EXPLORATIONS IN ECONOMIC HISTORY **20**, 37–57 (1983)

Employment in Nineteenth Century Indian Textiles*

MICHAEL J. TWOMEY

University of Michigan, Dearborn

The "de-industrialization" of India has been a topic of extensive debate in the literature of political economy. Officials of the East India Company warned against it in the early days of the 18th century.[1] That the growth of the Lancashire cotton mills came at the expense of Indian handicraft production has been widely accepted, especially among certain nationalist economic historians, led by Dutt (1956).[2] A focal point in the recent academic discussion has been Morris's (1963) article, reprinted, along with comments from other scholars, in the March 1968 issue of the *Indian Economic and Social History Review,* and in Morris *et al.* (1969), in which he declared "there is a strong likelihood that the traditional sector, generally speaking, did not decline absolutely in economic significance and therefore did not constitute a depressing element in the performance of the nineteenth century economy. It is even possible that absolute growth occurred."[3] Among other comments, critics pointed to the weak statistical basis of Morris's position. One important study he did cite is the Thorner (1962) analysis of the Indian census data of 1881 and 1931,

* The author thanks members of the UM–Ann Arbor Economic History Seminar, D. A. Farnie, Don Anderson, and Richard Roehl, for comments on earlier drafts.

[1] See Dutt (1956), Chap. XIV. Humanitarian considerations were probably less important to them than was the protection of their own near monopoly in the trade of Indian piece goods.

[2] A good presentation of the different subcurrents of the nationalist position is Ganguli (1977). As another example, Maddison (1971, p. 54) comments "There is a good deal of truth to the de-industrialization argument." Baran (1957, p. 149) states, "(Britain's) commercial policy destroyed the Indian artisan and created the infamous slums of the Indian cities . . . Its economic policy broke down whatever beginnings there were of an indigenous industrial development. . . ." It might be noted that Baran's treatment of the "Roots of Backwardness" of India gives more emphasis to the "drain" of resources from India than to de-industrialization per se. As noted by Morris (1963) and Chaudhuri (1968), that is another thorny issue of Indian economic history.

[3] Morris (1963, p. 613). Immediately above this quotation, another phrase refers specifically to handloom weavers. We shall return to this distinction at the end of the paper. There are many other stimulating hypotheses in Morris's paper which we shall not consider here.

0014-4983/83/010037-21$03.00/0

which indicated no increase in the percentage of the population dependent on agriculture.[4] Surveys of 19th century Indian economic history by Chaudhuri (1968), Kumar (1972), and most recently Robb (1981) have emphasized the still unsettled empirical basis of this discussion.

This paper shall attempt to attach rough orders of magnitude to the different variables important in determining the accuracy of Morris's statement.[5] The first step in this exercise is the collection and presentation of data on Indian trade—exports and imports, of both yarn and cloth—which is generally possible from 1790 on. The more difficult task is the construction of time series for total production and consumption; these are presented from 1880 on. On the basis of this data we shall distinguish two periods of marked effects on Indian textile employment; an earlier one due the reduction of exports, the second due to the inroads of English textiles on production for local use. Certain average productivity ratios permit the conversion from output changes to employment effects. With regard to Morris's assertion, we shall argue that there was an absolute decline in handicraft textile employment over the century, and highlight the period 1850–1880 as that of strongest displacement of domestic handicrafts by British exports.

The cotton plant was first domesticated in India, whose textile trade is so ancient that Indian cotton fabrics have been found in the tombs of the pharaohs. For the period under consideration, we shall distinguish five stages of Indian textile production and trade: (1), the years prior to 1830, involving a steady decline in the volume of Indian handmade exports from a high in the 1790s; (2), 1830–1850, when exports stagnated while the growth of imports from Britain was arguably not greater than the growth of domestic demand due to population growth; (3), 1850–1880, which saw accelerating textile imports, as well as the successful foundation of the domestic manufacturing industry; (4) 1880–1913, at the end of which imports peaked; (5) the post-1913 period, when domestic manufacturing dominated both imports and hand weaving.

Textile mills were attempted in India as early as 1818, but for a variety of reasons the first successful one was established only after 1850. It is well known that these mills did not have the benefits of significant tariff protection, which was only to come in the 1920s.[6] The story of the evolution of the Indian spinning and weaving industries is best told by Mehta (1953, 1954); other important sources are Gadgil (1971), Gandhi (1930), and Govil (1950).

[4] In contrast to Thorner, Bagchi (1976) found a decline in that percentage over the period 1809–1901, for the area of Bihar. Bagchi's use of data has been severely criticized by Vicziany (1979) and Robb (1981). We shall argue below that the period analyzed by Thorner is inappropriately late.

[5] One could quarrel with the implication that the absence of *absolute* (as opposed to *relative*) decline is sufficient to avoid being a depressing element.

[6] On Indian tariff policies, see Rider (1970), Harnetty (1972), and Dewey (1978).

The data on Indian trade, presented in Table 1, form the basis for much of our periodization of the Indian textile experience, which unfortunately excludes considerations of political developments. There is a clear turning point in 1830, when the subcontinent becomes a net importer of cloth. The mid-century acceleration of imports was halted by the "cotton famine" of the early 1860s, but growth resumed thereafter. In 1880 she became a net exporter of (machine spun) yarn. Cloth imports fell after 1913, and never regained their prewar level. At the end of the period, yarn exports were being replaced by cloth exports.

Under the East India Company, the export of cotton textiles increased considerably, expanding from an inter-Asian trade toward the European markets, marking its apex at the end of the 18th century,[7] when the major part of exports was sent to England for re-export onto the continent and elsewhere. The suggestion of Table 2 is that the re-exported part of Indian shipments to England continued to rise up into the 1790s, while the (relatively smaller) domestic English market was already falling by then due to accelerating home production. By the turn of the century, English goods clearly dominated the world market.

What happened thereafter to total Indian textile exports is difficult to specify with exactitude. Some information is presented in Table 3. In contrast to the collapse of the export market to England in the decades after 1800, the rest of the Indian exports was not as severely damaged, apparently declining slightly in volume, and by some factor less than half in price. The price change reflects a drop in quality, because English exports first displaced the higher part of the Indian trade, as the price differential between mechanically spun and hand spun yarn increased with the fineness of the yarn. On the basis of the data in Table 4, we would conclude that real cloth prices fell in England after 1800; Parshad (1932, p. 210) cites a report suggesting that Indian piece goods sold in England had reached their highest sale prices in the 1780s. Table 4 also suggests that the price decreases in England due to mechanization and technical improvements were aided, at least between 1815 and 1845, by the decline in the price of the raw material, due to the expansion of American supplies. Of course, one cannot necessarily infer price movements in India on the basis of information on English prices, because of transport costs, the English tariffs and other trade impediments, as well as the breaking up of the East India Company's trade monopoly. Combining these considerations and the incomplete data in Tables 3 and

[7] The author has not found any data for total Indian cloth exports before 1790, Nevertheless, trade to England expanded considerably. Chaudhuri (1978, p. 548) shows average annual exports of 441 thousand pieces in 1756–1760 (down from a high of over one million in 1727). Milburn (1813, p. 234) reports yearly trade of 874 thousand during 1771–1779, and (p. 415) over two million during 1791–1800, after which it declined. An undetermined, but presumed small, part of this growth was due to the displacement of trade in non-British hands. See Arasaratnam (1980) and Chaudhuri (1974).

