrepreneurs. Certain rectifications have been made, and numerous inconsistencies remain, which it would be tiresome to explain.

Sources: (1784-91) A.N. F12 650; BRUSLE, *Tableau statistique du département de l'Aube* (Paris, Year IX), pp. 59-71; (1800-12), A.N. F12 1561-62, 1567, 1571, 1622; A.D.A. M2282, 2344; Archives Municipales de Troyes F164; (1825-26) A.D.A. M2330; (1834) MINISTRE DU COMMERCE, *Enquête relative à diverses prohibitions...* (3 vols., Paris, 1834), III, pp. 336-42; (1840-46) STATISTIQUE DE LA FRANCE, *Industrie* (4 vols., Paris, 1847-52), I, pp. 202-09; A.D.A. M2344; GRÉAU AÏNE, 'Statistique de la production...', *M.S.A.A.*, XIV (1847-48), 205-15; (1860-70) *Enquête parlementaire sur le régime économique*, I, *Industries textiles: Coton* (Paris, 1870), pp. 692; *Statistique de la France, Industrie...* 1861-65 (Nancy, 1873), pp. 64-71.

