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# Industrial Organization and Technological Change: The Decline of the British Cotton Industry*

¶*In this important study Professor Lazonick provides an astute reappraisal of why Britain's once dominant economy has failed to meet the challenges of international competition in the twentieth century. The vehicle for his discussion is cotton manufacture, the industry which, through the technological and commercial innovations of the late eighteenth and early nineteenth centuries, made Britain the leading industrial power. Among Dr. Lazonick's questions are why did Britain's preeminance in this industry come to an end? Why did technological innovation yield to stagnation? Why did inefficient modes of economic organization persist in the face of manifest inadequacy? And what does the history of this industry have to teach us about recent economic theory?*

Only twice in the history of industrial capitalism has a national economy that dominated international economic affairs entered into a relative decline in the face of foreign competition. The first nation to undergo this experience was Britain after achieving its peak of supremacy in the third quarter of the nineteenth century. The second was, or rather is, the United States after its turn at the top in the quarter century following World War II. Where the relative decline of the United States will leave it in the world economy remains to be seen. But for once powerful Britain all the returns are essentially in. Not surprisingly, for a number of decades economic historians have been busy trying to understand why and how it happened. Proferred explanations include Britain's "early start," the problem of "technical interrelatedness," a disease known as "entrepreneurial failure," and, when all other explanations are happily rejected, "conditions outside its control."[1]

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*A summary of this paper appeared under the title, "Competition, Specialization, and Industrial Decline" in the *Journal of Economic History*, Vol. XLI, No. 1, March 1981. The analysis presented here has benefitted greatly from collaborative work with Stephen Marglin on the history and theory of the firm and with William Mass on the historical development of the cotton textile industry in Britain and the United States. An anonymous referee pointed out some important omissions in an earlier draft of this paper which I have attempted to rectify. Thomas Brush offered useful comments and very important research assistance. Additional research assistance was provided by Todd Hennis and Martha Smith. This paper is based upon research supported by the National Science Foundation under Grant No. SES 78-25671, and by a grant-in-aid from the Merrimack Valley Textile Museum.

[1]See e.g. the bibliographical survey in D.H. Aldcroft and H.W. Richardson, *The British Economy 1870–1939* (London, 1969, pp. 305–313; see also D. McCloskey and L. Sandberg, "From Damnation to Redemption: Judgements on the late Victorian Entrepreneur," *Explorations in Economic History*, Ser. 2, Vol. 9, No. 1, (Fall 1971) pp. 89–108.

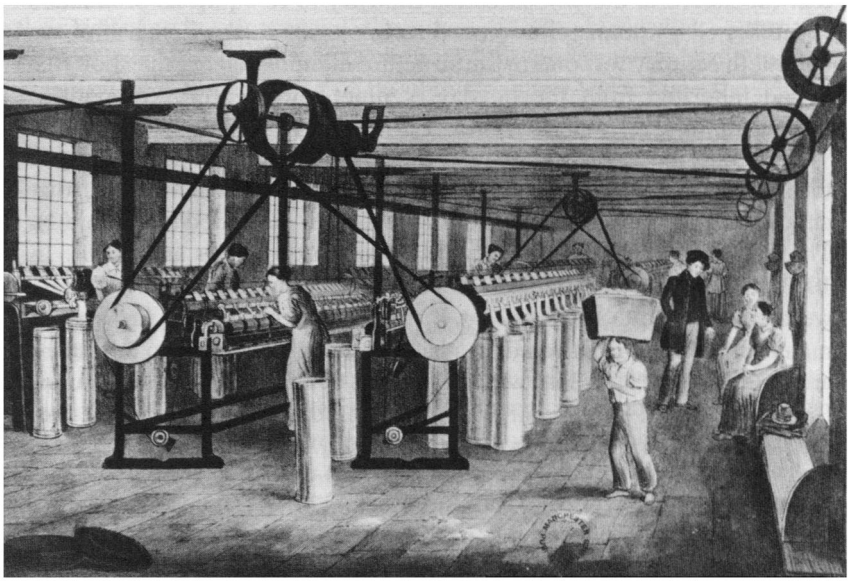
The academic debate over the explanation of Britain's relative decline is far from settled. A prime purpose of this article is to ensure that the debate goes on. The historical experience of British industrial capitalism has intellectual significance far beyond its obvious importance as a case study of the fall of a once powerful economy. It is this particular historical experience, variously interpreted, that exerts to this day the preponderant influence on how neoclassical, neokeynesian, and neomarxist economists conceptualize the process of capitalist development.[2] Hence, our own understanding of British economic history since the late nineteenth century provides a basis for assessing the descriptive and predictive relevance of alternative theoretical perspectives that have purported to comprehend that experience. It is only with such insight into the relation between theory and history that we can *begin* to develop a theoretical analysis that captures the essence of the dynamics of capitalist development as it is occurring today.

This article on the British cotton industry's decline is an attempt to understand the relation between history and theory. As such it is both critical and constructive. It is critical in demonstrating that when a certain set of facts are crammed into typical neoclassical baggage, the latter bursts apart at the seams. Either the facts are too weighty or the baggage too flimsy, or both. It is constructive in suggesting an alternative, and hopefully sturdier, explanation of the British decline, based on the nature of the cotton industry's organizational structure and the influence of this structure on changes in technology.

The British cotton industry played a central role in its country's nineteenth-century development. On the eve of World War I, it remained Britain's largest manufacturing employer, contributed almost one-quarter of all the nation's exports, and was still expanding its capacity.[3] There is no question that, in order to cope with growing international competition and tariff walls in the first four decades of the twentieth century, the British cotton industry would have had to contract in size significantly no matter how it might have reorganized and re-equipped itself internally. It is significant, however, that the need for such a long-run contraction was not perceived and acted upon at all until the late 1920s. The issues we shall address are 1) why the industry had such great difficulty accomplishing the necessary contraction, and 2) why, even when it had become much smaller, it was unable to modernize organizationally and technologically that capacity that remained as was being done for example in the cotton industries of the United States and many Western European countries. The main argument of the article is

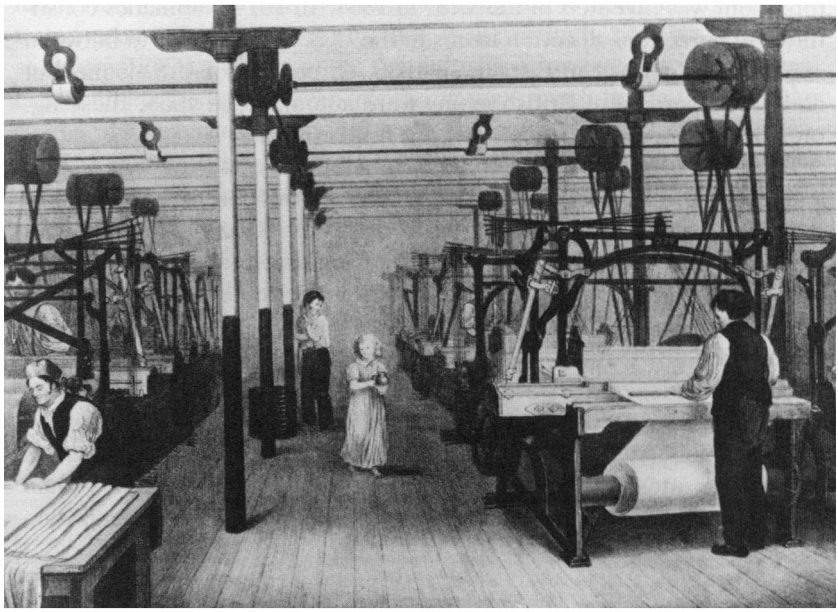
[2]For a systematic theoretical analysis of how these three views of the economy fundamentally differ, see S. Marglin, *Growth, Distribution and Prices* (Cambridge, Mass., 1984).

[3]P. Deane and W. Cole, *British Economic Growth 1688–1959* (Cambridge, England, 1964), p. 32; G. Jones, *Increasing Return* (Cambridge, England, 1933), p. 277.



Courtesy Baker Library, Harvard University.

Bobbin and Drawing Frames.



Courtesy Baker Library, Harvard University.

Weaving.

Idealized scenes in an Early Nineteenth Century Textile Mill.



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that the failure of the British cotton industry to re-equip its production processes on the basis of advanced technologies in the first half of the twentieth century was due to the structure of industrial organization that it had inherited from the heyday of nineteenth-century competitive capitalism.[4]

Right into the 1960s, the British cotton industry continued to rely on technologies, such as the spinning mule and the Lancashire loom, that almost all other cotton industries has long since discarded (see Table 1). The ring-frame had been greatly improved in the 1870s and 1880s. In 1913, 87 percent of all spindles in the U.S. but only 19 percent in Britain were rings, despite the fact that British textile machinery firms were manufacturing the ring-frame on a large scale to be shipped to industries around the world. In 1954, with 59 percent of its spindles still on mules, Britain possessed 84 percent of all mule spindles, but less than 10 percent of all ring spindles, in world operation. By this time, the mule spinning machine had vanished completely from the U.S. cotton industry. With the help of a government scheme in the late 1950s, large numbers of mules were finally scrapped, and by the early 1970s the machine had become a virtually extinct breed in the land of its birth.[5]

In the adoption of the automatic loom Britain was even slower, hanging on to the less automated Lancashire loom. The automatic, or Northrop, loom was invented in the U.S. in 1894. In 1914 automatics constituted 40 percent of all cotton looms in the U.S. as compared to between one and two percent in Britain. In 1936, 68 percent of U.S. looms but only three percent of British looms were automatic; in 1955, these figures were 100 percent and 12 percent respectively.[6]

Britain also lagged far behind in the adoption of all the new cotton manufacturing processes of the first decades of this century. After World War II, single-process openers, high-draft spinning, high-speed winders, and high-speed warping machines were among the processes that were widely used in the U.S. and other major cotton industries, but still rare in the British industry. The equipment Britain did have was not only obsolete by world standards but also extremely old, while the workloads and modes of work organization utilized on these machines dated back to the mid-nineteenth century if not before.

In what follows, I shall outline the nature of industrial organization in the British cotton industry in the first half of the twentieth century. Then I shall demonstrate how this structure of industrial organization

[4]Elsewhere, I analyze the influences of both the structure of industrial relations and the structure of foreign demand on productivity on the traditional machines. See W. Lazonick and W. Mass, "The Performance of the British Cotton Industry, 1870–1913," *Research in Economic History*, Vol. 9, (1984).

[5]R. Robson, *The Cotton Industry in Britain* (London, 1957), p. 355; A. Ormerod, "The Prospects of the British Cotton Industry," *Yorkshire Bulletin of Economic and Social Research*, Vol. 15, No. 1, (May 1963), p. 6.

[6]W. Mass, "The Adoption of the Automatic Loom," paper presented to the Cliometrics Conference, Chicago, May 1980, Table I; Robson, *Cotton Industry*, p. 356. See also United Textile Factory Workers' Association, *Plan for Cotton* (Ashton, 1957), p. 15.

impeded the introduction of more advanced technologies — particularly the ring frame in spinning and the automatic loom in weaving — during this period. Next I shall inquire why so little progress was made in the organizational restructuring of the industry so as to facilitate the adoption of modern production methods. Finally I shall consider the implications of my interpretation of the British cotton industry's decline for the broader analysis of the relative decline of the British economy in the twentieth century.

## Competition and Specialization

In the early decades of the industrial revolution, vertical integration of marketing with various levels of production (including in many cases machine-making) had been a necessity if pioneering cotton textile firms were to ensure themselves adequate supplies of inputs for their factories as well as sufficient outlets for their products. But from the beginning of the nineteenth century as the industry grew in and around Manchester, there developed what Alfred Marshall was later to call "external economies" in the form of financial services, market exchanges, transportation networks, and readily available supplies of cotton, machinery, and industrial workers.[7] The development of this geographically-concentrated economic infrastructure made it increasingly possible for small-scale production units to enter the industry. Moreover, as far-flung foreign markets became of ever-increasing importance to the industry, the capital and managerial requirements of a concern that integrated production and distribution were beyond the capacities of the vast majority of family firms seeking to produce yarn and cloth. Except for a few large enterprises, marketing and manufacturing had become almost completely vertically specialized in the British cotton industry by the mid-nineteenth century.[8]

From the 1820s to the 1840s, however, the combined spinning and weaving firm apparently grew in importance in the British cotton industry as large numbers of spinning firms (many if not most of which had been directly involved in the putting out of yarn to hand-loom weavers)

[7]A. Marshall, *The Principles of Economics* (London, 1925), eighth edition, ch. VIII–XIII.

[8]M. Edwards, *The Growth of the British Cotton Trade 1780–1815* (Manchester, 1967); A.J. Taylor, "Concentration and Specialization in the Lancashire Cotton Industry, 1825–1850," *Economic History Review*, 2nd ser., Vol. I, No. 2 and 3, (1949), pp. 114–122; V.A.C. Gatrell, "Labour, Power, and the Size of Firms in Lancashire Cotton in the Second Quarter of the Nineteenth Century," *Economic History Review*, 2nd series, Vol. XXX, No. 1, (February 1977), pp. 95–139; R. Lloyd-Jones and A.A. LeRoux, "The Size of Firms in the Cotton Industry: Manchester 1815–1841" *Economic History Review*, 2nd ser. Vol. XXXIII, No. 1, (February 1980), pp. 72–82; S.D. Chapman, "British Marketing Enterprise: The Changing Role of Merchants, Manufacturers, and Financiers, 1700–1860," *Business History Review*, Vol. LIII, No. 2, (Summer 1979), pp. 205–233; S.D. Chapman, "Financial Restraints on the Growth of Firms in the Cotton Industry, 1790–1850," *Economic History Review*, 2nd ser. Vol. XXXIII, No. 1, (February 1980), pp. 50–69; J. Jewkes and S. Jewkes, "A Hundred Years of Change in the Structure of the Cotton Industry," *Journal of Law and Economics*, Vol. IX, (October 1966) pp. 115–134; D.A. Farnie, *The English Cotton Industry and the World Market 1815–1896*, (Oxford, 1979).

added power-loom weaving sheds to their production facilities.[9] But from the 1830s the rapid growth of foreign trade in yarn to serve the weaving industries of the Continent, India, and China meant that there was an increasing role for specialized spinning firms in the British industry. These firms, once in place, stood ready as well to supply yarn to specialized weaving firms within the home market. During the 1850s, the spinning capacity of specialized mills surpassed that of combined mills, and over the next century vertically-specialized spinning and weaving firms became increasingly dominant in the industry (see Table 2).[10] For most firms spinning and weaving represented two separate industries linked by the Manchester Exchange, with the spinning industry becoming increasingly localized in south Lancashire towns such as Oldham and Bolton (which in turn tended to specialize in different types of yarn) and the weaving industry becoming increasingly localized in northwest Lancashire towns such as Blackburn and Burnley.[11]

Accompanying this high degree of vertical specialization was a high degree of horizontal competition. Over time these two structural characteristics of the industry were mutually reinforcing. As the external economies linking the vertical structure eased entry into the horizontal levels of spinning, weaving, and marketing, the specialized skills required of managers as well as the large number of suppliers and buyers at each of these levels discouraged the development of the internal organizational structures necessary for effective forward or backward integration.[12]

Of these three levels, the minimal capital requirements were greatest in spinning. From the 1860s, however, new spinning firms were able to tap large sources of capital from local residents who not only bought equity in the mills but also opened savings accounts at the mills, receiving almost twice the rate of interest offered by regular savings banks.[13] The development of these limited liability spinning mills went furthest in Oldham which, by the 1870s, had become by far the largest cotton spinning center in the world. Between 1884 and 1914, the average annual rate of entry of firms into the Lancashire spinning industry was 3.6 percent while the average annual rate of exit was 3.3 percent.[14]

In weaving, entry was even easier than in spinning, requiring, in the late nineteenth century, an investment of £20–50 per employee as com-

[9]Taylor, "Concentration," p. 119; J. Jewkes, "The Localisation of the Cotton Industry," *Economic History*, Vol. II, No. 5, (January 1930), pp. 92–93; D. Bythell, *The Handloom Weavers* (Cambridge, England, 1969), pp. 89–92.