TABLE 1
Indian Cotton Goods Trade, 1790–1930 (Annual Averages for Decade)

	Yarn		Cloth		Yarn		Cloth	
	Exports (m. lb)	Imports (m. lb)	Exports (m. yd)	Imports (m. yd)	Exports (m. £)	Imports (m. £)	Exports (m. £)	Imports (m. £)
1790	..[a]		50[j]				(2.4)[t]	
1800				..[m]			2.2	..[m]
1810		..[e]		5[n]			0.9	0.3[v]
1820		3[f]		26		0.3[r]	1.2	1.1
1830	0.2[b]	7	(30)[j]	60	0.3[p]	0.5	0.9	2.9
1840	0.6	17	26[k]	199	0.4[p]	0.8	0.8	2.9
1850	1.0[b]	25[f]	20[k]	507		1.1[r]	0.8[t]	6.0
1860		31[g]		674	0.1[q]	2.5[s]	1.2[u]	11.1
1870	6[c]	34[h]	14[c]	1189	0.3	2.8	1.3	14.3
1880	67[c]	50[i]	49[c]	1918	2.1	2.7	1.8	18.6
1890	186[d]	45	157[l]	2097	4.8	2.3	2.2	17.1
1900	242	36	77	2304[n]	6.1	2.0	1.2	21.9[v]
1910	163	35	133	2128[o]	6.7	3.6	3.0	35.9[w]
1920	45[d]	48[i]	164[l]	1684[o]	1.7[q]	4.0[s]	3.3[u]	29.1[w]

Note. .. indicates item was less than 0.05.

Abbreviations. *SA*, Statistical Abstract of British India; *SP*, Sessional Papers of the British Parliament; *HLJ*, House of Lords Journal.

[a] Said to have ceased by the 1780s, see Rostow (1975, p. 213), Mann (1968, p. 20), and Parshad (1932, p. 93).

[b] 1831–1859, Mann (1968, p. 129) (imports into England, most of which were re-exported).

[c] 1870–1889, *SP*, various years. [d] 1890–1930, *SA*, various years. [e] 1824–1825, *HLJ* (1830, p. 1392).

[f] 1827–1858, Mann (1968, p. 118). [g] 1860, Ellison (1968, p. 118). [h] 1870–1879, Ray (1934, p. 64). [i] 1880–1929, *SA*, various years.

[j] Table 3. There was, presumably, a considerable change in the quality of these products between 1790 and 1830.

[k] 1840–1859, Mann (1968, p. 117). Data shown are Mann's pound totals multiplied by 4.

[l] 1890–1929, *SA*, various years. [m] Govil (1950, p. 12). [n] 1815–1909, Sandberg (1974, Table 5). [o] 1910–1929, *SA*, various years.

[p] 1833–1849, *SP* 1852–1853 XCIX, 13. [q] 1867–1929, *SA*, various years. [r] 1820–1859, Mann (1968, p. 115).

[s] 1866–1929, Mann (1968, p. 115). [t] Table 3. [u] 1867–1929, *SA*, various years. [v] 1815–1909, Sandberg (1974, Table 5).

[w] 1910–1929, *SA*, various years.

TABLE 2
Production and Trade, 1780–1830

Decade beginning	1 India's total cloth exports	2 England's imports of textiles from Asia	3 England's re-exports of Asian textiles	4 Implied English consumption Asian textiles	5 English production	6 English exports of cottons
1780		1,344	394	950	5,400	766
1790	(2430)	1,687	1,142	545	10,000	3,380
1800	2,251	827	777	50	18,900	15,871
1810	976	515	432	83	29,200	18,742
1820	1,224	363	429	−66	33,100	16,879
1830	902	347	406	−59	45,600	22,398

Note. All data in thousand £. Data may refer to subperiods of indicated decades.

Sources. Column 1 from Table 3. Columns 2 and 3 from the Appendixes of Davis (1979). Column 4 = column 2 − column 3. Columns 5 and 6 from Deane and Cole (1967). It is clear from Table 3 that columns 2–4 are predominantly Indian cotton piece goods, as opposed to silk and/or Chinese products.

4, we shall conjecture a reduction by two-thirds of "real" Indian textile exports between 1790 and 1830. The tentative nature of this estimate is clear, but it shall turn out that it establishes an order of magnitude with sufficient precision for later comparisons.

Our suggested chronology of the Indian experience during the extended 19th century basically utilizes the period 1830–1850 to separate the period of declining Indian exports from that of declining handicraft production, which we argue is a post-1850 phenomenon. This position is based on comparisons of known imports with our own estimates of production in 1850 and the period after 1880.

The reports of various governmental boards of inquiry present a reliable overview[8] of the mill industry after 1900, with limited data reaching back to 1879; we have presented this in Table 5, along with our estimates of hand spinning. The major gap in our sources is any information about the evolution of hand spinning. What appears to be the most thorough analysis of the subject places the volume of hand spinning of yarn at about 60 million pounds in 1931,[9] while another source indicates that it

[8] There has been considerable discussion on the fine points of the appropriate methodology of constructing these tables, specifically, the conversion factor relating pounds of machine spun yarn to yards of machine woven cloth (Mehta, 1954, Chap. 4). Neither wishing nor qualified to enter this debate, we have chosen to follow the Tariff Board's methodology in constructing the early parts of Table 5.

[9] Desai (1953, p. 77). Gandhi (1930, p. 72) gives similar estimates for that period.

TABLE 3
Textile Exports of India and China, 1790–1850 (Annual Averages per Decade)

	1	2	3	4	5	6	7	8	9	10
	Total cotton piece good exports				Total cotton piece good exports to United Kingdom				Re-exports of cotton piece goods	
	India		Bengal		India		Bengal		United Kingdom	
	Q	V	Q	V	Q	V	Q	V	Q	V
1790	(4,500)[a]	(24,300)[d]		13,964[j]	2,200[a]	21,246[q]*	787[s]	6,445[j]	1,325[v]	11,420[x]
1800		22,515[e]		15,608[k]	1,824[m]	17,207[q]*	1,331[s]	12,610[s]*	1,717[v]	7,770
1810		9,760[f]		11,050[l]	1,358[n]	11,185[r]*			1,038[w]	4,320
1820		12,240[f]		5,230[l]	431[o]	6,005[r]*		458[u]		4,290
1830	(3,000)[b]	9,022[g]	478[i]	825[i]	271[o]	1,539[g]	6[t]	27[t]		4,060
1840	2,606[c]	8,094[g]			304[p]	632[x]			232[p]	4,500
1850	2,279[c]	8,258[h]								5,320[x]

	11	12	13	14	15	16	17	18	19	20	21
	Total exports of silk piece goods		Silk piece good exports to United Kingdom				Re-exports of silk piece goods	Cloth piece good exports to United Kingdom		Silk piece good exports to United Kingdom	
	Bengal		India		Bengal		United Kingdom	China		China	
	Q	V	Q	V	Q	V	Q	Q	V	Q	V
1790									260[hh]		
1800									676[hh]		
1810			112[za]					544[gg]	1,435[gg]	13[gg]	340[gg]
1820	400[y]	2,380[y]	151[za]	2,380[cc]*	123[y]	1,067[y]	92[ee]	302[gg]	604[gg]	26[gg]	334[gg]
1830	665[z]	4,119[z]	319[aa]		311[dd]	2,149[dd]	323[ff]				
1840			529[bb]				403[bb]				

Notes. Quantities (Q) are thousand pieces; values (V) are thousand rupees.

