COTTON TEXTILE IMPORT SUBSTITUTION

BRITAIN, INDIA, JAPAN AND CHINA: 1790-1930

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Introduction

This is an essay about import substitution in cotton textiles in
Britain, India, China and Japan, over the period 1790-1930. We shall
try to trace the development of domestic production of machine made cotton
goods, and for the last three countries, get a rough order of magnitude
of its impact on both imports and traditional production. In taking
such a large subject we shall inevitably cover well trodden territory,
and moreover, touch on some of the oldest debates in political economy.
It is hoped that by looking at the interrelationships amongts these countries,
and by focusing on the interrelated processes of domestic production and import
port substitution, rather than mere exports and imports, we shall see some
things in a new way.

The outlines of the story are well known. Textiles led England's
transformation from an economically minor country in 1760 to the dominant
power during the nineteenth century. As different countries grew, the
main markets for England's exports shifted from Europe and the U.S. towards
what are now called underdeveloped countries, the most important of which
was India. That country chafed at what it felt were improper controls on
its own economic development. In the late nineteenth century, Japan essen-
tially repeated the British experience, exporting primarily to Asian markets.

Main trends in the world wide growth of the cotton industry can be
appreciated from Table 1 on page 8. The growth of mill consumption before WWI re-
presents a considerable substitution of hand-made textiles (of all fibres)
by machine made cottons, as well as increased consumption of clothing. The
most rapid growth of consumption was achieved during the mid-nineteenth

century when England dominated world production and especially trade. The decline of the percentages of production entering trade represents growth of home production in Britain's former customers, while the declining fortunes of Britain in world cotton textile trade represents competition from other exporting countries, such as the U.S. and Japan.

It might be noted that, in terms of post-WWII cotton production, the U.S. has a quarter of the world total, China and the Indian subcontinent combine for another quarter. The U.S. is still a major exporter of cotton, while India-Pakistan is a small net exporter, China a small importer, and Japanese imports far surpass Britain's. China and India have been major exporters of cotton goods, while Japan's relative position has declined, and England's disappeared.[1] A growing part of today's world exports originates in very low wage countries via multinationals.

Some lesser known facts of importance in our narratives are: 1) British cotoon textile import substitution in the late eighteenth century; 2) Japanese textile import substitution (against China and Korea) long before Meiji; 3) India became a net exporter of cotton yarns by the mid 1870's, a period when some look for the negative impact of British imports; 4) the start of Japanese cotton cloth exports was achieved without significant use of power machinery.

In addition to asserting a common pattern in these four countries' experiences, we shall also argue that traditional analysis has underplayed the role of "modern" domestic industries in displacing traditional or hand-craft production. More specifically, the dropping off of British textile exports to Asia, as had been the case in the rest of the world, was due more to growth of production in those countries than from competition from other

exporting countries.

Some intriguing "might have beens" are: 1) successful Indian adoption of British textile technology in 1820; 2) destruction of the Japanese textile industry because of imports in the 1870's; 3) development of alternative fiber sources with very high supply elasticities--synthetics or some tropical plant not suitable for growth in the U.S.

Import substitution is the process of expanding a country's domestic production to replace goods imported from abraod. Economic treatises usually describe this happening because of tariffs, although as we shall argue in our cases, this has not been so. Nevertheless, traditional econo- mic analysis is usually highly critical of governmental intervention by means of tariffs and subsidies for this purpose, except in the case if what is called an infant industry. The first use of the infant industry argu- ment has been traced by Viner to a case in England in 1645, directed against foreign linens and ironware. Import substitution industrialization has long been subject to sharp debate amongst economists, a recent example of criticism of current developing countries' policies is Krueger.

There are a number of reasons for choosing the cotton industry. As a basis for clothing, cotton was less important than both wool and other vegetable fibres, such as flax, in Europe in 1790. But cottons were the biggest growth sector of nineteenth century textiles. Worldwide, cotton textiles have been amongst the first major import items for mass consumption, and certainly the first major non-food, non-luxury, manufactured import. In policy discussions of underdeveloped countries, textiles-usually cottons-are the primary candidate for governmentally assisted import substitution pro- grams, due to the relative simplicity of the technology. Cotton textiles

were the "leading industry" in Great Britain's "take off to sustained economic growth", and developing countries' desire to emulate that success is strong.