[10]Taylor, "Concentration,"; Jewkes, "Localisation"; J.R.T. Hughes, *Fluctuations in Trade, Industry and Finance, 1850–1860* (Oxford, 1960), pp. 97–99; Farnie, *English Cotton*, pp. 86–90.

[11]Jewkes, "Localisation."

[12]In what follows I shall ignore the finishing (bleaching, dyeing, and printing) level of the industry since its firms were neither buyers nor sellers of intermediate products but rather served as sub-contractors for the merchant-convertors who bought gray cloth and determined its final color and design.

[13]Farnie, *English Cotton*, p. 256.

[14]T. Ashton, "The Growth of Textile Businesses in the Oldham District 1884–1924," *Journal of the Royal Statistical Society*, Vol. LXXXIX, (1926), p. 573. See also Farnie, *English Cotton*, ch. 6–7.

pared to £250–300 per employee in spinning.[15] Entry was facilitated particularly by the widespread adoption of the room-and-power system from the last decades of the nineteenth century in newly expanding weaving areas such as Burnley. On this system, a firm rented space, power, and at times even looms from the proprietor of a large weaving shed, an average of four firms being housed under one roof.[16] Moreover, looms were built to last in Lancashire, and new entrants to the industry could often obtain used ones at low prices from those who had recently exited (or at least from their creditors). In an industry prone to recurrent overproduction due to intense competition, the bankruptcies were usually the products of a conjuncture of high yarn prices and low cloth prices, whereas the "newcomers" (who had often been weaving capitalists before) rushed in when yarn prices fell.[17]

The marketing of yarn and cloth was carried out by a plethora of shippers, home trade houses, and merchant convertors, the firms altogether numbering at least 2,000 even in the post-World War II period at a time when the marketing of U.S. production had become highly concentrated in 50–60 New York selling agencies closely allied or integrated with particular manufacturing concerns.[18] Many of these Lancashire firms were substantial export houses, and a portion of the home market was served by fully integrated firms. Still there was plenty of room for small merchants to set up by making use of the readily available finishing, packing, and shipping facilities in Manchester and by specializing in a particular type of yarn or cloth to be sold in a particular market.[19]

Linking these various highly competitive layers of the industry was a neoclassical economist's dream of a hierarchy of extremely well-developed markets — indeed in 1919 Alfred Marshall referred to the Lancashire cotton industry as "perhaps the best present instance of concentrated organization mainly automatic."[20] The raw cotton market was centered in Liverpool and the yarn and cloth markets in Manchester. An Oldham spinning mill manager might ride the train to Liverpool on Mondays to purchase cotton sufficient to fulfill yarn orders already received (very little being produced in anticipation of demand) and then visit Manchester on Tuesdays and Fridays to seek out new orders on the

[15]Farnie, *English Cotton*, p. 219.

[16]*Ibid.*, ch. 8.

[17]*Ibid.*, pp. 287–295; *Cotton Factory Times, (CFT)* 20 Nov. 1885.

[18]R. Robson, "Structure of the Cotton Industry: A Study in Specialization and Integration" (Ph.D. Thesis, University of London, 1950), p. 190; Robson, *Cotton Industry*, p. 87–88; S. Barkin, "The Regional Significance of the Integration Movement in the Southern Textile Industry," *Southern Economic Journal*, Vol. XV, No. 4, (April 1949) pp. 395–411; Fabian Research Group, *Cotton–A Working Policy* (London, 1945), p. 3; Committee on Industry and Trade, *Survey of the Textile Industries*, (London, 1928), pp. 20–22; Henry Clay, *Report on the Position of the English Cotton Industry*, Confidential Report for Securities Management Trust, Ltd. October 20, 1931, pp. 30–39; Economic Advisory Council, Committee on the Cotton Industry, *Report*, pp. 13–14, in *Parliamentary Papers*, 1929–30, XII; Great Britain, Board of Trade *Working Party Reports: Cotton* (London, 1946), p. 46, Association of Cotton Textile Merchants of New York, *Twenty-five years* (New York, 1944).

[19]M. Copeland, *The Cotton Manufacturing Industry of the United States* (Cambridge, Mass., 1912), pp. 365–70; Robson, *Cotton Industry*, p. 149.

[20]A. Marshall, *Industry and Trade* (London, 1919), pp. 600–601.

## TABLE 1
## MACHINERY IN THE BRITISH COTTON INDUSTRY, 1907–1979
### (INSTALLED CAPACITY)

| | Spinning spindles (millions) | | | Weaving looms (thousands) | | |
|---|---|---|---|---|---|---|
| | Mules | Rings | | Lancashire | | Automatic |
| 1907 | 43.7 | 8.3 | 1911 | 763.0 | | 5.4 |
| 1913 | 47.9 | 11.4 | 1924* | | 792.0 | |
| 1927 | 43.8 | 13.5 | 1930* | | 700.0 | |
| 1937 | 28.0 | 10.8 | 1936 | 489.5 | | 15.2 |
| 1947 | 19.9 | 9.8 | 1948 | 358.0 | | 26.0 |
| 1951 | 17.7 | 10.6 | 1955 | 294.7 | | 39.2 |
| 1955 | 14.5 | 10.9 | 1961 | 117.0 | | 47.0 |
| 1959 | 8.7 | 9.5 | 1964 | 56.6 | | 41.3 |
| 1963 | 1.6 | 5.6 | 1967* | | 57.8 | |
| 1967 | 0.4 | 3.9 | 1973* | | 49.4 | |
| 1971 | 0.2 | 3.3 | 1975 | 27.0 | | 22.1 |
| 1975 | — | 2.7 | 1977 | 21.6 | | 22.4 |
| 1979 | — | 2.1 | 1979* | | 35.4 | |

* = Total Number of Looms

Sources: W. Lazonick, "Factor Costs and the Diffusion of Ring Spinning in Britain prior to World War I," *Quarterly Journal of Economics*, Vol. 96, No. 1, (February 1981), p. 96; R. Robson, *The Cotton Industry in Britain* (London, 1957), pp. 339, 340, 342, 344, 355–356; U.S. House of Representatives, *Cotton Manufactures*. Report of the Tariff Board, Vol. 2 (Washington, 1912), p. 494; B. Mitchell and H. Jones, *Second Abstract of British Historical Statistics* (Cambridge, England, 1971), p. 42; A. Ormerod, "The prospects of the British cotton industry," *Yorkshire Bulletin of Economic and Social Research*, Vol. 15, No. 1, (May 1963), p. 19; Amalgamated Textile Workers' Union, Fifth *Annual Report* for the Period January 1 to December 31, 1979 (Rochdale, 1980), p. 31. Organization for Economic Cooperation and Development, *Textile Industry in O.E.C.D. Countries* (O.E.C.D.: Paris) 1973–74, pp. 121, 124, 1976–77, pp. 40–41.

floor of the Royal Exchange. In many cases, alternatively, spinners and weavers would transact their purchases and sales through cotton, yarn, and cloth agents who added even more layers to the vertical structure.

Vertical specialization increased in Lancashire from the mid-nineteenth century until after World War II. Between 1884 and 1911, the number of firms combining spinning and weaving fell by 37 percent while the number of spinning firms increased by 4 percent and the number of weaving firms by 28 percent (see Table 2). In 1930 only twenty-six of the more than 2,000 cotton yarn and cloth producers in Britain had their own marketing facilities, and only nineteen of these combined spinning and weaving as well. These twenty-six firms controlled about 7 percent of the spindles and 10 percent of the looms in the industry.[21] They generally had their origins in the nineteenth century, many in the early phases of the industrial revolution when some form of integration of production and distribution was a requirement of doing business.[22]

[21]Clay, *Report*, pp. 26A, 26B.

[22]E. Hopwood, *The Lancashire Weavers' Story* (Manchester, 1969), p. 15; Clay, *Report*, p. 26A. W. Mills, *Sir Charles W. Macara, Bart.* (Manchester, 1917) p. 50; A. Muir, *The Kenyon Tradition* (Cambridge, England, 1964); B. Ellinger and H. Ellinger, "Japanese Competition in the Cotton Trade, *Journal of the Royal Statistical Society*, Vol XCIII, pt. II, (1930) p. 209.

## TABLE 2
## VERTICAL SPECIALIZATION OF FIRMS IN THE BRITISH COTTON INDUSTRY
## 1884–1965

| Year | Spinning only | | Weaving only | | Weaving and spinning combined | | |
|---|---|---|---|---|---|---|---|
| | percent of firms | percent of spindles | percent of firms | percent of looms | percent of firms | percent of spindles | percent of looms |
| 1884* | 40.5 | 59.8 | 33.0 | 42.6 | 26.5 | 40.2 | 57.4 |
| 1911* | 38.6 | 77.4 | 46.3 | 64.6 | 15.1 | 22.6 | 35.4 |
| 1924 | 35.4 | n.a. | 52.1 | n.a. | 12.5 | n.a. | n.a. |
| 1931 | 29.0 | n.a. | 57.0 | n.a. | 14.0 | n.a. | n.a. |
| 1939** | 22.0 | 76.8 | 67.0 | 76.4 | 11.0 | 23.2 | 23.6 |
| 1946 | 22.1 | 84.1 | 67.6 | 75.6 | 10.3 | 15.9 | 24.4 |
| 1955 | 21.8 | 72.1 | 65.7 | 64.5 | 12.5 | 27.9 | 35.5 |
| 1959 | 22.6 | 42.4 | 63.2 | 64.4 | 14.2 | 57.6 | 35.6 |
| 1965 | 25.1 | 32.7 | 58.1 | 57.8 | 16.8 | 67.3 | 42.2 |

n.a. = not available
* = The statistics for these years apply to Lancashire only
** = The data on firms are for 1940, on spindles and looms for 1939.
Sources: J. Jewkes and S. Jewkes "A hundred years of change in the structure of the cotton industry," *Journal of Law and Economics*, Vol. IX, (October 1966), p. 120; H. Clay, *Report on the Position of the English Cotton Industry*, Confidential report for Securities Management Trust Ltd., October 20, 1931, p. 2; United Textile Factory Workers' Association, *Report on the Legislative Council on Ways and Means of Improving the Economic Stability of the Cotton Textile Industry* (Ashton, 1943), p. 156; R. Robson, *The Cotton Industry in Britain*, (London, 1957), p. 122; Great Britain, Board of Trade, *Working Party Reports: Cotton* (London, 1946), p. 37.

No doubt this specialized vertical structure as well as the ease of entry into its various levels attracted much in the way of individual initiative into the industry and promoted the expansion of capacity prior to World War I. So long as the industry's markets were growing absolutely, as was generally the case up to 1914, the specialized and competitive structure fostered the economic growth of production to meet this demand. With expanding markets, the development of production came about by the re-equipment of existing firms and perhaps even more by the entry into the industry of new, usually larger, firms in booms and the exit of the inefficient firms in slumps, thus up-dating and enlarging the capital stock.

With generally contracting markets after World War I, however, very few existing firms re-equipped and very few new firms entered the industry. In the 1920s many inefficient firms that might have been forced to exit had there been technical development and enlargement of the more efficient firms, found that they could hang on despite the dramatic decline in demand, living, so to speak, off their capital. Throughout the 1920s, both spinning and weaving capacity varied little from its pre-World War I levels. Many "American" spinning and weaving firms remained in business in the early 1920s by shifting some of their capacity, machinery permitting, into the production of finer goods, thereby over-

crowding the "Egyptian" section of the industry by the late 1920s and creating inefficiency through less standardized production within mills.[23]

The problem of excess capacity in the coarser goods section of the spinning industry in the 1920s was exacerbated by what turned out to be an enormous overcapitalization of spinning mills in the brief post-war boom of 1919–1920. High profits led to the buying up and recapitalization of existing mills at about three times their pre-war value per spindle and with an increase of loan capital of approximately 50 percent per spindle. Involved in this financial reconstitution were 46 percent of the spindles in the industry and 14 percent of the looms, the latter belonging mainly to combined firms. When the slump hit the industry beginning in the mid-1920s, the firms were forced to throw their yarn on the market at any price to meet fixed interest charges. The resultant low yarn prices were probably a prime reason for the survival of many coarse weaving firms in the depressed 1920s.[24] The financial condition of all the spinning mills was made even more unstable by the fact that shareholders in the Lancashire spinning industry were generally required to have only half of their share capital paid-up with the other half on call for emergencies. When this unpaid share capital was called in during the 1920s, local residents, who were preponderant among the stockholders, often had to withdraw their savings deposits from the mills in order to retain their equity, thus deepening the market crisis and the further dependence of the recapitalized mills on banks to whom they were already deeply indebted for working capital.[25]

The extreme competition for a declining market at all horizontal levels of the British cotton industry was neither propitious for re-equipment by existing firms nor for the up-dating of plant and machinery by the entry of new firms. In a survey undertaken in 1930, 96 percent of the mules and 87 percent of the rings in 200 mills had been installed prior to 1920, and 77 percent of the mules and 67 percent of the rings prior to 1910.[26] Horizontal competition in a contracting market stifled *any* type of re-equipment. Vertical specialization, however, constrained the adoption of modern capital-intensive technologies not only in the depressed periods of the 1920s and early 1930s but even in the much stronger

[23]Political and Economic Planning, Industries Group, *Report on the British Cotton Industry* (London, 1934), p. 21; M. Kirby, "The Lancashire cotton industry in the inter-war years: a study in organizational change," *Business History*, Vol. XVI, No. 2, (July 1974), pp. 145–159; Committee on Industry and Trade, *Survey*, pp. 33–34; J. Pennington, "Competition and specialisation in the cotton trade," *Journal of the National Federation of Textile Works Managers' Associations* Vol. VI, (1926–1927), p. 216.

[24]Committee on Industry and Trade, *Survey*, p. 37; G. Daniels and J. Jewkes, "The Post-war Depression in the Lancashire Cotton Industry," *Journal of the Royal Statistical Society* Vol. XCI, (1928) pp. 169–177; see also United Textile Factory Workers Association, *Inquiry into the Cotton Industry* (Blackburn, 1923), p. 15; O. Jones, "The Agitation for Control of the Lancashire Cotton Industry," *Harvard Business Review*, Vol. 2, No. 4, (July 1924) pp. 447–452.