An asterisk (*) indicates that the item is sale price in the United Kingdom which is almost double invoice price in India.

Parentheses ( ) indicate that the item was estimated by the author. Data originally appearing in £ converted to rupees by multiplying by 10. Different valuations of the separate rupees are ignored.

Abbreviations. SA, Statistical Abstract of British India; *HLJ,* House of Lords Journal; *SP,* Sessional Papers of the British Parliament. Format of references follow source's format.

[a] Estimated on the basis of Robson (1957, p. 1). Quantity to United Kingdom agrees with Milburn (1813), with *SP* 1812–1813 VII 475, and MacGregor (1850, pp. 413 and 418).

[b] Estimated by dividing 1830 value by implicit price for 1840.

[c] 1840–1857, Mann (1968, p. 117).

[d] Estimated multiplying quantity by an average price (of Bengal exports to U.K.) as calculated from Milburn (1813, Vol. 2, pp. 222 and 228), for the period 1797–1800.

[e] 1805, Milburn (1813, Vol. 2, p. 153). This total may include some intra-Indian trade, and may omit the value of the EICs trade with the United Kingdom, each of which totaled around 6 million rupees.

[f] 1814–1815, 1828–1829, Chaudhuri (1971, pp. 25–26). The 1814–1815 figure is based on Prinsep's estimates, and would appear to be low. Both include silk piece goods.

[g] 1833–1850, *SP* 1852–1853 XCIX 13. Yarn accounts for about 5% of the total.

[h] 1851–1857, *SA,* Vol. 5, p. 43. Converted from £.

[i] 1830–1838, *SP* 1840 VII 490.

[j] 1795–1800, Milburn (1813, Vol. 2, p. 117). May include silk piece goods. The sale value in England was 11,753 (Milburn, 1813, Vol. 2, pp. 178, 179).

[k] Sum of averages for private trade and company trade. Private trade from Milburn (1813, Vol. 2, p. 222), for 1800–1805; company trade from Milburn (1813, Vol. 2, p. 235), multiplied by 0.55 to convert to India invoice value. See Chaudhuri (1978, Chap. 12) for evidence of even higher mark-ups previously.

[l] 1812–1832, Mitra (1978, p. 186), after Trevelyan. Agrees with MacGregor (1850, p. 412).

[m] 1800–1809, *SP* 1812–1813 VIII 475, may include silk piece goods.

[n] 1810–1811, *SP* 1812–1813 VIII 475; 1814–1819, *SP* 1820 V 419. May include silk piece goods, Agrees with MacGregor (1850, p. 412).

[o] 1828–1838, *SP* 1840 XXXVII 245.

[p] 1845–1846 *SP* 1847–1848 LXII 16. Value figures are 40% higher than those given in *SP* 1852–1853 XLIX 13 for correxponding years.

[q] 1790–1809, Milburn (1813, Vol. 2, pp. 234 and 235). Evaluated at sale price in United Kingdom and converted from £. Totals are about 40% higher than those given in Davis's (1979) appendixes, which include China trade. Milburn's data is consistent with *SP* 1847–1848 LXI 127.

[r] 1810–1829, *HLJ* 1830, pp. 1386–1387. Evaluated at sale price in United Kingdom, which is about 40% higher than corresponding totals in Davis's (1979) appendixes, which also include China trade.

[s] 1797–1806, Milburn (1813, Vol. 2, p. 222). Value term is sale value in United Kingdom, which is almost double invoice price in India.

[t] 1833–1839, *SP* 1840 489.

[u] 1823–1825, Tripathi (1956, p. 202). Consistent with *SP* 1831 VI 169, and *SP* 1847–1848 LXI 127.

TABLE 3—*Continued*

[v] 1792–1809, *SP* 1812–1813 VIII 475. May include column 17.
[w] 1818–1819, *SP* 1820 VI 419. May include column 17.
[x] 1793–1858, Davis (1979) appendixes. Middle three years of decades; converted from £.
[y] 1827–1829, *HLJ*, 1830, p. 1394.
[z] 1828–1838, *SP* 1840 VIII 490. Between 10 and 20% was sent to other parts of India, although some of this was eventually exported.
[za] 1814–1828, *HLJ*, 1830, p. 1394.
[aa] 1828–1838, *SP* 1840 XXXVII 245. Consistent with *SP* 1840 XXXVII 245.
[bb] 1842–1846, *SP* 1847 LIX 335.
[cc] 1825–1828, *HLJ*, 1830, p. 1401. Values originally in £. Item is sale value in United Kingdom, not value in India.
[dd] 1830–1838, *SP* 1840 VIII 489.
[ee] 1829, *SP* 1829 XXII 107. Re-exports were 55% of imports.
[ff] 1836–1837, *SP* 1837–1838 XLV 477. Re-exports were about two-thirds of imports.
[gg] 1811–1828, *HLJ*, 1830, p. 1270. Values originally in £. Consistent with *SP* 1820 VI 419 and *SP* 1847–1848 LXI 127.
[hh] 1793–1809, *SP* 1847–1848 LXI 127. In 1817 to 1819 about 70% of nankeens were re-exported, in 1829 20% were re-exported. 1802–1808 consistent with Milburn (1813, Vol. 2, p. 514). Chao (1977, p. 82) gives value data for world export equivalent to over double that presented here. Nankeen cloth exports were nil from 1834 to 1866.

TABLE 4
Price Indices in Britain, 1800–1872 (1815–1816 = 100)

Year	General 1	General 2	Cloth 3	Yarn 4	Other exports 5	Cotton 6	Cloth ÷ raw cotton 7	Yarn ÷ cotton 8
1800	131	114	(153)	(108)		(84)		128
1815–1816	100	100	100	100	100	100	100	100
1828–1830	85	72	45	38	60	29	142	126
1843–1845	73	70	24	29	49	22	101	
1870–1872		76	24	45	50	40	57	

Sources. Column 1 is the Gayer–Rostow index, column 2 is the Rousseau index, both from Deane and Cole (1967). Columns 3–7 are from Imlah (1958, Tables II and IV). The cloth price for 1800 is the ratio of calculated average prices at the EICs sales in London of imported Indian piece goods, from MacGregor (1850, pp. 412, 413, and 418). The rest of column 3 is consistent with Sandberg (1974, pp. 239–240). Column 8 and the first entries in columns 4 and 6 (which refer to 1803–1805) are from MacGregor (1850, pp. 806–807). The average count of the yarn referred to is 25, which is rather coarse. Utilizing Ellison (1968, p. 55) and MacGregor (1850, p. 807), price indices for "40s" would be 1779, 488; 1799, 299; 1830, 37 (1815–1816 = 100). Pre-1815 prices for higher count yarns were even higher.

was the equivalent of 25 million pounds in the 1950s.[10] We have inserted in columns 11 and 12 of Table 5 time series on hand spinning, which, although based on very fragmentary evidence,[11] do allow a more complete vision of the whole Indian textile sector by indicating limits on the relative orders of magnitude of hand spinning inside it. For the early years,

[10] Robson (1957, p. 19). It is possible that handicraft spinning had reached its low after 1880 but before 1930, from which it rebounded due to the economic and political factors mentioned in the text. This possibility would not alter our main conclusions.