Having said this, we must recognize that some parts of this analysis would be more complete if we included all textile fabrics, but this is not possible.

One topic to which our study relates, but which we shall not discuss nor evaluate directly is imperialism. The reader is referred to Sar Desai's first chapter for a recent overview of that literature.

Our initial date is chosen to encompass the initial acceleration of English cotton textiles, which happened at the expense of Indian exports. The terminal date avoids having to consider the separate effects of the depression following 1929, WWII, and the introduction of synthetics.

Our goal in including these four countries is to reach a fuller picture of what happened in each country as a function of developments in the other countries. While this is not too novel in Great Britain, nor perhaps also Japan, there are few attempts at such a global picture for India and China. We will also argue that there were common elements in their experiences, not usually recognized.

Moreover, Japan and India were the most important LDC cotton textile producers and exporters before WWI. Egypt and Peru had exported much raw cotton, but had not established a strong industry. Elsewhere in Latin America,Mexico, Columbia, and Brazil had flourishing industries, but their impact outside the region was important only as a relatively minor contributor to the decline in British exports. Hence, one interested in studying the imapct of imported textiles on LDC's, and their response, might well start with these particular

Asian countries. And of course, development economists looking at the impact of manufactured goods on cottage indistry must look at India and China.

There are two other issues in the standard economic development literature to which this subject relates; the debate over the marginal productivity of labor and the Malthusian doctrine. In what is particularly known as the Lewis-Fei-Ranis model, the agrarian sector of an inderdeveloped country is described as having expanded to the point where its marginal productivity is zero, and food production just covers the population's subsistence needs. If the marginal productivity of labor is zero, ceteris paribus, the peasant will not want to substitute purchased goods for home production of goods like cloth. Moreover, if a population has reached its Malthusian limit, further population increases will only be possible with the introduction of new technology or the increasing productivity of land via exchange of a high yielding crop such as cotton for a lower yield crop such as grains-- the classical argument of comparative advantage. The application of these arguments to countries like China and India has long been the subject of study.

Some common characteristics of these countries' import substitution experiences can be touched on here. As each started to manufacture cotton goods, there was significant competition from finer imported production. Machine spinning flourished before machine weaving, the latter often lagging a number of decades. Hand weaving survived after each country had become a net exporter of cloth. We will argue that tariffs were not an important factor in any country's cotton textile import substitution industrialization.

The faster rise of machine spinning contrasted to the continuance of hand weaving is explained by the relative time involved in home production

of yarn and cloth. One reads that it takes at least three spinners to keep one weaver busy (hence the origin of the English word spinster), and of course these activities are always supplemental to the main agricultural pursuits of traditional societies. Since purchasing machine made yarn frees up significant time for other activities while enabling the weaver to improve the strength of his/her product, it is quite understandable that hand spinning will be driven out much more quickly than hand weaving. Since (except in the case of England) imports usually created and supplied the markets for manufactured goods, import substitution will occur first in spinning.

We will follow various authors in reducing production of cloth to yards (or square yards) and expressing yarn quantities in pounds, or their equivalent in cloth yardage. When necessary, some comparisons will be made using monetary aggregates.

About two-thirds by weight of the product of the cotton plant is seed, which, incidentally, has considerable value in itself. We will refer to seedless or ginned cotton as raw cotton, to distinguish it from manufactured cotton cloth, or piece goods. Most of our data comes from secondary sources, and most tables are hidden in different appendices. Graphs have been prepared which represent the production in each country, based on the data in the appendices and their sources. Numerous time series have been prepared, with the goal of indicating long term trends. In these tables, annual averages are presented for ten year periods, or a sub-period, together with their sources. In many cases comparability and continuity considerations involve presentation of more than one source for the same period. There is a continual mix-up in the author's use of proper nouns or adjectives to refer to the

people inhabiting these islands off the north-west coast of Europe.