[25]Committee on Industry and Trade, *Survey*, pp. 36–38.

[26]J. Ryan, "Machinery Replacement in the Cotton Trade," *Economic Journal*, Vol. 40, (December 1930) p. 7; Political and Economic Planning, *Report*, p. 54.

market conditions of the two decades or so prior to World War I, the late 1930s, and the years after World War II. Specifically, vertical specialization greatly impeded, among other technological advances, the introduction of ring spinning (which in turn restricted the introduction of the high-draft preparatory process which was not well suited to mule spinning), the automatic loom, as well as high-speed winding and warping machines.

The primary constraint on the introduction of ring spinning in Lancashire was the cost of shipping ring yarn. Mule yarn was spun into packages (called "cops") on the bare spindle or on lightweight paper tubes while ring yarn had to be spun into packages on wooden bobbins. If the yarn was shipped on these relatively heavy bobbins the cost of transport was increased significantly since freight on the bobbins had to be paid not only to the weaving mill but also back to the spinning mill.[27] Moreover the bobbins themselves were relatively expensive — one mill manager claimed that they were "one of the costliest of mill stores for a ring spinning mill to keep up."[28] Shipping on the bobbin for the export trade was therefore simply out of the question. But even when shipping within Lancashire, the spinner had no assurance that the bobbins would be returned promptly, in usable condition, or at all. As late as the interwar period, there were no arrangements in the Lancashire cotton industry whereby the spinning mill could charge the weaving mill for the skips, cases, and warping beams that the latter was constantly receiving along with the yarn and then credit the weaver when these items were returned. Competition among spinners undoubtedly impeded their ability to institute such practices on an individual basis. That the problem was recognized is evident from the following complaint by a spinning mill manager in 1919:

> The present system leads to a state of "no value" or "nobody's property" after it leaves the mill. There is no responsibility for returning [skips, cases, beams, etc.], and at present prices — 60s. for skips, 32s. for cases, etc. — it becomes a very serious item. The number used for receptables in warehouses, fencing gardens, and poultry farms are legion. The number used by doublers, dyers, etc. to send their own products to their customers is the same. Users of yarn take unto themselves the right to use the spinners' property for any purpose they may desire. It is not what is called a "square deal". It is time the spinner "woke up" and make a charge, and credit it on return.[29]

[27] *See W. Lazonick, "Factor Costs and the Diffusion of Ring-spinning in Britain prior to World War I," Quarterly Journal of Economics*, Vol. XCVI, No. 1, (February 1981).

[28] J. Kershaw, "Uses of Paper-tubes in the Textile Trade," *Journal of the British Association of Managers of Textile Works* (Lancashire Section), Vol. IV, (1912–1913), p. 86.

[29] B. Robinson, "Business Methods in the Cotton Trade," *Journal of the British Association of Managers of Textile Works* (Lancashire Section), Vol. IX, (1918–1919) p. 96. There had been a court decision in 1895 absolving a weaver of responsibility for a spinning mill's skips burnt while in his possession, a decision that was upheld when appealed by the FMCSA. *Textile Mercury*, August 10, 1895. As for bobbins, they were commonly used as grips for skipping ropes — today such items, complete with old Lancashire skipping rhymes, can be purchased any Saturday in Portobello Road.

As a result of these costs, ring yarn was virtually never shipped on the bobbin in Lancashire. One alternative would have been to develop a ring-frame to spin on the bare spindle, an endeavor which in fact absorbed much time and energy on the part of Lancashire's expert machine makers, but with no commercial success.[30] A second alternative for weft yarn was to rewind it into large packages at the spinning mill and then rewind it onto shuttle pirns at the weaving mill. On the winding machines in use in Lancashire (which even before World War I were far from being the most advanced technology), such rewinding of ring weft posed a cost constraint of roughly the same, and equally as prohibitive, magnitude as shipping on the bobbin. As a result ring spindles were virtually *never* used to spin weft in the disintegrated Lancashire spinning mills.[31] These cost-constraints imposed by vertical specialization in transferring ring weft from the spinning mill to the weaving mill were the major cause of the slow rate of adoption of the ring-frame in Lancashire from the 1870s on.[32]

On the other hand, twist (or warp) yarn, whether ring or mule, had to be put onto warping beams in any case; so with either technology some winding costs would be incurred. When mule yarn was used, the warping process was usually carried out at the weaving mill where it could be supervised by the management since faulty warping could result in costly stoppages and waste in the subsequent sizing and weaving processes.[33] However, in order to save the costs of shipping on the bobbin (or, before World War I, on the even larger warping spools then in use) or alternatively to avoid performing an extra stage of winding, it became the practice to do the winding and warping of ring twist at the spinning mill.[34] Hence the demand for ring twist, and the rate of diffusion of the ring-frame, depended partly on the willingness of weaving managers to forego supervision of the winding and warping processes as well as on their perceptions of the added costs of letting their own winding and warping machines sit idle or their confidence in dispensing with the processes altogether.[35]

Insofar as the warping processes were shifted to the spinning mills, the introduction of high-speed warping machinery (which by the late 1920s ran almost four times as fast as the ordinary machinery) was

[30]*Textile Manufacturer*, June 15, 1979, p. 179; December 15, 1889, p. 567, March 15, 1980, pp. 88–89; November 15, 1908, p. 361; J. Nasmith, *The Student's Cotton Spinning* (Manchester, 1896) 3rd ed., p. 532; W. Walsh, "Fifty-years' Progress in Ring-spinning Machines," *Textile Manufacturer*, Dec. 1925, p. 96.

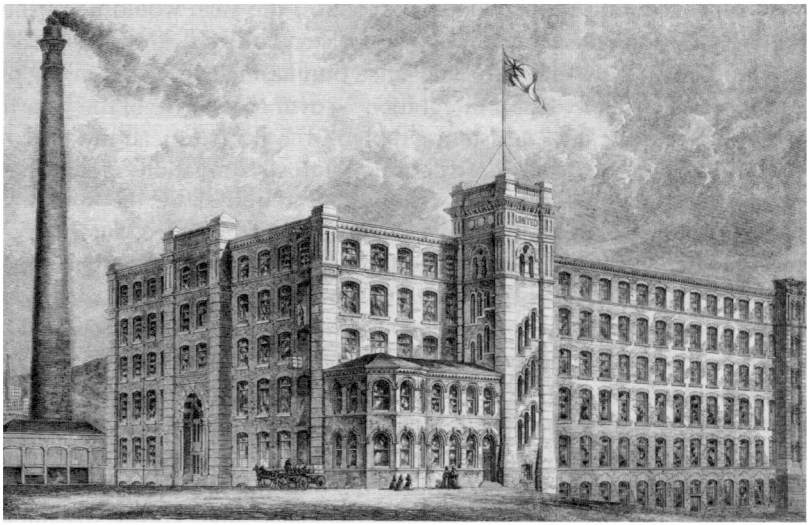
[31]Copeland, *Cotton Manufacturing*, p. 74; Lazonick, "Factor costs," p. 14.

[32]*Ibid.*, pp. 13–16.

[33]Copeland, *Cotton Manufacturing*, p. 72n; T. Thornley, *The Middle Processes of Cotton Mills* (London, 1923), p. 127.

[34]Thornley, *Middle Processes*, p. 110; R. Peake, *Cotton: From the Raw Material to the Finished Product* (London, 1926), pp. 79–80; Great Britain, Board of Trade, *An Industrial Survey of the Lancashire Area* (London, 1932), p. 135; E. Gray, *The Weaver's Wage* (Manchester, 1937), p. 63.

[35]Peake, *Cotton*, pp. 79–80; Political and Economic Planning, *Report*, p. 95; E. Snowden, "Cotton Yarn Preparation Developments," in Cotton Board, *Cotton and Rayon Machinery and Processing Development* (Manchester, 1945), p. 92.



The United Mill at Chadderton shortly after its Construction in 1874.

impeded. The maximum feasible speed of a warping machine was dependent on the diameter of its warping beam, the larger the diameter, all other things being equal, the faster the machine could be run. But the larger diameter of the beam also meant that it weighed more, and as a speaker to the National Federation of Textile Managers' Associations warned, "this type of beam is only suitable for the manufacturer [i.e., the weaver] who does his own warping, and is not suitable for spinners who have to transport their own beams."[36] It might also be noted that in the 1930s, ring spinning mills came to a minimum price agreement on warped yarn, an agreement which prompted some weaving firms to bring previously idle winding and warping equipment into use again, and, perhaps, to shift back to using mule twist yarn.[37] Facing all these uncertainties and constraints, it is not surprising that in 1913 nonintegrated spinning firms had only 50 to 55 percent of the ring spindles in the industry even though they possessed about 80 percent of all spindles, and that in 1946 they possessed 65 percent of ring spindles but 92 percent of mule spindles and 84 percent of all spindles.[38]

The method of buying cotton in Britain also favored the retention of mule spinning over ring spinning. In the United States most of the cotton needed for the upcoming year was bought just after the cotton har-

[36]F. Holt, "High-speed Winding and Warping," *Journal of the National Federation of Textile Managers' Associations*, Vol. IX, (1929–1930) pp. 104–105.

[37]Gray, *Weaver's*, p. 62.

[38]J. Worrall, *The Cotton Spinners' and Manufacturers' Directory for Lancashire* (Oldham, 1913); Great Britain, Board of Trade, *Working Party*, p. 37.

vest to ensure that, for a given staple length, the yarn would be of the high quality and consistency required for standardized, low end-breakage production.[39] In effect such advance purchasing and warehousing of cotton was a form of vertical integration — over the course of the year it ensured a regular and consistent supply of the firm's crucial raw material. In Britain, however, the structure of industrial relations meant that consistently low-breakage yarn was neither required by the spinning manager nor demanded by the weaving manager.[40] Hence, such large-scale buying and warehousing of cotton was rarely done.[41] Instead, the spinning manager would buy his cotton in Liverpool (or increasingly in Manchester) essentially from week to week, never knowing exactly what quality cotton would be available and always keeping his eyes open for feasible mixes of cotton that would enable him to cut costs. Due to its intermittent (rather than continuous) spinning motion, the mule put much less strain on the yarn being spun than the ring-frame. As a result, the mule was much more adaptable to not only inferior cotton but also a *wider range* of cotton quality than was the ring-frame. Hence the mule provided the Lancashire cotton buyer with more week-to-week flexibility in the quality of cotton he could feasibly purchase.

Due to the differences in spinning motions on rings and mules, ring yarn was harder twisted than mule yarn for any given count spun at normal production levels per spindle. Ring yarn was therefore stronger, more uniform, and more break-resistant than mule yarn and tended to have a relative advantage where weaving managers put a high priority on low end-breakage rates. Given the structure of industrial relations in Britain which fixed piece-rates regardless of output and which limited the number of looms per weaver, weaving managers with Lancashire looms did not try to minimize end breakages but rather sought out the lowest quality yarn that their operatives, and buyers, would stand. In addition, quite apart from the industrial relations structure, end breakages, and resultant down-time, were less costly on the Lancashire looms than on the much more expensive automatic looms. Moreover, the use of high quality yarn could permit a significant increase in looms per weaver on the automatic loom since the primary work of the operative was repairing warp breaks. But on the Lancashire loom use of such yarn might not permit any increase in looms per weaver since on this machine the primary work of the operative was changing shuttles. Hence, the use of low quality yarn on the automatic loom would greatly reduce its labor-cost saving potential.

The choice of technique between Lancashire looms and automatic looms was, therefore, greatly dependent on the ability of the weaving

[39]C. Brooks, *Cotton* (New York, 1898), pp. 282–284; Copeland, *Cotton Manufacturing*, pp. 180–184.
[40]See Lazonick and Mass, "Performance."
[41]Brooks, *Cotton*, p. 209.

manager to obtain low-breakage yarn on a regular basis. But in the Lancashire industry, where the Lancashire loom dominated, where spinning mills sought to cut costs by using inferior cotton and by "indifferent" yarn preparation (as one manager put it), and where even ring yarn was of a much lower twist than in the United States, the manager of a specialized weaving mill had no assurance whatsoever that he could obtain the necessary supplies on the market.[42] As the 1944 Platt Mission to the U.S. stated in its report:

> The [economically] optimum twist . . . for spinning does not always coincide with that for weaving. Under American conditions, where spinning is standardized and subordinated to weaving, it is possible to determine this optimum twist, and equally important, maintain it.[43]

In 1913, almost all Britain's automatic looms were in firms that combined spinning and weaving. In 1957 combined firms, which then controlled 33 percent of all looms, possessed 67 percent of the automatic looms in the industry.[44]

High quality yarn had always been important in the United States as a labor-saving measure.[45] It became all the more important with the advent of high-speed ring spindles from the 1870s, the Northrop loom from the 1890s, and high-speed winding and warping processes from the first decades of the twentieth century. By the interwar years quality control not only of the cotton but also of the yarn at each process up to the loom had become the key to achieving high productivity on the new machines. There could be no interest in the spinning department of an integrated mill, as was often the case in a specialized spinning mill, in passing the breakage problems on to the weaving room where they were particularly costly.[46] A crucial stage of quality control was the winding of all yarn, twist and weft (or "warp" and "filling" in the U.S.), after it came off the spinning frame so that it could be "cleaned and cleared," that is, so that the chance of further breakage could be minimized. Such rewinding of ring weft also permitted the spinning of larger packages on the ring-frames (since they did not have to be ready for the shuttle) which cut down on time lost in doffing, while the cost of winding itself was greatly reduced by a number of important improvements from the beginning of the century.[47] By the 1930s almost all yarn in the U.S. was

[42]Ormerod, "Prospects," p. 12; W. Lazonick "Production Relations, Labor Productivity and Choice of Technique, U.S. and British Cotton Spinning," *Journal of Economic History,* Vol. 41, No. 3, (September, 1981,) pp. 491–516; United States Productivity Team Report, *The British Cotton Industry* (British Productivity Council: London, 1952), p. 12.

[43]Great Britain, Ministry of Production, *Report of the Cotton Textile Mission to the U.S.A.* (London, 1944), p. 26.

[44]Ormerod, "Prospects," p. 12.

[45]It saved labor in more than one way; the better work conditions not only permitted more output per worker, but also helped to keep good workers from seeking jobs elsewhere. See Lazonick, "Production Relations."

[46]*Textile Manufacturer,* 15 March 1903, p. 89; Ormerod, "Prospects," pp. 12–13.