[11] Factors include trends in mill consumption and exports of raw cotton, and the production estimates as reported by the International Institute of Agriculture, together with yield data from Harnetty (1972, p. 94) and Heston (1973), and the regional production estimates of Harnetty (1972, p. 54) and McAlpin (1975, p. 666). One other major consideration is the estimate cited by Mann (1968, p. 64) of Indian consumption of cotton at 2½ pounds per person. This is comparable to estimates made for other pre-industrial cotton growing societies. For China, see Feuerwerker (1970) and Chao (1977). For Japan, see the production data in Okhawa *et al.* (1966, p. 178), and imports from Seki (1956, pp. 302–303). Based on these and other sources, the author has estimated production and consumption for the 1870–1930 period for both countries; in 1870, per capita consumption of cotton in China was 3 pounds per year, and 2.6 pounds in Japan. See also Ellison (1968, p. 144). Tables are available on request. In contrast, average English consumption in 1850 was 7½ lb, up from about ¼ lb in 1773. Compare Deane and Cole (1967, pp. 8, 144, and 145) with Robson (1957, Appendix Table 1).

For the conversion of hand woven textiles, we have followed the Indian Tariff Board (India, 1927), Utley (1931, p. 286), Wadsworth and Mann (1931, p. 120), and Gandhi (1930, p. 85) in using 4 yards of cloth per pound of cotton.

TABLE 5
Indian Textiles, 1880–1930

Year	Machine-spun yarn (m. lb)					Cloth from machine-spun yarn (m. yd)					Cloth from hand spun yarn		Approximate totals	
						Domestic production								
	Raw cotton. Mill consumption	Domestic production	Imports net of pre-exports	Exports	Domestic consumption	By machine	By hand	Imports net of re-exports	Exports	Domestic consumption	Assumed hand spun yarn (m. lb)	Cloth equivalent (m. yd)	Total Indian production (m. yd)	Total Indian consumption (m. yd)
1880–1884	162	151	42	43	150	238	400	1766	36	2368	150	600	1200	3000
1885–1889	323	261	49	90	220	344	600	1972	60	2856	140	560	1500	3400
1890–1894	476	381	45	162	264	429	680	2018	171	2956	130	520	1600	3500
1895–1899	574	463	49	209	303	477	812	1968	145	3107	120	480	1700	3600
1900–1904	665	532	28	234	325	545	846	1992	120	3263	110	440	1800	3700
1905–1909	787	652	35	251	436	801	1070	2174	119	3926	100	400	2200	4300
1910–1914	807	652	35	183	503	1140	1045	2528	123	4594	90	360	2500	5000
1915–1919	821	663	22	142	543	1545	858	1397	226	3574	80	320	2700	3900
1920–1924	832	679	48	67	661	1742	1188	1387	195	4142	70	280	3200	4400
1925–1929	857	774	48	45	777	2176	1481	1807	164	5300	60	240	3700	5500

Sources. The series for cloth from hand spun are the author's estimates, as described in the text. For 1899–1929, all other series are from the Indian Tariff Board (India, 1927), Appendixes III and IV. For 1925–1929, sources are Indian *Statistical Abstract*, and Utley (1931, p. 286). For 1880–1899, raw cotton consumption in mills is given by the Indian Tariff Board (India, 1927), Appendix II, combined with Pearse (1930) for 1880–1884. The domestic production of machine spun yarn is estimated to be the same average fraction of mill consumption of raw cotton before 1900 as it is stated (implicitly) to be for the post-1900 period. All data on traded yarn or cloth for the pre-1900 period is from the Indian *Statistical Abstract,* various years. The separation of machine spun yarn into hand woven and machine woven is assumed to follow the ratio of machine looms to machine spindles for the pre-1900 period. The conversion ratio for yards of cloth from pounds of machine spun yarn is assumed to be 4.7 in mills, 4.0 in hand weaving.

changes of 50 million pounds in our estimate of hand spinning, or by 33%, would alter our total consumption figure by about 7%, and our total production estimate by 16%.

During the period 1880–1914, there was a broadly continuous growth in Indian machine production of cloth. Hand weaving appears to have grown,[12] in spite of the large decline we assume for hand spinning. Note also that more machine spun yarn was consumed by hand weaving than by machine looms up until the 1910s, over half a century after the mill industry became established. Furthermore, between 1880 and 1913 the growth of imports was equaled by the growth of mill production of cloth. Cloth imports peaked in 1913, and declined markedly during World War I. They were not able to recover their market after the war for two reasons: the imposition of protective tariffs in India, and the nationalist Swadeshi movement. Factory production of cloth, having surpassed both hand weaving and imports during the war, continued to rise thereafter, and India finally re-established herself as a net exporter of cotton textiles in the 1940s. Our estimates of per capita consumption[13] are 11 yards in 1880, 15 yards in 1913, and 17 yards in 1930. Per capita imports were 1 yard in 1840, 7 yards in 1880,[14] 8 yards before World War I, and 5 yards

[12] The future of hand weaving continued to be an important issue after World War II; see Mehta (1954, Chap. 4).

[13] All estimates of Indian population in the text are interpolated from McEvedy and Jones (1978), who suggest the following totals: 1800, 190 million; 1850, 230 million; 1900, 290 million; 1925, 330 million. In contrast, Morris (1974) suggested 197, 237, 285, and 315 million, respectively. There has been a tendency to raise the estimated population for 1800; Morris *et al.* earlier (1969, p. 149) had cited a "commonly accepted estimate" of 100 to 125 million for 1800.

[14] Hunter (1886, p. 600) stated that "it may be roughly estimated that about three fifths of the cotton cloth used is woven in the country from native thread or from imported twist." Farnie (1979, p. 119) cites this passage in his discussion of the mutual importance of the Indian market and British production. Our corresponding estimate is only two-fifths. Hunter's fraction, combined with well-measured import totals and fairly reliable estimates of machine spun yarn, implies a volume of 500 million pounds of hand spun yarn. This would raise the per capita consumption figure to 17 yards of cloth, or over 4 pounds of cotton, which seems too high. Given Hunter's general authority, the discrepancy is puzzling. As we shall argue below, acceptance of the 17 yards per capita consumption figure for the early 1880s would not invalidate our conclusion that a rise in per capita imports from 1 yard in 1850 to 7 yards in 1880 severely hurt handicraft activities (in the face of a small rise in per capita income), but it would be difficult to explain the implicit vertiginous drop in hand spinning between 1880 and 1930, and a near stagnation of overall consumption in spite of a 25% increase in population and a 20% increase in per capita income (according to both Mukerji and Heston). Unfortunately, reliable statistics on the production of raw cotton, from which one could deduce handicraft production by subtracting exports and mill consumption, are not available.

We might also note here that the use by Wright (1974) of Indian exports to the United Kingdom as a proxy for total Indian exports of raw cotton seriously underestimates the latter. In 1880 the United Kingdom only received about one-fifth of total Indian cotton exports, according to the Indian *Statistical Abstract*. Hanson's (1979) critique of Wright's argument also ignored developments in Asian textile trade.

in 1930. By 1929, the respective shares of total Indian cloth consumption were Indian mills, 38%, imports 32%, hand weaving using mill yarn, 26%, and hand weaving using hand spun yarn, 4%.