This introduction cannot be summarized better than did an illustrious predecessor. "It is right to state that it was the original intention of the author to have compiled the statistical tables illustrative of the trade [read-production and trade]; but that, at the request of several friends, [not true here] he was induced to edit a few remarks to lead the mind of the reader in their perusal, and to publish them in the form they now assume. As such, then, these pages are presented in their crude state. The author is cognizant he has much indulgence to crave for their incomplete and desultory character, put together without sufficient regard to order, but if he has committed any errors in the use of his figures, it is by inadvertance and not intention or want of care."[2]

TABLE 1
WORLDWIDE TRADE AND PRODUCTION OF COTTON TEXTILES IN SELECTED YEARS
(ANNUAL AVERAGES)

YEARS	WORLDWIDE MILL CONSUMPTION OF COTTON (m. lbs.)	PERCENTAGE OF PRODUCTION ENTERING WORLD TRADE	PERCENTAGE OF CLOTH PRODUCTION ENTERING WORLD TRADE	WORLD TRADE (1910-13=100)	BRITAIN'S PERCENTAGE OF WORLD PRODUCTION	BRITAIN's PERCENTAGE OF WORLD TRADE
1829-1831	420	55	---	7.9	57	70
1882-1884	4,000	38	45	51.7	37	82
1910-1913	10,500	28	31	100.0	20	58
1926-1928	12,200	23	23	95.4	12	39
1936-1938	14,000	16	18	76.2	9	28
1953-1955	16,800	10	12	57.1	5	12

SOURCE: Sandberg, after Robson

England

In 1790, England's major textile product both in production and exports, was woolens, not cottons.[3] She was struggling against cotton and silk textile imports from India and China, which had been the world's major non-woolen exporters. The West Indies were the chief exporters of cotton to England, and Europe was England's major textile market.[4] The eighteenth century had seen a series of protective measures for English textiles, but that industry needed inventions to increase its mechanical power, and cotton needed especially Whitney's cotton gin (1793)[5] before it became competitive.[6] These inventions combined with the relatively untouched productive capacity of the American South to provide England with its major export item for over a century.

England's potential supply of cotton from the West Indies was obviously limited. India, then under the East India Company, did not respond satisfactorily,[7] and the United States soon emerged as the major source of English supplies remaining so throughout our period. Although the expansion of production and especially exports of cotton in India and Egypt had profound effects on those countries, their impact in Britain was not generally significant except during the cotton famine caused by the U.S. Civil War. It is interesting to note that during this period U.S. cotton production increased sufficiently to enable its own domestic industry to surpass in volume the production of Great Britain, although U.S. textile exports were much smaller.