[47]Copeland, *Cotton Manufacturing*, p. 74; W. Turner, "Universal Winding," *Journal of the British Association of Managers of Textile Works* (Lancashire Section) Vol. II, (1910–1911), pp. 122–132; Robson, *Cotton Industry,* p. xvii.

rewound on these machines whereas in Britain the new winding technology was, like the automatic loom, barely adopted even by the 1940s. The break-prone yarn used in Britain could not stand the high speeds of these machines while quality control was not a great concern to British cotton managers in any case.[48]

The integration of spinning and weaving was a necessary condition for the adoption of more automatic and high-speed machinery in the British cotton industry. But it was by no means a sufficient condition. As Alfred Chandler has demonstrated, it is the integration of distribution with production which gives managers the incentive to mass produce while it is their coordinated control over the interrelated production processes and the assurance of regular supplies of inputs all along the line which enable them to do so.[49] The separation of marketing from production in Lancashire and the large number of firms at each level meant that weavers could never be sure of long runs and that both spinners and weavers rarely produced for stock.[50] In the weaving sector, at least, vertical specialization meant anything but product specialization and standardization, especially when the market contracted at which time even spinning firms were forced to pick up small orders and widen their range of counts. In spinning, a change in the cotton mixings meant a day or two of work stoppage, although within certain limits the flexibility of the mule meant it could spin different counts from the same mixing with only a much less costly alteration of the machinery gearing. The Lancashire loom could be fitted with attachments for plain or fancy work, and hence was well-adapted to non-standardized production. It was not unusual for a weaving operative to be tending looms weaving different types of cloth.[51] In 1963, the Managing Director of Ashton Brothers accused his industry of having "clung tenaciously to the two most flexible machines ever known in any industry — the Lancashire loom and the mule."

> [T]he Lancashire manufacturer expects to use the same equipment to manufacture a heterogeneous range and type of goods, with little in common except width! This sets the pattern for equipment. Not only is he unwilling to "through manufacture" a product; he cannot become really efficient in his selected horizontal tier.[52]

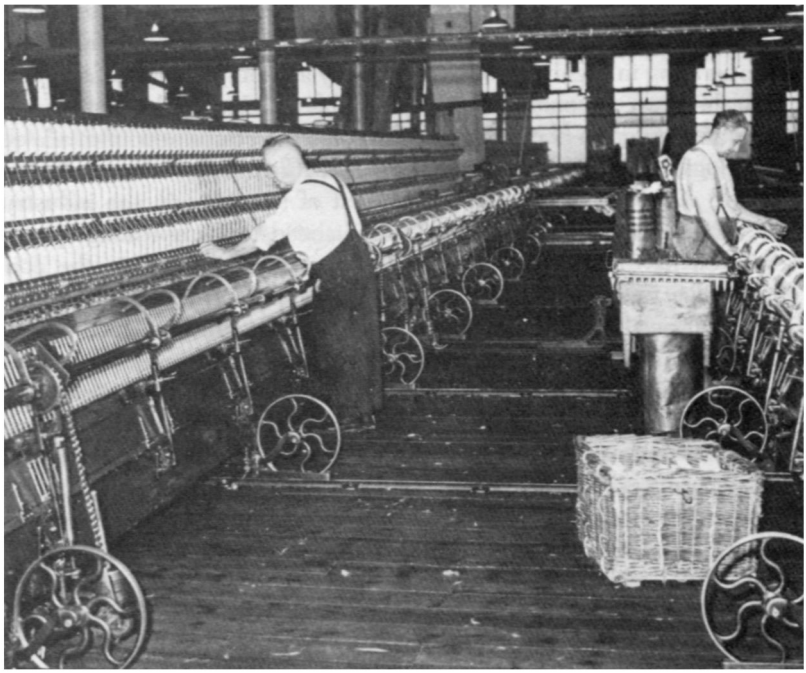
[48]L. Tippett, *A Portrait of the Lancashire Textile Industry* (London, 1969), pp. 66–67; Productivity Team Report, *Cotton Weaving* (London, 1950), p. 12; U.S. Productivity Team Report, *British Cotton* (London, 1950), p. 17.

[49]A. Chandler, *The Visible Hand* (Cambridge, Mass., 1977). Gray, *Weaver's*, p. 30.

[50]W. Reekie, "The Marketing of Cotton Goods Abroad," *Journal of the National Federation of Textile Works Managers' Associations*, Vol. VI, (1926–1927) pp. 174–175; Great Britain, Ministry of Production, *Report*, pp. 30–31.

[51]Ormerod, "Prospects," pp. 11–12.

[52]J. Jewkes, "Is British Industry Inefficient?" *Manchester School*, XIV (January 1946), 1–16.



Workers at Mule Frames in the Dee Mill, part of the Courtaulds Group, 1956.

## ATTEMPTS AT STRUCTURAL CHANGE

Ashton Brothers itself was a fully integrated concern, and as the first to introduce Northrop looms into the British industry stands out as an innovator as well as profit-maximizer. The key difference between Ashton Brothers and the vast majority of firms in the Lancashire industry was that its well-established market position as a plain-cloth producer gave it the power both to experiment and to play a part in *defining* the constraints it would ultimately (but not necessarily irrevocably) face. The profits that a firm like Ashton Brothers maximized were the result of the profitable opportunities which the firm itself had a hand in creating, not simply ones that the market presented to it. When it introduced its first automatic looms in 1903, Ashton Brothers used them with mule cops because that was the type of spinning equipment it had at the time. The firm fought a short battle with the weavers' union, and settled on ten looms per weaver. By 1908 it had scrapped over half its 160,000 mule spindles and had installed 90,000 ring spindles as well as about 1,000 Northrop looms designed for ring bobbins. It engaged the union in a thirteen-week contest and this time achieved twenty looms per

weaver.[53] Clearly a firm like Ashton Brothers (and there were few like it in Lancashire) faced many constraints it could not control — for example, operating in highly-unionized territory and employing half the people in the town, it could not just ignore the unions. But by virtue of its power as a large integrated firm which could introduce new interrelated technologies and take on the unions alone, it (and a few others) did not face the same constraints as did the rest of the firms in the industry. Specialized spinning managers and specialized weaving managers may very well have been acting rationally by optimizing within the constraints *they* faced as they retained the mule and Lancashire loom. But it was the specific nature of the organizational structure in which market forces were imbedded that largely defined these constraints and consequently the technologies they chose. The issue of the technological backwardness of the British cotton industry from the late nineteenth century cannot be understood by merely analyzing the individual managerial decision subject to constraints. One must analyze why the constraints developed the way they did, or, what is the same thing, why these particular constraints could not be overcome. Let us, then, address this issue.

To be sure, there were intelligent observers of the industry who denied there were any constraints worth overcoming. In 1919, Alfred Marshall (no great authority on the cotton industry but influential nonetheless) wrote:

> It is generally recognized that the chief economy in production, as distinguished from marketing, that can be effected by a cartel or other association of producers, is that of so parcelling out the demand for various sorts of the same class of product that each business can specialize its plant on a narrow range of work, and yet keep it running with but little interruption. This specialization is however thoroughly effected without conscious effort in the Lancashire cotton industry; and especially in those branches of it, which are mainly in the hands of a multitude of independent businesses of moderate size. As is well known, fine spinning, coarse spinning and weaving are localized separately. Individual firms frequently specialize on a narrow range of counts for spinning. Blackburn, Preston, Nelson, and Oldham are centres of four different classes of staple cloths, and so on.[54]

In 1946, John Jewkes (who was an eminent authority on the cotton industry) argued that the flexible structure of the British cotton industry gave it a comparative advantage in the production of specialized products. He went on to claim that vertical integration would rob the industry of this advantage. "Vertical integration may be a form of industrial

[53]A. Fowler, "Trade Unions and Technical Change: The Automatic Loom Strike, 1908," *Bulletin of the North West Labour History, Society*, 1980; W. Mass, "Technological Change and Industrial Relations in the Cotton Textile Industry: The Diffusion of Automatic Weaving in Britain and the United States" (Ph.D. dissertation, Boston College, 1983).

[54]Marshall, *Industry and Trade*, p. 601.

organization associated with relative immaturity," he conjectured, and went on to assert that the "case against British industry as a whole is very thin."[55]

The problem with Jewkes's argument is that over the next decade, as the British cotton industry retained its fragmented structure, it lost not only the lowest quality markets to India, Japan, and Hong Kong, as had been the case before the war, but also higher quality markets to Western Europe and the U.S.A. (see Table 3).[56] Between 1956 and 1961, the U.K. experienced a 10 percent increase in labor productivity mainly due to the attrition of inefficient firms, while labor productivity increases in Belgium, France, and Italy were 15 percent, 28 percent and 52 percent respectively. In 1960, output per worker in spinning was from 30 to 60 percent higher in France, Germany, and Holland than in Britain despite the fact that the average count spun was higher (and therefore, other things equal, the output per spindle-hour lower) in these countries.[57]

The post-World War II period thus extended the long-term decline of the British cotton industry in a world economy extremely favorable to growth. The roots of this long-term decline, as I have argued, must be located in the institutional structure which developed in the "laissez-faire" period of the nineteenth century when serious competitors had not yet arisen and the British industry dominated the markets of the world. Yet despite the inapplicability of its fragmented structure to twentieth century competition, by the 1950s a restructuring of the industry had barely occurred.

In the decades prior to World War I, structural change was rare in the British cotton industry. Besides the formation of two oligopolistic (and multinational) firms in the manufacture and sale of sewing thread (J.P. Coats in 1896 and, in response, the English Sewing Cotton Co. in 1897), there were apparently only two important amalgamations in the cotton industry prior to World War I — Horrockses, Crewdson (1887), a large enterprise that integrated spinning, weaving, and marketing, and the Fine Cotton Spinners' and Doublers' Association (1898), a holding company of some thirty firms spinning very fine yarns, each firm retaining a high degree of operational autonomy.[58]

Rare, as well, were the advocates of structural change. In 1904 Frederick Merttens, President of the Manchester Statistical Society, argued

[55]J. Jewkes, "Is British Industry Inefficient?" *Manchester School*, Vol. XIV. No. 1, (January 1946) pp. 1–16. The Association of Vertical Specialization with Economic Progress is Made in George Stigler, "Division of Labor is Limited by the Extent of the Market," *Journal of Political Economy*, Vol. 59, No. 3, (January 1951); reprinted in Stigler, *The Organization of Industry* (Homewood, 1968).

[56]For a comprehensive analysis see B. Vitkovitch, "The U.K. Cotton Industry, 1937–54," *Journal of Industrial Economics*, Vol. III, No. 3, (July 1955), pp. 241–265.

[57]S. Pollard, *The Development of the British Economy 1914–1967* (London, 1969) 2nd ed., p. 422; Ormerod, "Prospects," p. 6.

[58]H.W. Macrosty, *The Trust Movement in British Industry* (London, 1907), pp. 124–141; G. Carter, *The Tendency Towards Industrial Combination* (London, 1913), pp. 309–315.

in a very general way that horizontal combination and vertical integration were necessary prerequisites to the cheapening of production and meeting of foreign competition. In 1905 W.H. Guthrie, in an article entitled "The Cotton Mill of the Future," outlined the advantages of integration from spinning through marketing, optimistically predicting that the introduction of advanced technologies would result in the reemergence of the integrated firm in the British industry. "There is no doubt," he argued, "that the greatest hindrance to the more general adoption of the ring frame in this country is the decentralisation of spinning and weaving plants. With the advent of the automatic loom (which is at its best when using weft spun on a bobbin) these conditions will be changed, and our mills, will again become cotton-manufacturing concerns."[59] Unfortunately for Guthrie's prediction, it was structure which determined technology and not vice versa, and over the next decade as the number of firms in Lancashire increased by 14 percent, the number of spindles by 30 percent and the number of looms by 24 percent, the industry became more horizontally competitive and more vertically specialized than ever.[60] In such generally prosperous times, those within the industry had little inducement to undertake institutional innovation and those outside the industry were hardly in a position to be critical.

But as the slump in the coarser goods section of the cotton industry in the early 1920s failed to disappear within the "normal" one or two years, first the spinning capitalists and then the banks began to take action to control competition. In order to keep up yarn prices, the Federation of Master Cotton Spinners' Associations organized short-time work between 1921 and 1926, which, insofar as it was adhered to, created conditions more favorable for the survival of the less efficient firms. In 1923 some spinning capitalists (including Charles Macara, who had been President of the FMCSA from 1894 to 1916) advocated a scheme to permit more efficient mills to run while compensating the workers and owners of less efficient firms to cease production, but the FMCSA rejected the plan.[61] In the same year, the FMCSA instituted a scheme of minimum prices, and the following year, in order to enforce it on "disloyal" spinners, sought to have it legalized by Parliament. Unfortunately for the spinners, the weaving industry successfully opposed such an attempt to raise the price of one of its basic inputs. In 1927, the FMCSA attempted once again to assert its own authority, setting up a cartel called the American Cotton Yarn Association to set prices and limit

[59]F. Merttens, "Productivity, Protection and Integration of Industry," *Transactions of the Manchester Statistical Society*, 1903–1904; W.H. Guthrie, "The Cotton Mill of the Future," *Textile Manufacturer*, 15 August 1905, p. 255.

[60]Jones, *Increasing Return*, p. 277.

[61]P. Fitzgerald, *Industrial Combination in England*, (London, 1927), pp. 9–10; Committee on Industry and Trade, *Survey*, p. 34; G. Daniels and H. Campion, "The Cotton Industry and Trade," in British Association, *Britain in Depression* (London, 1935), p. 340; C. Macara, *The New Industrial Era* (Manchester, 1923), p. 90; Jones, "Agitation," p. 450.

production. Within ten months the cartel had been eroded by competitive forces.[62] Meanwhile the banks, still expecting a recovery, continued to extend credit to (or agree to moratoria for) the deeply indebted spinning mills, the financial position of which was being further weakened by the general deflation of the 1920s.[63]

Now it was the banking sector that required some leadership to extract its members from a difficult situation. Encouraged by the general movement towards "rationalization" of industry in the late 1920s, the Bank of England sought to effect a large-scale amalgamation of spinning capacity that, by providing a highly concentrated entity under centralized control with the financial ability to re-equip, could set the tone for the industry and force inefficient producers out. The idea was to set up a firm — the Lancashire Cotton Corporation — which expected to merge as many as two hundred mills and twenty million spindles in the American section of the spinning industry, wiping out all fixed interest charges in the process by issuing preference shares to ordinary creditors and debenture holders and new common shares to old shareholders.[64]

By all accounts the directors and managers of the Lancashire cotton mills resisted attempts at merger on the grounds — quite rational from the individual point of view — that any such amalgamation would involve their loss of individual control over their enterprises.[65] As Keynes put the problem in 1928:

> There [is] probably no hall in Manchester large enough to hold all the directors of cotton companies; they [run] into thousands. One of the first things should be to dismiss the vast majority of these people, but the persons to whom this proposal would have to be made would be precisely those directors.[66]

Or as John Ryan, Managing Director of the Lancashire Cotton Corporation (and himself a relative newcomer to the cotton industry brought in by the banks) argued:

> I do not think we can leave it to the individuals. Vested interests will always resist a movement which tends to remove them, and vested interests can very

[62]Committee on Industry and Trade, *Survey*, pp. 35–36; Daniels and Campion, "Cotton industry," p. 341.