Although it is not a central focus of our paper, a few comments on the factors affecting the growth of industrial production are perhaps appropriate. The opening of the Suez canal lowered external transport costs considerably, while the expansion of railroads lowered internal costs (McAlpin, 1975), increasing the supply of cotton and expanding the domestic market for piece goods. Table 6 supports our conjecture that raw cotton in India was relatively cheaper before the cotton famine, giving effective protection to the fledgling industry. Note also in Table 6 that the relative price of yarn and cloth, compared to the overall price index, fell by almost half between 1873 and 1900, in spite of a fall of the Indian rupee with respect to the British pound.[15] Finally, there is a reversal of the trend in the relative prices of cotton and cloth after the start of World War I, which continued after the wartime scarcities were over. This may be a reflection of the postwar tariffs in India.

Earlier we suggested a five-part periodization of the Indian textile experience. We shall now argue that the most severe employment effects of the so-called de-industrialization occurred during the first and third of these stages, with the third having the greatest impact.

In 1790, production for export was not large compared to home consumption in India. Robson (1957) puts total annual exports at 50 million yards during the 1790s; assuming a population of 190 million and consumption at 9 yards per capita[16] would imply that exports were less than 3% of total production, by volume. Even if the average labor intensity of exports was three times that of domestically oriented production, exports would have accounted for less than 10% of the total labor input in textiles.

Our analysis of employment shall calculate for various periods the equivalent number of full time job equivalents (FTJEs) involved in production. It is clear that spinning has more frequently been a part time activity, and we shall separate spinning from weaving later on, but, in our opinion, treatment of the full employment impact of textiles should incorporate both groups. We can utilize data presented in Prakesh (1974) to estimate that the total employment in 1790 was between 400,000 and 500,000 FTJEs.[17] The reader will recall that, on the basis of the discussion

[15] This supports Ryan's (1981) criticism of Nugent (1973) that it was factors other than the rupee devaluation which spurred, in this case, exports of Indian yarn.

[16] The per capita consumption figure is that of 1850, which is, as noted, somewhat smaller than our estimates for 1880 and afterward. The main defense of this assumption is convenience; it would have to be two or three times larger for exports to have been significant in overall production, and this is clearly unrealistic.

[17] Using data from a variety of sources, Prakesh estimated that the production (for

TABLE 6
Prices in India, 1850–1930 (1873 = 100)

Year	CPI	Yarn	Cloth	Raw cotton
1850	75		(89)	(48)
1862	93		(133)	(82)
1873	100	100	100	100
1879–1881	105	80	79	90
1889–1891	111	74	77	91
1899–1901	124	61	78	77
1909–1911	144	88	94	119
1919–1921	326	251	286	201
1929–1931	199	110	139	110

Sources. CPI data from Singh (1965, p. 685). 1850 data is source's statistic for 1857. Yarn, cloth, and raw cotton prices for 1873 and afterward from Indian *Statistical Abstract*, various years, representing rupee prices of standard types of exported yarn and imported cloth. Earlier cloth prices from Sandberg (1974, p. 24). Earlier raw cotton prices calculated from data in Mann (1968, pp. 130 and 132), Harnetty (1972, p. 56), and the Indian *Statistical Abstract*, which gives only values. This may overstate the increase in prices. According to Ellison (1968, Table 1), the price of "Dhol. Fair" rose only 16% between 1850 and 1873, and it is difficult—but not impossible—to attribute the resultant differential to a lowering of transport costs.

relating to Tables 3 and 4, we estimate the decline between 1790 and 1830 of "real" exports, and hence of export related employment, at two-thirds of the total, let us say 300,000 FTJEs, or about 0.2% of the population. This drop was not evenly distributed in the economy, however. The data in Table 3 show that the value of Calcutta's exports fell from 14 to 1 million rupees, or by 95%, while that of the rest of the subcontinent declined from 11 to 8 million rupees, or by only 30%. Applying these ratios to the total employment drop yields a decline in Bengal of 244,000,[18] and for the rest of India a drop of 56,000 FTJEs. Bengal's exports of silk textiles did increase, but might have absorbed only 10,000 weavers, and few others, as silk preparation is much less labor intensive than cotton. Referring to the data in Table 1, we estimate that the increase in imported yarn might have given employment to 20,000 weavers (and, of course, to no spinners).[19]

export) of 577,690 pieces, equivalent to 9.6 million square yards, would have involved between 75,620 and 99,804 FTJEs, as follows: 5–6 workers per loom (including 1.5–2 weavers), and an annual production per loom of 36 pieces, totaling 640 square yards per year, at 17 square yards per piece. This works out to around 125 yards per person per year, or 8 FTJE per 1000 yards. Morris's reading of the productivity data in Morris, *et al.* (1969, p. 128) together with Robson's (1957, p. 1) export figure imply a total employment of 550,000 FTJEs.

[18] This is much lower than Sinha's (1970, p. 8) figure of one million in Bengal alone.

[19] This is not as positive a picture as that described by Kumar (1972, pp. 76–77), and weakens one of the bases of Morris's argument cited earlier.

These calculations highlight the regional impact of the decline in Indian textile exports. For the country as a whole, the drop was certainly significant—perhaps totaling two-thirds—but not a large fraction of the total production.[20] Exports *from* the Bengal presidency and *to* Great Britain were the two parts of the trade that were hardest hit. As Bengal was the seat of the East India Company and British rule, it is natural that reports originating there effectively exaggerated the overall impact on the country. An example is the phrase originally appearing in the British Governor General's report of 1834–1835, and later made famous by Marx, "the bones of the cotton weavers are bleaching the plains of India."[21] In addition to its reflection of a regional bias, the observation effectively ignores the fact that weavers were but a third of those involved in handicraft production, and that they did have some limited access to alternative employment, weaving silk and imported cotton yarn. That English commentators most frequently referred to the lot of weavers, not spinners or other textile workers, reflects the fact that they had greater contact with weavers, who in turn subcontracted with spinners and others. We should not forget that even before 1770 foreigners had often commented on the poverty-stricken lot of weavers, for which neither foreign competition nor famine can be blamed.[22]

As noted above, imports of cloth amounted to about 1 yard per person by 1850, which might have been 10% of Indian production. We now turn to the post-1850 period, when Indian production fell to less than 40% of Indian consumption, the rest being supplied by Lancashire.

Facile discussion of the "de-industrialization of India" can too easily overlook the fact that India ranked fourth worldwide in mill consumption of cotton in 1913 (behind the U.K., U.S. and Germany).[23] Moreover, mechanized production of yarn and cloth both grew by larger amounts than their corresponding imported totals after 1880. Therefore,any significant "de-industrialization" solely attributable to British exports would have occurred before that date. So we shall concentrate on the years 1850–1880, when cloth imports increased by 1500 million yards, or 6 yards per person, compared to our estimated total consumption of about 11 yards per capita.

The data presented earlier permit the calculation of the degree to which these imports replaced handicraft production, as contrasted to merely supplying expanding demand due to income and population growth, as

[20] Contrast Sanderson (1951, p. 146): "[by 1850] this entire Indian export of cotton goods has been destroyed by the tariff policies of the British government," which is incorrect both in magnitude and causality.