[63]M. Kirby, "Lancashire Cotton," p. 148; H. Clay, *The Problem of Industrial Relations* (London, 1929), pp. 138–139; H. Clay, *The Post-War Unemployment Problem* (London, 1929), p. 163; Committee on Industry and Trade, *Final Report* (London, 1929), p. 46; A. Lucas, "The Bankers' Industrial Development Company," *Harvard Business Review*, Vol. XI, No. 3, (April 1933), pp. 272–273. For a case of prolonged optimism see Fitzgerald, *Industrial Combination*, p. 8; "The cotton trade is one of the few sections of industry in which English firms have little to fear from foreign competition."

[64]Clay, *Post-War Unemployment*, p. 49; Economic Advisory Council, *Report*, p. 20; R. Streat, "The Cotton Industry in Contraction: Problems and Policies of the Inter-war Years," *District Bank Review*, No. 127, September 1958, p. 7; A. Lucas, *Industrial Reconstruction and the Control of Competition: The British Experiments* (London, 1937), p. 155; J. Wisselink, "The Present Condition of the English Cotton Industry," *Harvard Business Review*, Vol. VIII, No. 2 (Janaury 1930) p. 158. On the rationalization movement in general, see L. Hannah, *The Rise of the Corporate Economy: The British Experience* (Baltimore, 1976), ch. 3.

[65]Streat, "Cotton Industry," p. 7; "Combinations in the Cotton Trade," *Journal of the National Federation of Textile Works' Managers' Associations*, Vol. XII (1932–1933) pp. 5–9; D. Macgregor, J. Ryan *et. al.*, "Problems of Rationalisation: a Discussion," *Economic Journal*, Vol. XL, (September 1930), pp. 360–361; see also A. Chandler, "The Growth of the Transnational Industrial Firm in the United States and the United Kingdom: a Comparative Analysis," *Economic History Review*, 2nd series Vol. XXXIII, No. 3, (August, 1980); Hannah, *Rise*, pp. 147–148.

[66]In discussion of paper by Daniels and Jewkes, "Post-war depression," p. 200.

easily hold a position which is acceptable to themselves but yet is acting as a parasite on an industry and slowly driving it to death. . . .[67]

By 1930, the Lancashire Cotton Corporation had coerced 96 firms and 9.3 million spindles (almost one-fifth of the Lancashire total) into the fold, as the bankers threatened the reluctant directors of these firms with termination of credit.[68] Another group of indebted directors sought to create a corporation of "spinners of American cotton for the benefit of the spinners," but were (as Wisselink put it) "loath to give up their functions," and the banks refused to lend their support.[69] The Lancashire Cotton Corporation, however, which did not have centralized control, was unable to develop an effective managerial structure, and in 1932 its chief executives resigned when the board of directors decided that the mill managers, who had been displaying a lack of initiative, should be given more autonomy.[70]

The problems of the Lancashire Cotton Corporation ultimately benefitted the rest of the spinning industry by ridding it of a significant amount of excess capacity. By 1939 it had scrapped about 4.5 million spindles which it had brought under its control.[71] As the world-wide depression hit an already stagnant British cotton industry in the early 1930s, it became apparent that a more coordinated and explicit scrapping policy was required to eliminate machinery and firms. By 1934, British yarn production had declined by 40 percent and cloth production by 55 percent from their 1912 levels while the number of spindles in the industry had contracted by only about 20 percent and the number of looms by about 25 percent.[72] In approving a scheme for eliminating spindles in 1934, the FMCSA stated that the problem of surplus capacity had been with the industry for nearly fifteen years, and that the "ordinary processes of economic law" had not so far solved it. "The Surplus Spindles Bill," they argued, "may be regarded as an insurance against a price war between the combines and the smaller independent firms, which, however it ended, could only be a disaster for Lancashire."[73] The scheme, which called for a compulsory per spindle levy on all operating firms to be used to buy up and scrap the capacity of spinning firms

[67]Macgregor, Ryan et. al., "Problems," p. 361

[68]Hannah, *Rise*, p. 84; Kirby, "Lancashire Cotton," pp. 149–151.

[69]Wisselink, "Present Condition," p. 159.

[70]*Economist*, October 8, 1932, p. 635; Hannah, *Rise*, pp. 84–85; Lucas, *Industrial*, pp. 156–159; Kirby, "Lancashire Cotton," p. 152.

[71]Pollard, *Development*, p. 122. The *purpose* of the Lancashire Cotton Corporation was not to reduce surplus capacity in the cotton industry as some have argued. See e.g. G.W. Furness, "The Cotton and Rayon Textile Industry," in D. Burn (ed.), *The Structure of British Industry* (Cambridge, England, 1958), pp. 187–188; and Kirby, "Lancashire Cotton," p. 151. Rather its purpose was to salvage the financial investments of the bankers which inevitably involved some scrapping of the least serviceable machinery in the plant acquired. That the founders of the L.C.C. *intended* in 1929 to scrap about half of the Corporation's spindleage capacity over the next decade is by no means evident.

[72]Federation of Master Cotton Spinners' Associations, *Cotton Spinning Industry Bill (1935): The Industry's Case for the Bill* (Manchester, 1935), p. 2.

[73]*Ibid.*, pp. 11–13.

willing to be compensated for going out of business, became law under the Spindles Act of 1936. By World War II, the Spindles Board set up under the Act had acquired and scrapped 6.2 million spindles, reducing capacity to two-thirds the pre-World War I level.[74]

In 1929, when the Lancashire Cotton Corporation was in the process of formation, John Ryan, its first Managing Director, declared to the cotton textile Managers Association: "The horizontal amalgamation is no use to Lancashire; it must be vertical . . ."[75] Yet in the inter-war years vertical integration was rarely discussed, never mind attempted. The Lancashire Cotton Corporation, which had initially intended to integrate vertically, had enough difficulty managing its horizontal operations, and simply scrapped the 20,000 looms which had been in the mills that it had acquired.[76]

Nor was there any significant vertical integration or technical change in the context of the more favorable market conditions after World War II. From 1946 to 1951, the British cotton industry experienced a dramatic boom, with yarn production increasing by 50 percent and cloth production by 56 percent (see Table 4). Mills that had been closed during the war, and whose plant and equipment had long since been written off, were able to enjoy profits on the basis of traditional production methods. There were no labor productivity gains in spinning and only slight gains in weaving during this period. In 1951, only 8 percent of spinning capacity and 6 percent of weaving capacity was post-World War II vintage.[77]

That Lancashire cotton managers complained of labor shortage during these boom years was due to their continued reliance on labor-intensive methods of production which prevented them from matching the wages and work conditions of more modern industries that were developing in the Lancashire area. In 1948 the government intervened to try to solve this problem both by recruiting labor for the industry and by passing the Cotton Spinning Industry (Re-equipment Subsidy) Act. Under the Act, firms having at least three mills and a minimum number of spindles were eligible to receive a 25 percent re-equipment subsidy to be used to modernize some of the mills and close down the remainder. But the Act provided no incentive to integrate spinning and weaving as part of the re-equipment process, let alone to integrate production and distribution. Government intervention in effect took the vertical structure of

[74]Robson, *Cotton Industry*, pp. 229, 230, 340.

[75]J. Ryan, "Combination in the Cotton Trade," *Journal of the National Federation of Textile Works Managers' Associations*, Vol. VIII, (1928–1929) p. 24. See also H.A. Marquand, *The Dynamics of Industrial Combinations* (London, 1931), pp. 108–110.

[76]Robson, *Cotton Industry*, pp. 120–121.

[77]C. Miles, *Lancashire Textiles: A Case Study of Industrial Change* (Cambridge, England, 1968), pp. 38–39. See also D.C. Shaw, "Productivity in the Cotton Spinning Industry," *The Manchester School*, Vol. XVIII, No. 1, (June 1950).

the industry as given. Not surprisingly, the Act of 1948 had only a minimal impact on re-equipment.[78] The ossification of the British cotton industry into its horizontal layers, and the attendant problems for technical change, were well summed up in 1950 by the British Productivity Team on Cotton Weaving. Reporting on their recent visit to U.S. mills, the Productivity Team stressed the multi-fold advantages of vertical integration, but went on to warn:

> To attempt to change the horizontal structure would affect operatives, managements, shareholders, spinners, merchants, merchant-convertors and many others. New buildings would be needed in addition to new machinery. Clearly such a proposal is out of the question.[79]

The boom ended in 1951 with cloth output for the home market somewhat larger than it had been in 1937, but with exports down some 50 percent and imports up by close to 700 percent (see Table 4). In 1937 imports had represented only 3.1 percent of domestic consumption whereas by 1951 they had grown to 16.1 percent, coming in mainly from Hong Kong, Pakistan, and India which enjoyed duty-free access under the 1932 Ottawa agreements that had been designed to secure Commonwealth markets for British cotton goods. To attribute the stagnation of the British cotton industry that ensued after 1951 to cheap imports, however, would be an oversimplication. In fact, between 1951 and 1958, import penetration was slight.[80] The fundamental problem was an industry mired in its own highly competitive and vertically specialized structure, lacking any internal forces to set in motion structural transformation. In 1958, there were almost 1500 firms undertaking converting activities in the Lancashire cotton industry, and over three-quarters had no formal marketing or financial links with any particular weaving firms.[81] As this mass of marketing firms fed small orders to firms in the vertically disintegrated production structure, production runs grew shorter while delivery times grew longer, further worsening Lancashire's competitive position in the world's markets.[82]

The weaving sector itself continued to consist of small family firms in the 1950s. Indeed between 1940 and 1959 the average number of looms per firm actually decreased from 470 to 403. Even though the number of firms declined by over 40 percent during this period, there were still 567 specialized weaving enterprises remaining in the industry in 1959. And despite major governmental intervention in the early 1960s to rid

[78]Miles, *Lancashire*, pp. 26–27, 40; Robson, *Cotton Industry*, p. 219. See also Ormerod, "Prospects," pp. 8–9.

[79]Productivity Team Report, *Cotton Weaving*, p. 16.

[80]Miles, *Lancashire*, p. 26.

[81]*Ibid.*, p. 68.

[82]Lucas, *Industrial Reconstruction*, p. 159; Clay, *Report*, p. 68; Vitkovitch, "U.K. Cotton," p. 262; Ormerod, "Prospects," p. 14; UTFWA, *Plan*, p. 16. See also, F. Vibert, "Economic Problems of the Cotton Industry," *Oxford Economic Papers*, N.S., Vol. 18, No. 3, (Nov. 1966).

the Lancashire cotton industry of excess and antiquated capacity, 322 specialized weaving firms still remained in the industry in 1965.[83] On the basis of her first-hand investigations of about one hundred family firms in the industry in the 1960s, Caroline Miles presented the following profile:

> . . . old equipment, largely if not entirely written off; an aging, immobile labour force, possessing skills not readily transferable to modern plant; aging management with no successors in view; and stagnant or declining markets. With low fixed costs and an available labour reserve (since the aging workers were not able to get permanent jobs elsewhere), such a firm was able to disrupt prices, under-cutting firms with relatively high fixed costs when demand was rising and withdrawing again when trade was slack.[84]

Most of the spinning firms were joint-stock companies, although even in these businesses family control and management were often exercised.[85] From 1940 to 1959 the spindle capacity of the average spinning firm increased by about 23 percent, largely due to horizontal amalgamation (some of which was stimulated by the Act of 1948 that only applied to firms with at least three mills). In 1940 there were 280 firms carrying out spinning in the British cotton industry; in 1959, 141.[86] The largest of these firms, the Lancashire Cotton Corporation, had long since abandoned the notion of vertical integration. Other large amalgamations such as the Fine Spinners and Doublers and the Combined English Mills were loosely organized federations of largely autonomous units. With persistent over-capacity at the weaving level and with their own lack of internal organization, even the largest spinning firms were content to take the horizontal structure of the industry as given during the post-World War II decades. They provided no leadership whatsoever in structural change.

By 1959, the British cotton industry was struggling to survive in a highly competitive international environment in which success was based on a degree of tariff protection combined with high capital-intensity and high throughput production. Once again the British government intervened, this time on a much more massive scale than ever before, in an effort to improve Lancashire's productive base (a strategy it pursued in lieu of the imposition of strict import controls on goods from Commonwealth countries). The 1959 Cotton Industry Act sought to rid both the spinning and weaving sections (as well as the finishing section) of excess capacity while providing financial assistance for the re-equipment of the plant that remained. Firms were paid for scrapping

[83]Miles, *Lancashire*, pp. 44, 73, 120–121.

[84]C. Miles, "Protection of the British Cotton Industry," in W. Corden and G. Fels, *Public Assistance to Industry* (Boulder, 1976), pp. 203–204.

[85]G. Bennett, "The Present Position of the Cotton Industry in Great Britain," (unpublished M.A. thesis, University of Manchester, 1933), ch. III.

[86]Miles, *Lancashire*, p. 44.

TABLE 3
U.K. COTTON INDUSTRY: DECLINE IN VOLUME OF PIECE-GOOD EXPORTS
1910–1953

| Period | Per cent change in piece goods exports due to: | | |
|---|---|---|---|
| | Lower total imports | Competition from Japan, India, Hong Kong | Competition from other countries |
| 1910–13 to 1927–29 | −25.8 | −54.7 | −17.0 |
| 1927–29 to 1935–37 | −34.3 | −60.2 | 3.9 |
| 1935–37 to 1949–53 | −30.5 | − 2.8 | −67.3 |

Source: B. Vitkovitch, "The U.K. Cotton Industry 1937–54," *Journal of Industrial Economics*, Vol. III, No. 3, (July 1955), pp. 254, 255, 257.

some or all of their equipment with a premium being paid to those firms that went out of business. Operatives were also compensated for lost jobs. Under the Act, 48 percent of all spinning spindles, 27 percent of all doubling spindles, and 38 percent of all looms in the industry were scrapped. Forty-four percent of specialized spinning firms and 22 percent of specialized weaving firms left the industry altogether. Integrated firms tended to stay in business, and hence the industry became more verticalized by the process of attrition. By 1963, 80 firms integrating spinning and weaving controlled 70 percent of spinning capacity and 40 percent of weaving capacity. But the Act itself had done nothing to promote vertical integration of production in the remaining firms nor did it deal in any way with the highly fragmented marketing sector.[87]

The 1959 Act, by providing a 25 percent subsidy for re-equipment, did result in some modernization of Lancashire's stock of machinery. Of the total machinery in place as of October 1965, 13 percent of the spindles and nine percent of the looms had been purchased with re-equipment grants. Scrapping and re-equipment under the 1959 Act apparently resulted in significant productivity increases in both spinning and weaving compared to the low rates of productivity increase in the decades before.[88] But the industry as a whole still retained managerial and marketing structures that impeded the introduction of mass production methods.

From 1964, however, the structure of the British cotton industry experienced a dramatic transformation by a vertically-related, but heretofore, external force, namely the producers of man-made fibres. Begin-

[87]*Ibid.*, pp. 50–57, 60, F. Fishwick and R. Cornu, *A Study of the Evolution of Concentration in the United Kingdom Textile Industry* (Commission of European Communities, October 1975), pp. 27–29; Tippett, *Portrait*, p. 161.

[88]Miles, *Lancashire*, pp. 65, 85, 87.