[21] See the discussion in Sandberg (1974, p. 166) and Morris *et al.* (1969, p. 165, ftn. 152). Feuerwerker (1970, p. 338) offers a similar quotation from Marx regarding China.

[22] See Chaudhuri (1978, p. 268). The decline of the Mughal empire should also account for a previous drop of specialty weaving, see Ghosal (1966, p. 21).

[23] Robson (1957, p. 19). Because of the pervasiveness of handweaving the ranking in terms of machine made cloth might have been lower.

was suggested by Morris. The basic procedure is to estimate total consumption in 1850, from which artisan production is derived by subtracting imports. This involves assuming imported and handicraft textiles are comparable on a volume basis (weight or length), but is incapable of distinguishing between shifts of and movements along a hypothetical supply curve for handicrafts. Such an analysis would involve consideration of changing opportunity costs of handicraft activities, lowered transportation costs, and a model much too detailed for the available data.[24]

One early econometric work on the demand for Indian textiles is the article by Desai (1971), whose import demand functions exhibited high price elasticities. Unfortunately, only one of those equations used a proxy for income, and domestic prices of imports were not deflated by an overall price index. Using somewhat different time series than Desai's,[25] and including those two variables, we present in Table 7 demand functions for both imports and consumption. The first two equations suggest that Desai's results are replicated for our sample. Inclusion of income and relative prices in Eqs. (3) and (4) lowers the price elasticity considerably. Table 5 presented estimates of total Indian cotton textile consumption for the period 1880–1930. When combined with the price and income data used in Eqs. (1)–(4), this series yields Eq. (5) in Table 7, which can be projected back in time to yield an estimate of total Indian consumption in 1850 of 2130 million yards, or 9 yards per capita. Our estimates of post-1800 production and consumption are shown in Fig. 1.

For the conversion of cloth production to employment figures, we shall use the 20th-century data cited by Prakesh (1974); a fulltime weaver would produce 1000 square yards per year, and need two or three spinners to produce the yarn, or approximately 3.5 FTJE/1000 linear yards of cloth.[26] On the basis of the calculations in Table 8,[27] this suggests an

[24] One important factor causing a shift would be the changing relative price of raw cotton and cloth, as shown in Table 6, which, *ceteris paribus*, would shift handicraft supply to the left. Lacking Indian handicraft production data, we cannot pursue this. For a discussion of studies applied to the United States and the world market which touch on these issues, see Rostow (1975, pp. 740–745).

[25] Price data from the Indian *Statistical Abstract*, after 1873. Earlier data on the CPI from Singh (1965, p. 685) and, for cloth, Sandberg's series of prices in England (1974, p. 249). The per capita income estimates are M. Mukerji's, reported in Singh (1965, p. 689).

[26] Prakesh (1974), footnoes 35–37. In aggregate, these coefficients are comparable to those used for China by Feuerwerker (1970). Also, one report claimed that the productivity in the pre-industrial England of 1720 was 140 yards per person, Wadsworth and Mann (1931, p. 120). The high ratio of spinners to weavers may indicate the etymological origin of the word spinster. Comparison with our data in footnote 17 shows that we are implicitly treating post-1850 handicraft production as half as labor intensive as earlier production for exports. Furthermore, we are ignoring late 19th century improvements in weaving as being of secondary order of magnitude compared to our other approximations.

[27] The reader will notice that the calculations in Table 8 for 1850 ignore the employment effects of exported handicraft cloth, which cannot have been significant compared to the totals.

TABLE 7
Regression Results[a]

		R^2	Period
(1)	Imports = 23.0 − 3.71 Pcloth (17.0) (12.9)	0.67	1815–1913
(2)	Imports = −12.5 − 0.69 Pcloth + 2.11 Income (3.78) (5.15) (8.05)	0.90	1857–1900
(3)	Imports = 9.27 − 1.22 Pcloth/CPI (49.7) (11.7)	0.77	1857–1900
(4)	Imports = −13.21 − 0.62 Pcloth/CPI + 1.98 Income (4.94) (6.49) (8.43)	0.92	1857–1900
(5)	Consumption = −0.19 − 0.30 Pcloth/CPI + 0.80 Income (0.15) (2.79) (7.09)	0.54	1880–1930

[a] All variables in logarithms. t Statistics in parentheses. Pcloth, price of cloth; CPI, average price level in India. For sources, see text.

absolute fall in Indian textile employment for 1850 to 1880 of 3.6 million FTJEs, or almost 1½% of the 1850 population of 250 million.[28] This estimate is subject to many errors, particularly the estimate of hand spun yarn in Table 5, the assumed growth of population and per capita income, and the coefficient relating cloth production to FTJEs, so that a range of 2 to 6 million FTJEs might be more realistic.[29] Some preliminary re-estimates of Eq. (5) indicated that the calculated change in cloth consumption over the 1850–1880 period was not overly sensitive to increases of even 200% in estimated hand spinning in 1880, due to its small part of total consumption in 1880, as well as the resultant change in the income elasticity in Eq. (5). Similarly, our productivity data are rather crude, and potentially capable of considerable refinement with a more thorough search of the relevent specialized literature.

We have identified as distinct phases of Indian textile history the period of the decline of the export market, the decline of handicraft production, and the rise of domestic industry. Some employment effects of the first two phases have been estimated. Now we shall turn to the broader issue

[28] This is twice the absolute number estimated by Feuerwerker (1970) as the employment loss in China due to imports during 1870 to 1910. As a fraction of the total population, the difference would be four times larger. Ironically, China's foreign competition was not British piece goods but yarn from India and, later, Japan.

[29] Unpublished results generously made available to the author by Alan Heston suggest a smaller, though still positive, growth of per capita income during the period 1868–1882/1883. For a given hypothesized growth of population, the assumption of a smaller increase of per capita income over 1850 to 1880 would raise the estimated level of consumption (and hence production) in 1850, leading to an increase in our estimated FTJE loss due to imports.