TABLE 4

UNITED KINGDOM — PRODUCTION, EXPORTS, AND IMPORTS OF COTTON AND MAN-MADE FIBRE PIECE-GOODS, 1912–1973

(MILLION SQUARE YARDS)

| | Production | Exports | Imports |
|---|---|---|---|
| 1912* | 8050 | 6913 | 98 |
| 1924 | 6074 | 4444 | 36 |
| 1930 | 3500 | 2472 | 123 |
| 1937 | 4532 | 2022 | 71 |
| 1946 | 2390 | 665 | 18 |
| 1951 | 3550 | 1078 | 473 |
| 1958 | 2350 | 468 | 434 |
| 1965 | 1900 | 300 | 676 |
| 1973 | 1421 | 348 | 1018 |

* = linear yards

Sources: R. Robson, *The Cotton Industry in Britain* (London, 1957), p. 345; C. Miles, *Lancashire Textiles: A Case Study of Industrial Change* (Cambridge, England, 1968), p. 26; R. Shaw and C. Sutton, *Industry and Competition* (London, 1976), p. 157.

ning in the mid-1930s, cellulose fibres, and in particular rayon, had been processed into yarn and cloth using cotton spinning and/or weaving equipment. In 1936, rayon had made up only one percent of total spinning output, but by 1951, ten percent. Although the absolute amount of man-made fibre used in spinning and weaving remained more or less constant from the early 1950s to the mid-1960s, it became an ever-increasing proportion of the total output of the Lancashire "cotton" industry as the output of both cotton yarn and cloth steadily declined. In 1966, cotton entered into less than 60 percent by weight of Lancashire weaving, man-made fibres (now both cellulosics and synthetics) making up the rest.[89]

The dominant firm in the transformation of the industry was Courtaulds, a U.K.-based multinational corporation that had a virtual monopoly in the supply of rayon to the British market. But with the development of synthetic fibres by chemical giants such as I.C.I. in Britain and Dupont in the U.S., the demand for Courtaulds' most important product, rayon, began to decline. During the 1950s, Courtaulds attempted to diversify its products, but was not overly successful. After fighting off a takeover bid by I.C.I. in 1962, the directors of Courtaulds staked the future of their company on the vertical integration and revitalization of their most important single product market — the Lancashire "cotton" industry. The original plan, drawn up in 1962, was to gain control over five large firms in the spinning industry — the Lancashire Cotton Corporation, Fine Spinners and Doublers, English Sewing Cotton, Tootals,

[89]Robson, *Cotton Industry*, p. 345; Miles, *Lancashire*, pp. 13, 85.

and Combined English Mills — as a basis for rationalizing the structure of the industry as well as to exert pressure on the government to protect the home market and thereby provide incentives for the capital-intensive investments that were needed to make the cotton and man-made fibres industry viable. By 1964 Courtaulds had acquired the Lancashire Cotton Corporation and Fine Spinners and Doublers (one-third of the industry's spinning capacity), and in 1968 it added Ashton Brothers. Meanwhile it built completely new facilities to weave its fibres, finding nothing that was worth taking over in the traditional Lancashire weaving industry.[90]

At the same time, I.C.I. was securing its own man-made fibres markets by financing acquisitions and plant modernization by other firms with an interest in the Lancashire industry. Viyella International, an outsider to the Lancashire cotton industry which acquired Combined English Mills, was backed by I.C.I., while the English Sewing Company (which acquired Tootals) was financed by both I.C.I. and Courtaulds.

In 1968, the five-firm concentration ratio in the spinning of cotton and man-made fibres was 50 percent, up from 37 percent in 1963 and 32 percent in 1958. These firms controlled over one-third of weaving sales in 1968, more than double the market share of the top five firms a decade before. The five largest firms in 1968 were fully integrated concerns, Courtaulds being the most dominant by far followed by two other firms that had been financed by the corporate giants of the British chemical industry.[91] Between 1963 and 1974 employment in the British "cotton" industry was halved and output remained constant but productivity rose by 86 percent, or about 8 percent per annum.[92] Since 1974, these new giants in the textile industry, like all othe British industrial enterprises, have had to cope with a sagging national economy and an unstable international environment as well as the ever-present danger of bureaucratic ossification. But they have certainly overcome the problem of a fragmented structure of industrial organization and the technological stagnation that had ensued from it since the late nineteenth century. Now, ironically enough, the problem facing British industry is a political perspective that draws upon neoclassical orthodoxy to argue that the free market system is an engine of economic prosperity.[93]

[90]D.C. Coleman, "Courtaulds and the Beginning of Rayon," in B. Supple (ed.), *Essays in British Business Experience* (London, 1974); Coleman, *Courtaulds*; Knight, *Private Enterprise and Public Intervention: The Courtaulds*, Volume III (Oxford, 1980), espec. pp. 270–281; Miles, *Lancashire*, pp. 91–93; Fishwick and Cornu, *Evolution of Concentration*, pp. 37–39, 76, 78–79, 188–191.

[91]Fishwick and Cornu, *Evolution of Concentration*, pp. 30, 37–39, 179–220; W. Reader, *Imperial Chemical Industries:* Volume II (Oxford, 1975); D. Channon, *The Strategy and Structure of British Enterprise* (Boston, 1973), pp. 173–178; Textile Council, *Cotton and Allied Textiles* (Manchester, 1969), Vol. I, ch. 2; United Kingdom, Board of Trade, *Census of Production*, Summary Tables (London, 1970), p. 131/109.

[92]Fishwick and Cornu, *Evolution of Concentration*, p. 21.

[93]For an elaboration of this theme, see B. Elbaum and W. Lazonick, "The Decline of the British Economy: An Institutional Perspective," Harvard Institute of Economic Research Discussion Paper No. 878, January, 1982.

Why did it take so long for the internal organization of the British cotton industry to be restructured in response to the new international environment of the twentieth century? Why, for example, could the British Productivity Team on Cotton Weaving argue in 1949, apparently with good reason, that a strategy of vertical integration was "out of the question"? In a freely competitive industry, what prevented the emergence of a number of fully integrated, technologically progressive firms that could force the specialized manufacturing and marketing firms to adapt or get out?

Orthodox economic theory with its analytical focus on managerial choices subject to *given* market and technical constraints does not take us very far in understanding issues of structural change. In his influential article on "the nature of the firm" (published in Britain in the late 1930s), Ronald Coase portrays the decision to whether or not to integrate as a matter of "substitution at the margin," thus bringing the theory of vertical integration within the limits of the theoretical imagination of the neoclassical economist.[94] Operating within factor-price constraints as set by market forces the manager of the firm will decide to use the market to supply an input or sell a particular output when the cost of doing so is less than the cost of superseding the market by organizing the particular vertically-related process under his own management, and vice versa when the cost of doing so is more. As a proposition subordinating the choice of enterprise form to the decision to maximize profits subject to given constraints, Coase's theorem is a perfectly logical extension of neoclassical analysis. But as a fundamental proposition for analysing the nature and development of the modern capitalist enterprise, Coase's approach is highly misleading for three basic reasons.

First, the modern enterprise, if it is to reap the benefits of mass production, cannot shift its mode of operation with every change in relative factor prices, but rather must engage in long-term investment planning

[94]R. Coase, "The Nature of the Firm," *Economica*, N.S. Vol. IV, (November 1937); reprinted in G. Stigler and K. Boulding (eds.), *Readings in Price Theory* (Chicago, 1952). Over three decades later, Coase argued quite correctly that "modern economists writing on industrial organization have taken a very narrow view of their subject," and he specifically criticizes the work of Joe Bain, Richard Caves, and George Stigler for treating the study of industrial organization as simply applied price theory. R. Coase, "Industrial Organization: A Proposal for Research," in V. Fuchs (ed.), *Economic Research: Retrospect and Prospect* (New York, 1972), Vol. III. "What one would expect to learn from a study of industrial organization," Coase argues, "would be how industry is organized now, and how this differs from what it was in earlier periods; what forces were operative in bringing about this organization of industry, and how these forces have been changing over time; what the effects would be of proposals to change, through legal actions of various kinds, the forms of industrial organization." *Ibid.*, p. 603. Indeed, Coase claims that such issues had been his prime concern when he wrote "The Nature of the Firm" in the 1930s. Coase's latter-day critique of the neoclassical approach is well-taken, but he seems oblivious to his own important role in bringing the study of "the nature of the firm" into the ahistorical neoclassical perspective of constrained optimization. After all, the central analytical point of Coase's 1937 article was the notion that "substitution at the margin" can explain both horizontal combination and vertical integration. "A firm can expand in either or both of these ways," he argued there. "The whole of the 'structure of competitive industry' becomes tractable by the ordinary technique of economic analysis." Coase, "Nature", p. 398.

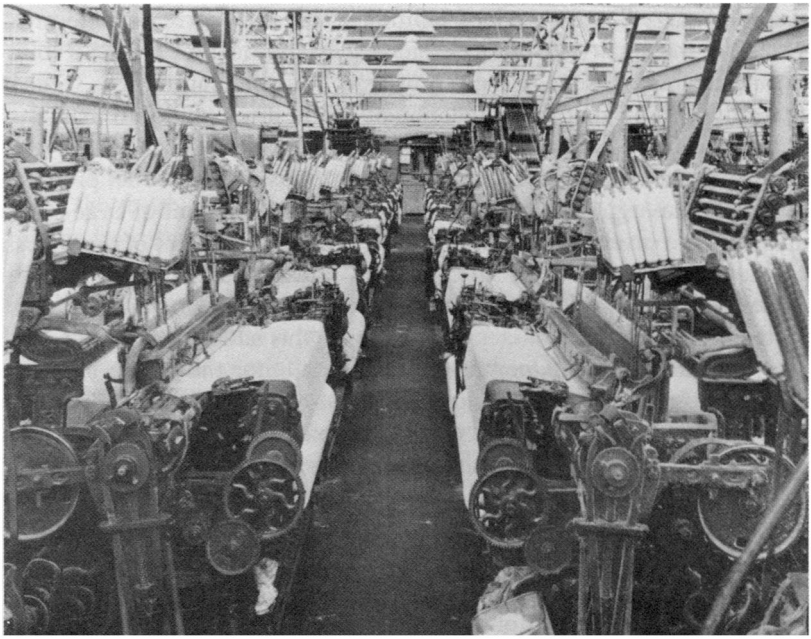
which includes a firm commitment of capital to producing certain products by certain interrelated technical processes. Indeed, in the post-World War II Lancashire cotton industry we find spinning and weaving firms or weaving and merchant firms combining and then separating for the sake of short-term supply and demand advantages without in the least altering their organizational or technical methods of production. Such actions constituted precisely Coasian managerial decision-making. But ironically these actions *exemplified the failure to develop the modern corporate enterprise* as illustrated in the following remarks by the Managing Director of Ashton Brothers to Section F of the British Association for the Advancement of Science in 1962:

> In 1946, 22.5% of installed looms were owned by combined operations — I have avoided the term "verticals". By 1959 this figure had risen to 33% . . . Most of the "combined operations" were not vertical in the strictest sense. The vertical operation converts fibre into the final fabric, merchandising the goods through appropriate trade channels. The three horizontal tiers — spinning, weaving and finishing — are, of course, included as are yarn processing and stitching operations if appropriate. The mere ownership of facilities in all sections does not necessarily satisfy this definition. Financial control is not integration. Unless fused commercially, administratively and technically such units can be mutually inhibiting, and the combined activities weaker than the horizontal constituents. The history of post-war organizational changes confirms this. In the late 1940s, weavers frequently acquired converting facilities to obtain a more secure marketing basis; convertors acquired weaving facilities to obtain assured supplies. These associations were frequently short-lived. Of 264 weaving units closed down in the four years before the 1959 Act, 109 were also convertors. A further 62 were members of groups which covered converting.
>
> Under the Yarn Spinners' Association and with fixed prices, spinners tended to integrate forward to secure weaving facilities and so obtain indirect yarn business, being content to weave at cost and obtain the constituent yarn profit. Today, the reverse is occurring, and we have supposedly-vertical organizations closing spinning units because it is claimed either that yarn can be imported cheaper than it can be spun in the U.K. or that capital can be conserved. One essential requirement for vertical integration is stability. This is incompatible with such an opportunist approach to organization.[95]

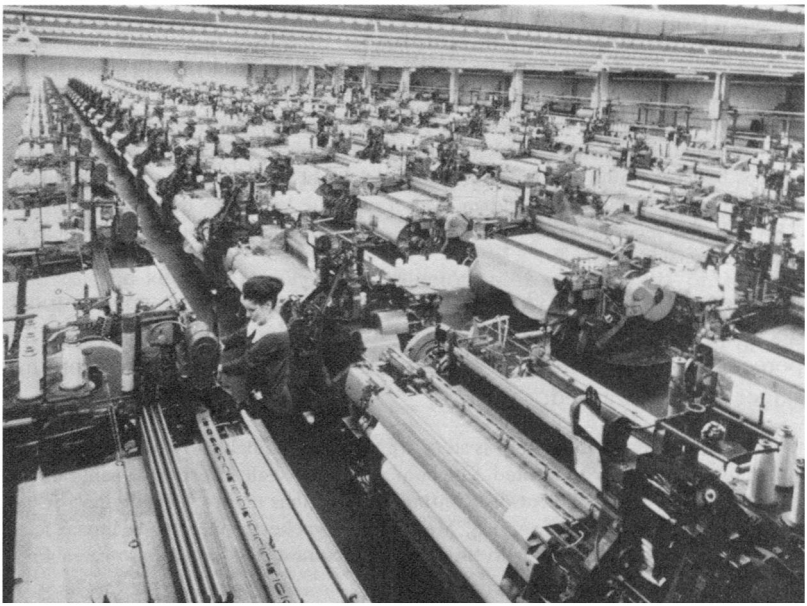
In short, the manager who integrates and disintegrates according to the ebb and flow of the market situation does so in lieu of the long-term planning of the organizationally-interconnected and technically-interrelated production and distribution processes that characterize the modern corporation.

Second, the Coasian approach ignores the role of concentrated product market power in the development of modern enterprise. No firm will produce a product unless it has a reasonable chance of selling it.

[95]Ormerod, "Prospects," pp. 10–11. See also U.S. Productivity Team, *British Cotton*, p. 6; Miles, *Lancashire*, p. 56; Furness, "Cotton," pp. 214–217.



A Weaving Shed with Non-Automatic Looms Driven by Belts from Overhead Shafting.



A Weaving Shed Built in 1966 with Automatic Looms.



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And no firm will *mass* produce a product unless it has reasonable prospects for mass sales. Moreover, since mass production requires long-term planning, reasonable sales prospects must be long-term as well. It is for this reason that the development of the firm's ability to mass distribute is a necessary condition for the development of its incentive to mass produce. Hence a firm's control over mass markets must precede, or at least emerge simultaneously with, the development of large-scale, standardized production.[96] In this sense, the development of the British textile industries in the 16th to 18th centuries was in large measure induced by the development of national supremacy over world markets. In the eighteenth and nineteenth centuries, this national control created the opportunites for numerous merchants to enter the cotton industry, thus creating for the British industry as a whole a structure of mass distribution characterized by numerous competitors and specialization along product lines. This structure of marketing still worked admirably in the decades prior to World War I during which world trade was expanding, the Japanese economy was still in the process of commercial development, and British control over India, by far its largest cotton goods market, remained supreme.

But it was a structure of marketing which, when challenged during and after World War I, was incapable of unified and concerted response. For example, Burnett-Hurst describes how, when World War I broke out, disrupting Lancashire production and distribution facilities

> [the two largest] Japanese mercantile houses . . . opened branches in Bombay and a large number of agencies and subagencies throughout India. These firms also acquired and operated ginneries and presses. The Yokohama Specie Bank and other Japanese banks extended the fullest facilities for financing the trade with India, while Japanese shipping lines established regular and direct services between India and Japan. There is no doubt that the immediate success achieved by Japan in the Indian market was due largely to the rapidity with which she secured her position by the effective co-operation of her various commercial interests.[97]

Between 1914 and 1932, Britain's share of Indian piece-good imports declined from 97 percent to 50 percent while Japan's share rose from .1 percent to 45 percent.[98] In the latter year the British Trade Commissioner in India warned:

> It should be realized that unless steps are taken very quickly to re-establish the competitive power of United Kingdom goods we shall lose the valuable co-operation of many efficient distributing organizations upon which we have relied for more than half a century. Meanwhile Manchester merchants appear to be losing that close touch with the Indian situation which has been so valuable

[96]Chandler, *The Visible Hand*, Parts II–IV.

[97]A. Burnett-Hurst, "Lancashire and the Indian Market," *Journal of the Royal Statistical Society*, Vol. XCV, Part III, (1932), pp. 399–400.

[98]*Ibid.*, p. 422.

in the past. Travellers no longer visit India, correspondence falls off in these difficult times, and, to an observer on the spot, it sometimes appears as if the greatest single export trade in the world is gradually being allowed to "peter out," no active measures being taken to deal with the situation.[99]

In 1929 one united attempt — the Eastern Textile Association Ltd. — actually had been made to mass distribute in China, but its quick failure was "the death-knell of all attempts to unite in promoting new developments from the selling angle."[100] Instead there remained over a thousand merchants in the Lancashire export trade and many hundreds more in the home trade from the 1920s into the 1950s.[101] A precondition for any significant structural and technical reorganization of production was a concentrated marketing sector that would create the incentive for production firms to mass produce and perhaps integrate forwards and that could itself integrate backwards. Such a reorganization of the cotton industry along corporate lines had taken place in the United States by the 1950s, bringing to dominance a small number of giant, fully-integrated cotton corporations.[102] Neither the development of American enterprises such as Burlington Industries and J.P. Stevens nor the massive forward integration by Courtaulds in Britain in the 1960s can be understood as "substitution at the margin" by optimizing managers taking market forces as given. Rather, such structural change was the result of entrepreneurial strategies to attain or maintain concentrated market power. Up to the 1960s such power was lacking in Lancashire precisely because "perfect" competition, and the dominance of marginal decision-making by spinning, weaving, and marketing managers to which it gave rise, made the exercise of such coordination impossible.

Third, Coase's approach ignores the problem of *managerial structure*, the implicit assumption being that this structure does not change qualitatively with changes in vertical or horizontal organization but only perhaps quantitatively in terms of the number of managers who are incorporated into the existing mode of management. As Alfred Chandler has shown, the key to the successful development and stability of the large corporation in the United States has been the development of new hierarchical structures of managerial control.[103] The development of such

[99]Quoted in *Ibid.*, p. 424; see also Pennington, "Competition," pp. 213–228.

[100]Streat, "Cotton industry," p. 14; see also Robson, *Cotton Industry*, pp. 215–216; Daniels and Campion, "Cotton Industry," p. 342.

[101]See note 18; Miles, *Lancashire*, p. 68. In 1965 there were still 1000 merchant-convertors in the industry. A.M. Alfred, "U.K. Textiles — A Growth Industry," *Transactions of the Manchester Statistical Society*, 1965–66, p. 9.

[102]Barkin, "Regional Significance"; J. Markham, "Integration in the Textile Industry," *Harvard Business Review*, Vol. 28, No., 1, (1950); W. Kessler, "Chapters in Business History," and W. Crook, "Corporate Concentration in the Textile Industry," both in *Textiles — A Dynamic Industry* (Colgate University Textile Study Project, 1951); U.S. House of Representatives, Committee of the Judiciary, *The Merger Movement in the Textile Industry* (Washington, 1955); W. Simpson, *Some Aspects of America's Textile Industry* (Columbia, South Carolina, 1966), ch. 6; Alfred, "U.K. Textiles," p. 21; According to Arthur Knight, who became Chairman of Courtaulds in the 1970s, U.S. corporations such as Burlington Industries and J.P. Stevens provided models of vertical integration that his company could emulate as it integrated forward in the 1960s. Knight, *Private Enterprise*, p. 46.

[103]A. Chandler, *Strategy and Structure* (Cambridge, Mass., 1962); Chandler, *Visible Hand*, Part V.

a managerial structure in the transformation of a number of smaller firms into a large corporate entity entails a coming to power of some managers and a loss of power of others as the structure of decision-making and authority is qualitatively altered.

Horizontal amalgamation in itself does not necessarily mean, however, an end to managerial autonomy for the heads of the participating firms. The case of the Lancashire Cotton Corporation, in which local mill managers refused to abide by and eventually overturned centralized control, is a case in point. In British industry in general the development of hierarchical managerial structures did not follow large-scale amalgamations, primarily because the directors of the constituent firms insisted on maintaining family control and almost complete operational autonomy even within the new amalgamated setting.[104]

In the British cotton industry, the implications of the failure to develop coordinated control of an amalgamation are well illustrated by the case of Combined English Mills (C.E.M.), a combination of fourteen largely autonomous spinning mills that had been formed in the late 1920s in an attempt to support yarn prices and that produced five percent of the total yarn output of the British cotton industry in the early 1960s. C.E.M. had taken advantage of re-equipment subsidies under the 1959 Act, and by the end of 1963 produced all its output on modern machinery. Even though output per spindle rose by 38 percent and labor productivity by 25 percent between 1960 and 1964, C.E.M. was experiencing losses. In 1964 the amalgamation was taken over by Viyella International which then proceded to rationalize C.E.M.'s spinning operations and integrate them with other textile activities. Within two years under corporate management, half the mills had been closed, and the remaining mills were producing for 120 relatively large customers rather than for the 735 relatively small customers that had previously been serviced. As a result, inventories were dramatically reduced, output per customer was increased by about 550 percent, output per spindle rose by 60 percent while labor productivity rose by 50 percent. The profitability of C.E.M. was restored.[105]

As a general rule the directors of family firms in the British cotton industry insisted on retaining managerial control over their enterprises, even though to hand over the reins of power to a centralized source may have been in their long-term interests as shareholders. Raymond Streat, a prominent figure in Lancashire cotton affairs in the interwar years, recalled that "[e]ven some spinners who joined passionately in the de-

[104]Chandler, "Growth of the Transnational"; see also L. Hannah, "Managerial Innovation and the Rise of the Large-scale Company in Interwar Britain," *Economic History Review*, Vol XXVII, No. 2, (May 1974), pp. 252–270; P. Mathias, "Conflicts of Function in the Rise of Big Business: The British Experience," in H. Williamson (ed.), *Evolution of International Management Structures* (Newark, Delaware, 1975).

[105]Miles, *Lancashire*, pp. 22–23, 91.

bates [on amalgamation in the 1920s and 1930s] never really contemplated that their own mill should be amalgamated though they may scarcely have realized themselves that they were so built that their sole and personal authority was something they would never part with voluntarily."[106] The prolonged persistence of excess capacity in the industry, which absorbed all the attention of government programs from the 1930s into the 1960s, was due in part at least to the persistence of family firms. Very much in the tradition of the handloom weavers a century before, the owners of these firms hung on to their businesses at extremely low profits in order to maintain their relatively independent status.[107] In view of the large numbers of small, technologically-backward firms that remained in the cotton industry in the mid-1960s, Miles contended that higher prices for scrapped machinery under the 1959 Cotton Industry Act would not have enticed more firms to leave the industry:

> . . . . the main barrier to movement has been and still is the lack of "mobile" management skills. For the owners of most small firms the choice lay between retirement and continuing in the same business, however small its return.[108]

By the same token, those owners-managers that did remain in business had little interest or ability to participate in vertical integration. The owner-manager of a Lancashire spinning firm, for example, typically knew nothing about weaving, never mind marketing.[109] He was a specialist in his trade, with, particular expertise in the buying of cotton.[110] Indeed, as one spinning manager opposed to combinations argued in the early 1930s, "every practical cotton spinner, who understands spinning thoroughly, but has only a slight working knowledge of weaving, is anti-vertical combine."[111]

The vast majority of businessmen in the British cotton industry, therefore, had neither the incentive to participate nor the ability to lead in the internal transformation of their industry. The competitive and specialized organization of the industry had developed a breed of managers with specialized skills and individualistic attitudes who were not only ill-suited for involvement in a transition from competitive to corporate capitalism but also by their very presence obstructed such a transition. The

[106]Streat, "Cotton industry," p. 7.

[107]Fabian Research Group, *Cotton*, p. 13n.

[108]Miles, *Lancashire*, p. 74.

[109]See e.g. E. Helm, "The Middleman in Commerce," *Transactions of the Manchester Statistical Society*, 1900–1901, p. 57; W. Whittam, *Report on England's Cotton Industry* (Washington, 1907), p. 13; "Problems between spinners and manufacturers," *Journal of the British Association of Managers of Textile Works* (Lancashire Section) Vol. III, (1911–1912), pp. 127–136; "The Most Essential Improvement Required in the Cotton Trade," *Journal of the National Federation of Textile Works Managers' Associations*, Vol. V, (1925–1926) pp. 94–96; Bolton and District Managers and Over-lookers' Association, *Report of Delegates on American Tour* (Bolton, 1920), p. 39; Streat, "Cotton industry," p. 3.

[110]F. Jones, "The Cotton Spinning Industry in the Oldham District from 1896 to 1914," (unpublished M.A. Thesis, University of Manchester, 1959).

[111]"Combinations," *Journal of the National Federation of Textile Works Managers' Associations*, Vol. XII; 1932–1933, p. 9.

modern capitalist corporation is not a logical outgrowth of competitive market conditions. In the British cotton industry corporate organization failed to emerge on any significant scale until the 1960s precisely because competitive market conditions were so deeply entrenched. The result was prolonged technological backwardness and industrial decline.

## Explanations of Britain's Decline

This study of the British cotton industry suggests that a fundamental cause of Britain's relative decline from the late nineteenth century was the inability of its capitalists, divided as they were by competition and markets, to adapt Britain's nineteenth-century economic structure to the conditions of twentieth-century international competition. While the cotton industry represented only one of Britain's staple industries, there is evidence that similar problems faced Britain's other staple industries — coal, iron and steel, and shipbuilding — as well.[112] The structure of industrial organization which arose in the context of Britain's unchallenged domination of world markets in the mid-nineteenth century left the subsequent generations of capitalists powerless, both individually and collectively, to supersede the market so as to develop the coordinated managerial structures and introduce the high throughput production processes that characterize the modern capitalist enterprise.

What light does this analysis shed on some previous attempts to explain Britain's relative decline? In what follows I shall consider the hypotheses of technical interrelatedness and entrepreneurial failure, stressing the importance of the correct specification of the type of managerial activity with which a particular explanation is concerned.

The hypothesis of technical interrelatedness, which can claim Thorstein Veblen as its most distinguished proponent, is essentially an argument that Britain was handicapped by its early start.[113] Marvin Frankel, in his attempt at systematic formulation of the hypothesis, identifies the problem of technical interrelatedness with the effects of sunk costs, and distinguishes this cause of technological backwardness from those which derive from institutional rigidities on the one hand and resource inadequacies on the other.[114] He attempts to demonstrate that, even in the absence of institutional and resource constraints, an old industry will

[112]See e.g. B. Elbaum and F. Wilkinson, "Industrial Relations and Uneven Development: A Comparative Study of the British and American Steel Industries," *Cambridge Journal of Economics*, Vol. 3, No. 3, (September 1979) pp. 275–303; M. Kirby, *The British Coalmining Industry* (Hamden, 1977); S. Pollard and P. Robertson, *The British Shipbuilding Industry 1870–1914* (Cambridge, Mass., 1979).

[113]See T. Veblen, *Imperial Germany and the Industrial Revolution* (Ann Arbor, 1968), Ch. IV. For discussions of early start hypotheses, see C. Kindleberger, "Obsolescence and Technical Change," *Bulletin of the Oxford Institute of Statistics*, August 1961, pp. 281–297; E. Ames and N. Rosenberg, "Changing Technological Leadership and Industrial Growth," in N. Rosenberg (ed.), *The Economics of Technological Change* (Harmondsworth, 1971), pp. 413–439; A. Levine, *Industrial Retardation in Britain, 1880–1914* (London, 1967), ch. 6.

[114]M. Frankel, "Obsolescence and Technological Change in a Maturing Economy," *American Economic Review*, Vol. XLV, No. 3, (June 1955), pp. 296–297.

have greater difficulty adopting a new technology than a new industry. As he puts it:

> As an industry (or industrial economy) grows and adapts to changing and increasingly complex production methods, interconnections, more or less rigid, develop among its technological components — among machines, plant, transport network and raw material supplies — that make increasingly difficult the introduction into the system of new, cost-saving changes. It may then happen that the entire system becomes obsolete because, as Veblen has observed, "An adequate remedy by detail innovation is not always practicable; indeed, in the more serious conjunctures of the kind it is virtually impossible, in that new items of equipment are necessarily required to conform to the specifications already governing the old." Unable to utilize the new production methods, the industry continues with its old ones. As a result, its costs are higher and labor productivity lower than they would be in a less "mature" industry. The old industry finds itself penalized for having taken the lead and shown the way to its young competitors in other regions.[115]

The crux of the problem is that not all the technically-interrelated components of a production process can be expected to wear out at the same time, so that the introduction of a new technology will generally require the scrapping of a great deal of existing plant and equipment that still has useful service to render. Thus, generally speaking, the greater the degree of technical interrelatedness, the more likely it will be that a manager, optimizing subject to given constraints at a point in time, will continue to invest in new *components* of the old technology, thus locking himself into the utilization of the old technology over the longer run.