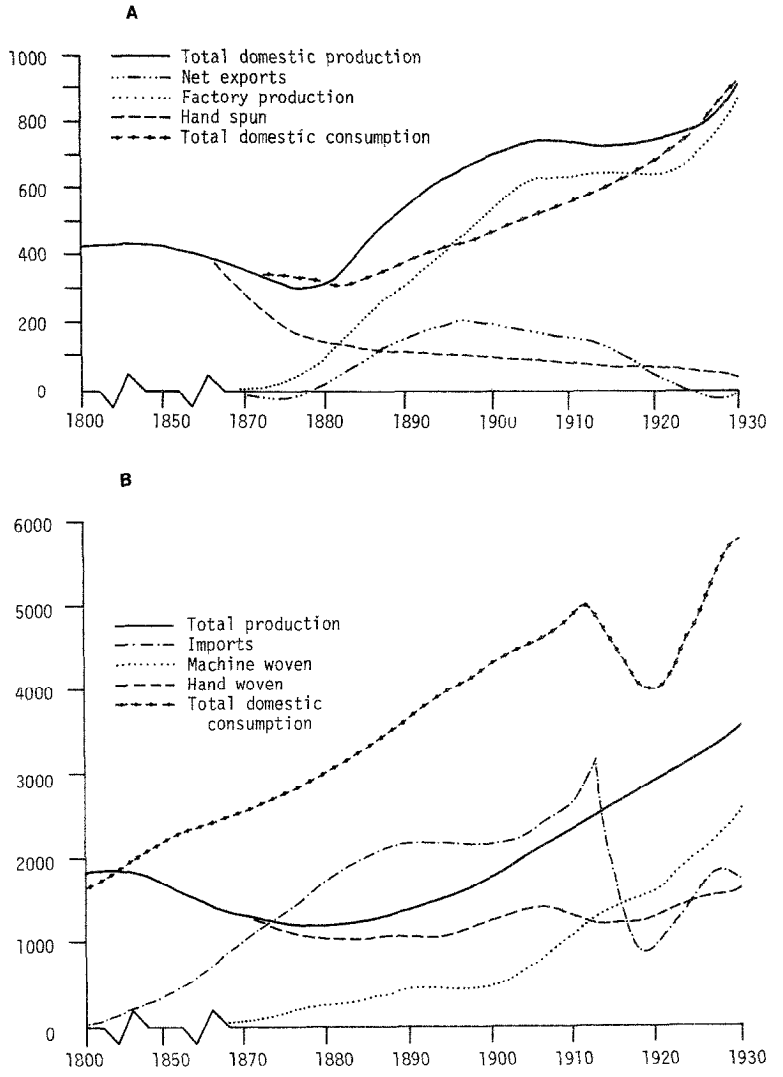

FIG. 1. Cotton goods in India, 1800–1930. (A) Yarn, million pounds; (B) cloth, million yards. The two graphs are constructed on the same scale: 4 yd of cloth = 1 lb of yarn.

as raised by Morris; that of an absolute decline in handicrafts (and/or hand weaving) over the whole century. Judgments on this matter depend heavily on the population data utilized, about which estimates show even more variance than those of per capita income levels. Morris's basic point about the importance of population growth counteracting the decline of the export market is clearly justified by our calculations in Table 9, for the period 1800–1850. In the second half of the century, however, the main factor sustaining hand weaving was the growth of the country's

TABLE 8
Cotton Textile Handicraft Employment, 1850, 1880

1850 Estimated consumption	2,100 m. yd	
−cloth imports	−300	
Estimated production	1,800 m. yd	
−cloth equivalent of imported yarn	−100 m. yd	
Handicraft production of cloth from hand spun yarn	1,700 m. yd	
Estimated employment, @ 3.5 FTJE/1000 yd (hand spun)		= 5,950,000 FTJEs
Estimated employment, @ 1.0 FTJE/1000 yd (machine spun)		= +100,000
Total estimated employment, 1850		= 6,050,000
1880 Estimated hand woven from hand spun yarn	600 m. yd	
Estimated hand woven from machine spun yarn	400 m. yd	
Estimated employment, @ 3.5 FTJE/1000 yd (hand spun)		= 2,100,000 FTJEs
Estimated employment, @ 1.0 FTJE/1000 yd (machine spun)		= +400,000
Total estimated employment, 1880		2,500,000
Estimated decline, 1850–1880	3,550,000 FTJEs	

TABLE 9
Summary Estimates of Indian Handicraft Textile Employment, 1800–1929

	Using hand spun yarn		Using machine spun yarn		Total (million FTJEs)	Weavers only
1800 High estimate	1810 × 3.5	+	0	=	6.3	
	1810 × 1.0	+	0	=		1.8
Low estimate	1090 × 3.5	+	0	=	3.9	
	1090 × 1.0	+	0	=		1.1
1850	1700 × 3.5	+	100 × 1.0	=	6.0	
	1700 × 1.0	+	100 × 1.0			1.8
1880	600 × 3.5	+	400 × 1.0	=	2.5	
	600 × 1.0	+	400 × 1.0	=		1.0
1913	360 × 3.5	+	1140 × 1.0	=	2.4	
	360 × 1.0	+	1140 × 1.0			1.5
1929	240 × 3.5	+	1480 × 1.0	=	2.3	
	240 × 1.0	+	1480 × 1.0	=		1.7

Note. The estimates for 1800 assume population are 190 and 110 million, respectively, a per capita cloth consumption of 9 yd, and that exported cloth is twice as labor intensive as ordinary cloth. 1800 exports from Robson (1957, p. 1). 1850 and 1880 production totals from Table 6; 1913 and 1929 totals from Table 5.

The calculations convert cloth quantities to estimated employment on the basis of 3.5 FTJE/1000 yd (total), and 1.0 FTJE/1000 yd (weavers).

spinning mills,[30] and hand spinning itself probably declined considerably. Our conclusion is that total handicraft textile employment fell absolutely over the entire century, and that weaving declined down to 1880. Whether it is more appropriate to look at total handicraft activity or only weaving, and whether the kind of hand weaving that grew up with the mills should be compared with the "traditional" activity are two questions that our analysis is not designed to answer.

This paper has only treated one aspect of the de-industrialization debate. A recent summary of the many issues under discussion is Robb (1981). A fuller evaluation of the quantitative arguments presented here would need an appreciation of the alternatives available to displaced handicraft workers, on which much work still needs to be done.[31]

REFERENCES

Arasaratnam, S. (1980), "Merchants and the Company: The Handloom Industry in South-eastern India 1750–1790." *Indian Economic and Social History Review* **17**, 257–282.

Bagchi, A. K. (1976), "De-industrialization in India in the Nineteenth Century: Some Theoretical Implications." *Journal of Development Studies* **17**, 135–164.

Baran, P. A. (1957), *The Political Economy of Growth*, New York: Monthly Review Press.

Chao, K. (1977), *The Development of Cotton Textile Production in China*, Cambridge, Mass.: Harvard Univ. Press.

Chaudhuri, K. N. (1966), "India's Foreign Trade and The Cessation of the East India Company's Trading Activities, 1828–40." *Economic History Review* **19**, 344–363.

Chaudhuri, K. N. (1968), "India's International Economy in the Nineteenth Century: An Historical Survey." *Modern Asian Studies* **2**, 31–50.

Chaudhuri, K. N. (1971), *The Economic Development of India Under the East India Company, 1814–58*, Cambridge: Cambridge Univ. Press.

Chaudhuri, K. N. (1974), "The Structure of Indian Textile Industry in the Seventeenth and Eighteenth Centuries." *Indian Economic and Social History Review* **11**, 127–182.

Chaudhuri, K. N. (1978), *The Trading World of Asia and the English East India Company 1660–1760*, Cambridge: Cambridge Univ. Press.

Davis, R. (1979), *The Industrial Revolution and British Overseas Trade*, Atlantic Highlands, N.J.: Humanities Press.

Deane, P., and Cole, W. A. (1967), *British Economic Growth*, Cambridge: The University Press. 2nd ed.

Desai, M. (1971), "Demand for Cotton Textiles in Nineteenth Century India." *Indian Economic and Social History Review* **10**, 337–361.

Desai, R. C. (1953), *Standard of Living in India and Pakistan 1931–32 to 1940–41*, Bombay: Popular Book Depot.

Dewey, C. (1978), "The End of the Imperialism of Free Trade: The Eclipse of the Lancashire Lobby and the Concession of Fiscal Autonomy to India." In C. Dewey and A. G.

[30] Once again, we would hypothesize that transport costs inhibited a pre-1870 growth of Indian handweaving using imported yarn, just as transport costs and tariffs helped protect English spinners from imported Indian yarn before the mid-18th century spurt of inventions.

[31] See, e.g., the July 1975 issue of *Explorations in Economic History*. According to official statistics, the employment in Indian textile mills was only 44,000 in 1880, and 350,000 in 1930. The early 19th century experience of Bengal is treated by Ghosal (1966). For a discussion of some other Asian countries, see Resnick (1970).

Hopkins (Eds.), *The Imperial Impact: Studies in the Economic History of Africa and India*. Atlantic Heights, N.J.: Humanities Press.

Dutt, R. (1956), *The Economic History of India in the Victorian Age*, London: Routledge & Kegan Paul. 8th Impression.

Ellison, T. (1968), *The Cotton Trade of Great Britain*, New York: A. M. Kelly. New impression of 1886 edition.

Farnie, D. A. (1979), *The English Cotton Industry and the World Market, 1815–1896*, Oxford: Oxford Univ. (Clarendon) Press.

Feuerwerker, A. (1970), "Handicraft and Manufactured Cotton Textiles in China, 1871–1910." *Journal of Economic History* **30**, 368–378.

Gadgil, D. R. (1971), *The Industrial Revolution of India in Recent Times, 1860–1939*, Bombay: Oxford Univ. Press. 5th ed.

Gandhi, M. P. (1930), *The Indian Cotton Textile Industry*, Calcutta.

Ganguli, B. N. (1977), *Indian Economic Thought, Nineteenth Century Perspectives*, New Delhi: Tata McGraw-Hill.

Ghosal, H. R. (1966), *Economic Transition of the Bengal Presidency*, Calcutta: Firma K. L. Mukhopadhyay.

Govil, K. L. (1950), *The Cotton Industry of India*, Bombay: Hind Kitabs. 2nd ed.

Hanson, J. R. (1979), "World Demand for Cotton during the Nineteenth Century: Wright's Estimates Re-examined," *Journal of Economic History* **39**, 1015–1021.

Harnetty, P. (1972), *Imperialism and Free Trade, Lancaster and India in the Mid-Nineteenth Century*, Manchester: The University Press.

Heston, A. (1973), "Official yields per Acre in India 1886–1947." *Indian Economic and Social History Review* **11**, 303–332.

Hunter, W. W. (1886), *The Imperial Gazetteer of India*, London: Trubner. Vol. VI.

Imlah, A. H. (1958), *Economic Elements in the Pax Britannica*, New York: Russell and Russell.

(India) (1927), *Report of the Indian Tariff Board*, Bombay: Government Central Press.

Institut International D'Agriculture, *International Yearbook of Agriculture Statistics*, various years, Rome.

Kumar, D. (1972), "Economic History of Modern India," *Indian Economic and Social History Review* **11**, 63–90.

MacGregor, J. (1850), *Commerical Statistics*, London: Whitaker. Vol. IV, 2nd ed.

Maddison, A. (1971), *Class Structure and Economic Growth. India and Pakistan Since the Moghuls*. New York: Norton.

Mann, J. (1968), *The Cotton Trade of Great Britain*, London: Frank Cass. Reprint of 1860 edition.

McAlpin, M. B. (1975), "Railroads, Prices and Peasant Rationality: India 1860–1900." *Journal of Economic History* **34**, 662–684.

McEvedy, C., and Jones, R. (1978), *Atlas of World Population History*, New York: Facts on File.

Mehta, S. D. (1953), *The Indian Cotton Textile Industry: An Economic Analysis*, Bombay: G. K. Ved.

Mehta, S. D. (1954), *The Cotton Mills of India 1854 to 1954*, Bombay: G. K. Ved.

Milburn, W. (1813). *Oriental Commerce . . .*, London: Black, Parry.

Mitra, D. B. (1978), *The Cotton Weavers of Bengal*, Calcutta: Temple Press.

Morris, M. D. (1963), "Towards a Re-interpretation of Nineteenth Century Indian Economic History," *Journal of Economic History* **23**, 606–618.

Morris, M. D., *et al.* (1969), *Indian Economy in the Nineteenth Century: A Symposium*. Delhi: Hindustan Publ.

Morris, M. D. (1974), "The Population of All India 1800–1951." *Indian Economic and Social History Review* **11**, 309–313.

Nugent, J. B. (1973), "Exchange Rate Movements and Economic Development in the Late Nineteenth Century," *Journal of Political Economy* **81,** 1110–1135.

Ohkawa, K., *et al.* (Ed.) (1966), *Estimates of Long Term Economic Statistics of Japan Since 1868.* Vol. 9. Agriculture and Forestry, Tokyo: Toyo Keizai Shinposha.

Parshad, I. D. (1932), *Some Aspects of Indian Foreign Trade, 1757–1893,* London: P. S. King.

Pearse, A. S. (1930), *The Cotton Industry of India,* London: Taylor Garnett Evans.

Prakesh, O. (1974), "Bullion for Goods: International Trade and the Economy of Early Eighteenth Century Bengal." *Indian Economic and Social History Review* **13,** 159–187.

Resnick, S. A. (1970), "The Decline of Rural Industry Under Export Expansion: A Comparison Among Burma, Phillipines and Thailand, 1870–1938," *Journal of Economic History* **30,** 51–73.

Rider, T. D. (1970), "Tariff Policy of the Government of India and Industrial Development 1894–1934." *Journal of Economic History* **30,** 278–280.

Robb, P. (1981), "British Rule and Indian 'Improvement'." *Economic History Review* **34,** 507–523.

Robson, R. (1957), *The Cotton Industry in Britain,* London: Macmillan.

Rostow, W. W. (1975), *How it all Began, the Origins of the Modern Economy,* New York: McGraw-Hill.

Ryan, J. S. (1981), "Silver and the Indian Economy, 1870–1892." Paper presented at the 22nd Annual Cliometrics conference.

Sandberg, L. G. (1974), *Lancashire in Decline,* Columbus: Ohio State Univ. Press.

Sanderson, G. D. (1951), *India and British Imperialism,* New York: Bookman.

Seki, K. (1956), *The Cotton Industry of Japan,* Tokyo: Japanese Society for the Promotion of Science.

Singh, V. B. (Ed.) (1965), *The Economic History of India, 1857–1956,* Bombay: Allied Publ.

Sinha, N. K. (1970), *The Economic History of Bengal, 1793–1848,* Calcutta: Firma K. L. Mukhopadhyay. Vol. III.

Thorner, D. (1962), *Land and Labour in India,* Bombay: Asia Publ. House.

Tripathi, A. (1956), *Trade and Finance in the Bengal Presidency, 1793–1833,* Bombay: Orient Longmans.

Utley, F. (1931), *Lancashire and the Far East,* London: Allen and Unwin.

Vicziany, M. (1979), "The Deindustrialization of India in the Nineteenth Century: A Methodological Critique of Amiya Kumar Bagchi." *Indian Economic and Social History Review* **14,** 105–147.

Wadsworth, A. P., and Mann, J. (1931), *The Cotton Trade and Industrial Lancashire 1600–1780,* Manchester: Manchester Univ. Press.

Wright, G. (1974), "Cotton Competition and the Post-Bellum Recovery of the American South." *Journal of Economic History* **34,** 610–635.