This argument has obvious merit as one possible explanation of technological backwardness — it would be interesting to see it applied to the U.S. automobile and steel industries of the present day. As for Frankel, he in fact refers to the British cotton industry, and in particular to the failure to adopt the automatic loom, as a prime empirical application of the hypothesis of technical interrelatedness. But despite his careful categorization of the sources of technological backwardness into institutional rigidities, resource inadequacies, and the effects of sunk costs, his own account of the constraints on the adoption of the automatic loom emphasizes institutional rigidities rather than the effects of sunk costs although it is the latter hypothesis that he is purportedly attempting to demonstrate. For what Frankel emphasizes is the problem of vertical specialization and the consequent lack of coordinated decision-making *across* technically-interrelated industrial units as opposed to the timing of the component obsolescence of technically-interrelated processes *within* a decision-making unit.[116] The problem of sunk costs, reflecting the long-run pitfalls of short-run maximizing behavior (and in this sense

[115] *Ibid.*, p. 297.
[116] *Ibid.*, pp. 313–314.

reflecting the constraint of highly competitive conditions on managerial decision-making), undoubtedly played a role in the technological backwardness of the British cotton industry.[117] But in the decade prior to World War I, during which the number of spindles and looms installed in Lancashire grew by 31 percent and 23 percent respectively, there was plenty of opportunity for "new starts" unencumbered by the component problem of technical-interrelatedness within spinning, weaving, or combined firms.[118] Yet it was during this period that Britain was falling far behind the U.S. in the adoption of modern methods of production. The larger problem was the inability of managers to develop modern corporate production structures even in the context of these "new starts." Britain was indeed handicapped by its early start — its nineteenth century mode of development permitted highly competitive and highly specialized managers to dominate the industrial structure, managers who were then unable to transform their organizational environment as a precondition for responding to the production and distribution methods of twentieth century international competition.

In attempting to explain the technological backwardness of an industry (or an economy), it is of utmost importance to identify carefully the constraints on managerial decision-making that are inherent in one's explanation if one is actually to test the particular hypothesis under consideration. The debate over the hypothesis of entrepreneurial failure is plagued by just such problems in the specification of the type of managerial activity under scrutiny.

It was, of course, Joseph Schumpeter who accorded the entrepreneur a central role in the process of economic development. For him, the understanding of the process of economic development went beyond the theoretical boundaries of what is today called neoclassical economics, and he argued that "changes in technique and productive organization require special analysis" and "non-recognition of this is the most important single reason for what appears unsatisfactory to us in economic theory."[119] In order to rectify this shortcoming, Schumpeter's theory of economic development was based on a clear distinction between the manager of neoclassical theory who, to use modern language, optimizes subject to "given" constraints and the entrepreneur who alters these constraints, thus creating new profitable opportunities. One need not accept Schumpeter's theory of economic development as complete nor subscribe to all his conclusions in order to recognize the relevance of the

[117]See e.g. *CFT*, 16 January 1885 for a specific example.

[118]Frankel also argues that the Lancashire weaving industry had little opportunity for modernization because the industry grew little after 1900. But see the data in Jones, *Increasing Return*, p. 277.

[119]J. Schumpeter, *The Theory of Economic Development* (New York, 1961), p. 60n. On these issues, Schumpeter finds himself drawn to Marx's theory of capitalist development, but, as he humbly notes, "my structure covers only a small part of his ground." *Ibid.*

analytical distinction between working within constraints and changing them. Indeed if Schumpeter's conceptual distinction between managerial activity and entrepreneurial activity is accepted as valid, it can readily be seen that the presence of successful "neoclassical" managers who optimize subject to the constraints they face in no way precludes the failure of some person or groups of people to fulfill the entrepreneurial role of altering those constraints. Managerial activity may well pass the test of constrained optimization while the firm, industry, or economy fails to engage in entrepreneurial activity and hence fails to generate a *new* array of optimal decisions within a *new* array of "given" constraints.

In contrast to the Schumpeterian distinction, the general practice of neoclassical economists has been to use the labels "manager" and "entrepreneur" interchangeably, in all cases signifying a businessman who, in his decision-making role, takes prices and productivity as given by the market and technology respectively. It is therefore not surprising to find that some "new" economic historians, who pride themselves on their rigorous application of neoclassical theory to economic history, fail to notice any significant distinction between the entrepreneur and manager in their attack on the hypothesis of entrepreneurial failure.

The attack began in the late 1960s, and the initial efforts were summarized in an article published in 1971 by Donald McCloskey and Lars Sandberg in which they emphasize the theoretical and quantitative precision of the "new" economic history in testing the hypothesis of British entrepreneurial failure in the late nineteenth and early twentieth centuries.[120] McCloskey and Sandberg are highly critical of not only the conclusions but also the methodology of the "heirs of Veblen and Schumpeter" (by whom they apparently mean David Landes and Derek Aldcroft) who "taking a sociological view of the matter," attach great importance to the failure of entrepreneurship in the explanation of Britain's decline. At the same time, they point out the limitations in the analyses of those "old" economic historians who have cast doubt on the entrepreneurial failure hypothesis, categorizing the detractors into those such as Charles Kindleberger who argue theoretically with a minimum of facts and those such as S.B. Saul who argue empirically with a minimum of theory. The "new" economic historians claim to have united the best of both these intellectual approaches, the combination of neoclassical economic theory and quantitative methods providing them with the analytical tools to test rigorously the hypothesis of entrepreneurial failure.[121]

[120]See McCloskey and Sandberg, "From Damnation." See also the collection of essays in D. McCloskey (ed.), *Essays on a Mature Economy: Britain after 1840* (London, 1971) and C. Harley, "Skilled Labour and the Choice of Technique in Edwardian Industry," *Explorations in Economic History*, Vol. II, No. 4, (Summer 1974), pp. 391–414. In what follows, I shall be concerned only with the theoretical merits of the work of the "new" economic historians. For a critique of Sandberg's quantitative efforts, see Lazonick, "Factor Costs."

[121]McCloskey and Sandberg, "From Damnation," pp. 91–94.

The result of these tests, as McCloskey and Sandberg see it, is a clear rejection of the hypothesis. "[T]he late Victorian entrepreneur," they conclude, "who started his historiographic career in damnation is well on his way to redemption."[122]

My concern here is not with the empirical content of the "new" economic historians' test of the hypothesis of entrepreneurial failure, but rather with the nature of the test itself. For while McCloskey and Sandberg argue that the "range of our ignorance of the influence of entrepreneurship has been greatly narrowed by its intensive study,"[123] I shall argue on the contrary that what they have "greatly narrowed" is the *definition* of entrepreneurship itself and along with it our comprehension of the processes of economic development. The "new" economic historians bring the study of entrepreneurship within the scope of neoclassical economic theory by defining the entrepreneur as a neoclassical manager. Hence the test of entrepreneurial performance is the extent to which managers can be shown to have minimized costs subject to given constraints. For example, in one neoclassical contribution to the debate, entitled "Yardsticks for Victorian Entrepreneurs," Lindert and Trace argue that "the cardinal rule [for judging the calibre of entrepreneurship] is that the comparison must reflect the conditions faced by the individuals or firms whose performance is being judged. It will not do, for example, to fault Victorian manufacturers for not having adopted techniques that were preferable under American or German, but not British price relationships."[124] In order to test the quality of "entrepreneurship" they propose the neoclassical test of allocative rationality, namely "a straightforward cost-benefit calculation to measure the private profits foregone by a non-optimal choice of technique," taking price relationships, and presumably productivity potential, as given to the firm and industry.[125]

In their joint article, McCloskey and Sandberg use the terms "entrepreneur" and "manager" interchangeably, making absolutely no attempt to justify the implicit conceptual assumption. In his own work on the British iron and steel industry, however, McCloskey is quite explicit on this issue: "I use the word "entrepreneur" throughout in the general sense of a businessman or manager rather than in the restricted sense of a *good* businessman or manager, that is, an innovating Schumpeterian

[122]*Ibid.*, p. 108. This view has begun to gain acceptance in the textbooks. See e.g. P. Payne, *British Entrepreneurship in the Nineteenth Century* (London, 1974), pp. 48–51; A. Musson, *The Growth of British Industry* (New York, 1978), p. 163. For a critique, see C. Kindleberger, *Economic Response* (Cambridge, Mass., 1978), ch. 7.

[123]McCloskey and Sandberg, "From damnation," p. 108.

[124]In McCloskey (ed.), *Essays*, p. 241.

[125]*Ibid.*, p. 243. This approach is explicit in Sandberg, *Lancashire*, ch. 2–4, and implicit in Harley, "Skilled Labour," and D. McCloskey, *Economic Maturity and Entrepreneurial Decline: British Iron and Steel 1870–1913* (Cambridge, Mass., 1973). For a much earlier statement of the neoclassical approach, see F. Jervis, "The Handicap of Britain's Early Start," *Manchester School*, Vol. XV, No. 1, (January, 1947), p. 212: "It is a commonplace of economic theory that the entrepreneur combines his factors in the optimum manner under the circumstances applicable to him."

entrepreneur."[126] Thus, McCloskey, while recognizing that his own analysis does not deal with Schumpeter's distinction between entrepreneurship and management, minimizes the importance of that distinction by characterizing it as a difference in degree rather than in kind. Hence the Schumpeterian notion of the entrepreneur is reduced to an (unspecified) "special case" of the (presumably) "broader" neoclassical notion of the manager.

It should be noted that neither David Landes nor Derek Aldcroft — the proponents of the hypothesis of entrepreneurial failure whom McCloskey and Sandberg criticize explicitly — highlight the distinction between entrepreneurs and managers. Landes, however, was a collaborator at Harvard's Research Center in Entrepreneurial History in the 1950s, and his approach is clearly influenced by the Schumpeterian tradition.[127] Aldcroft, on the other hand, was apparently untouched by Schumpeterian influence. Indeed, he subsequently indicated that he did not see any problem with the neoclassical definition of entrepreneurship.[128]

Yet there is in existence an extensive literature on the nature of the Schumpeterian notions of entrepreneurship and management, as well as some excellent empirical work (most notably that of Alfred Chandler) that explicitly utilizes the distinction.[129] One might expect, therefore that neoclassical economic historians would at least make some attempt to justify empirically and theoretically their rejection of Schumpeter's insights into economic development as well as to defend the superiority of their own approach as a prelude to testing their own definitions of "entrepreneurial failure." Instead of confronting the issues of economic development raised by the Schumpeterian approach, they simply define them away, proceeding, in a manner not uncommon among contemporary orthodox economists, *as if* all fundamental theoretical questions

[126]McCloskey, *Economic Maturity*, pp. vii–viii; see also the following statement in a piece extolling the recent work of "new" economic historians: "[F]ew economists outside of agricultural economics and economic history have given serious attention to measuring (as distinct from theorizing about) managerial ability or, in more elaborate language, entrepreneurship," D. McCloskey, "Does the past have useful economics?" *Journal of Economic Literature*, Vol. XIV, No. 2, (June 1976), p. 452.

[127]See D. Landes, *The Unbound Prometheus* (Cambridge, England, 1967), p. 354; D. Landes, "Factor Costs and Demand: Determinants of Economic Growth," *Business History*, Vol. II, (January 1965), p. 26.

[128]In McCloskey (ed.), *Essays*, pp. 272–277.

[129]Chandler, *Strategy*; Chandler, *Visible Hand*. See also E. Dahmèn, *Entrepreneurial Activity and the Development of Swedish Industry 1913–1934* (Homewood, 1970). On the conceptual distinction, see J. Schumpeter, "The Analysis of Economic Change," *Review of Economic Statistics*, Vol. XVII, No. 4, (May 1935), pp. 2–10, and "The Creative Response in Economic History," *Journal of Economic History*, Vol. 7, No. 2 (November, 1947), pp. 149–159, both reprinted in R. Clemence (ed.), *Essays of J.A. Schumpeter* (Cambridge, Mass., 1951), pp. 1–19 and 216–226; G. Evans, "The Entrepreneur and Economic Theory: A Historical and Analytical Approach," *American Economic Review*, Vol. XXXIX, No. 3, (May 1949), pp. 336–355; G. Evans, "Business Entrepreneurs: Their Major Functions and Related Tenets," *Journal of Economic History*, Vol. XIX, No. 2 (June 1959), pp. 250–270; A. Cole, *Business Enterprise in its Social Setting* (Cambridge, Mass., 1971); A. Chandler and F. Redlich, "Recent Developments in American Business Administration and Their Conceptualization," *Weltwirtschaftliches Archiv*, No. 86, (1961), pp. 103–130; H. Hartmann, "Managers and Entrepreneurs: A Useful Distinction?" *Administrative Science Quarterly*, Vol. 3, (1958–59), pp. 429–451; W. Baumol, "Entrepreneur in Economic Theory," *American Economic Review*, Vol. LVIII, No. 2, (May 1968), pp. 64–71; J. Soltow, "The Entrepreneur in Economic History," *American Economic Review*, Vol. LVIII, No. 2. (May 1968), pp. 84–92.

concerning the functioning of the capitalist economy have been resolved so that matters can be settled by an appeal to the "facts."[130]

The facts as I see them are that British businessmen performed admirably as neoclassical managers — they took the conditions facing them as given and tried to do the best they could, subject to these constraints. As entrepreneurs, however, they failed precisely because as individualistic managers in highly competitive and vertically-specialized industries they were powerless to alter the organizational constraints that determined feasible technological choices and profitable opportunities. As a result, they barely even tried, individually or collectively, to transform their industrial environment. Certainly in the decades prior to World War I, when the German, American, and Japanese economies were developing on the basis of modern corporate structures, British capitalists were oblivious to the need to make these institutional changes if Britain was to maintain its position in the world economy in the long-run. It is true that in the long-run, to paraphrase Keynes, all these British capitalists were dead. Their economy, however, lives on, as does neoclassical economics. To this day, neoclassical economists continue to extoll as the ideal form of economic existence the short-sighted capitalist and the competitive capitalism in which he was enmeshed. Certainly, the neoclassical notion that high levels of capital mobility, and hence allocative efficiency, are associated with high levels of competition is hardly borne out by the 20th century experience of the British cotton industry. In dealing with the real world, neoclassical economists remain every bit as trapped by their theoretical vision of economic activity in which firms are subordinate to markets as were the British cotton capitalists for whom such subordination was a reality. The era of competitive capitalism has long since past. It is time that orthodox economists began to learn some lessons from history. Perhaps then they could begin to illuminate rather than obscure our understanding of the dynamics of the corporate capitalist economy that exists today.

[130]In some quarters, however, there is genuine confusion concerning the theoretical issues involved. For example, Peter Payne, in his recent contribution to the *Cambridge Economic History of Europe*, is careful to make a distinction between entrepreneurs who make strategic decisions and managers who keep the concern running. Yet after discussing the empirical contributions of the "new" economic historians he concludes that the hypothesis of entrepreneurial failure has taken "quite a beating." P. Payne, "Industrial Entrepreneurship and management in Great Britain," in P. Mathias and M. Postan (eds.), *The Cambridge Economic History of Europe*, Vol. VII, Part I, (Cambridge, England, 1978), pp. 180–181, 208–209. Similarly, Nathaniel Leff notes that "in recent years the term entrepreneurship has sometimes been used as a synonym for the firm, or for management in general, with little regard for special 'entrepreneurial' qualities," but he then goes on to accept the McCloskey-Sandberg argument that entrepreneurial performance was not an important problem in the relative decline of the British economy. N. Leff, "Entrepreneurship and Economic Development: The Problem Revisited," *Journal of Economic Literature*, Vol. XVII, (March 1979), pp. 47, 50–51. A recent discussion of British entrepreneurial activity that well reflects this confusion can be found in the opening chapter of M.W. Kirby, *The Decline of British Economic Power since 1870* (London, 1981).