The story of the growth and decline of the British cotton textile industry is well known, and one can read of it in classics such as Mann and Ellison; some recent works are Edwards, Davis, Farnie, and Sandberg.
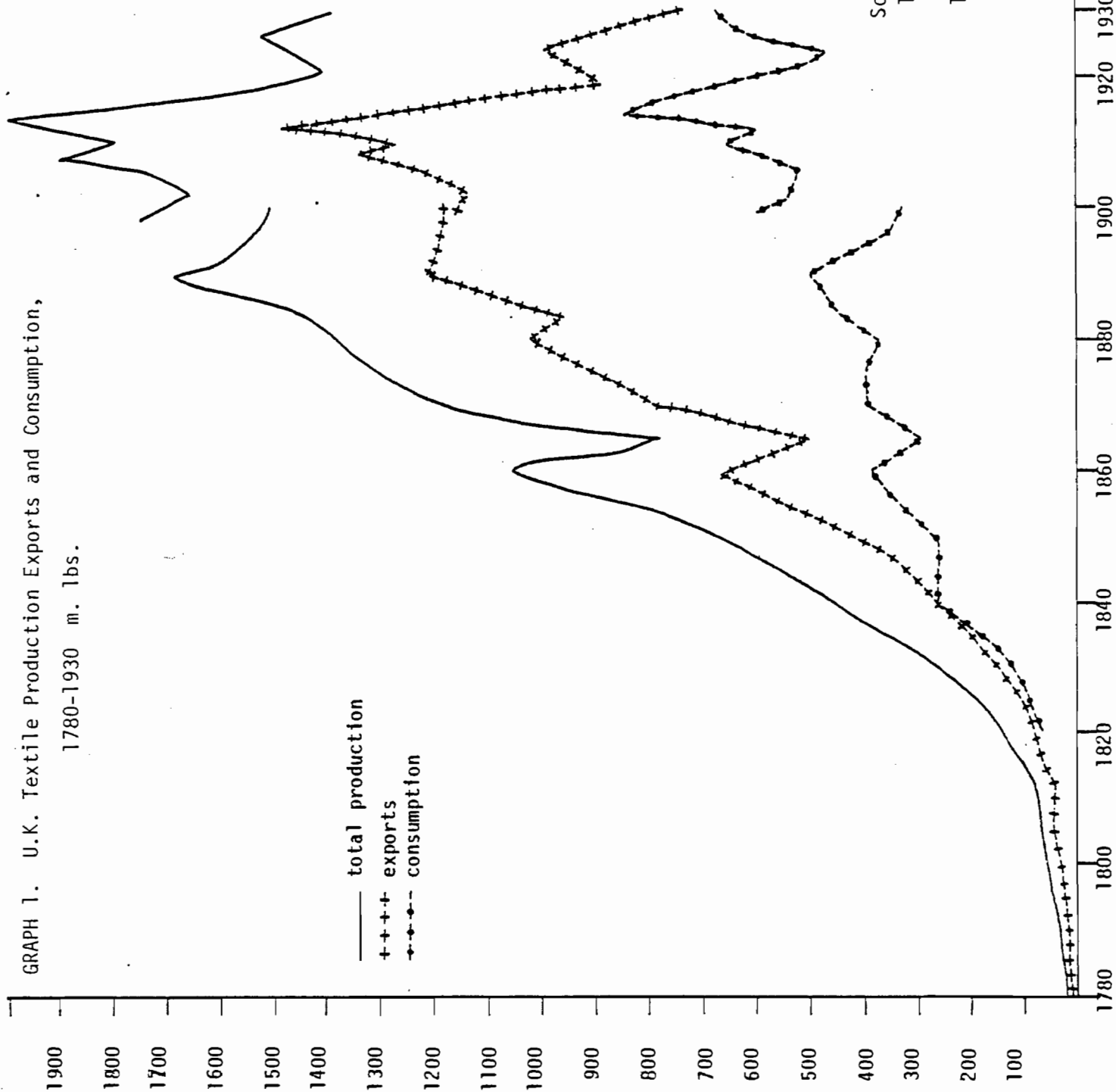
By 1815 exports were over half of production with the percentage rising slowly and steadily to almost 80% in 1900. Cotton textiles accounted for 50% of total exports in 1830, declining thereafter with the growth of "heavier" industrial exports to a level of about 25% in the 1920;s. Exports of piece goods have always been much more important than yarn. From Tables 2 and 3 we can see that the growth of exports occurred first towards Europe, then the Americas, and finally Asia, especially India. The earlier rapid growth of domestic consumption cooled off by 1840, see graph 1.

Price movements may be summarized briefly, see graph 2. Increased efficiency in textile production together with the expansion of raw cotton led to a rather continuous drop in prices during the nineteenth century,[8] only interrupted by the U.S. Civil War. General price indices in England did not fluctuate as much, rising with the Napoleonic Wars and declining much less overall during the nineteenth century. Yarn prices followed piece good prices. More detailed discussion of price and "quality" indices can be found in Sandberg.

Factors given to explain the decline in British exports, and hence overall demand, have varied. The earlier emphasis on technological stagnation and especially Japanese competition has been complemented by more recent discussions of growth and domestic industries in erstwhile markets.[9] Of course, import substitution in Europe was long ago recognized as an important factor for the decline in that market.[10]

The origins of the British cotton textiles industry find it quite dwarfed by other textiles, especially woolens. British imports of foreign-- i.e. Indian--cotton goods during the eighteenth century were prohibited by law, although some domestic consumption seems to have taken place.[11] Net

GRAPH 1. U.K. Textile Production Exports and Consumption,

1780-1930 m. lbs.

total production
+-+-+-+ exports
consumption

Sources:
1780-1900 Deane and Cole,
pp. 185-187
1900-1930 Robson Table A-1.

1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100

1780 1800 1820 1840 1860 1880 1900 1920 1930

GRAPH 2. PRICES IN ENGLAND

a

b

c

d

e

10

5

2

1 10

5

2

1

10

5

2

1

1790   1800   1810   1820   1830   1840   1850   1860   1870   1880   1890   1900   1910   1920   1930

a. price of raw cotton (U.S. upland)

b. Average price of yarn exports
    from Ellison

c. Average price of cloth exports;
    from Ellison until 1880, dotted
    line from Aldcroft

d. Sandberg's index of price of standard
    standard gray cloth
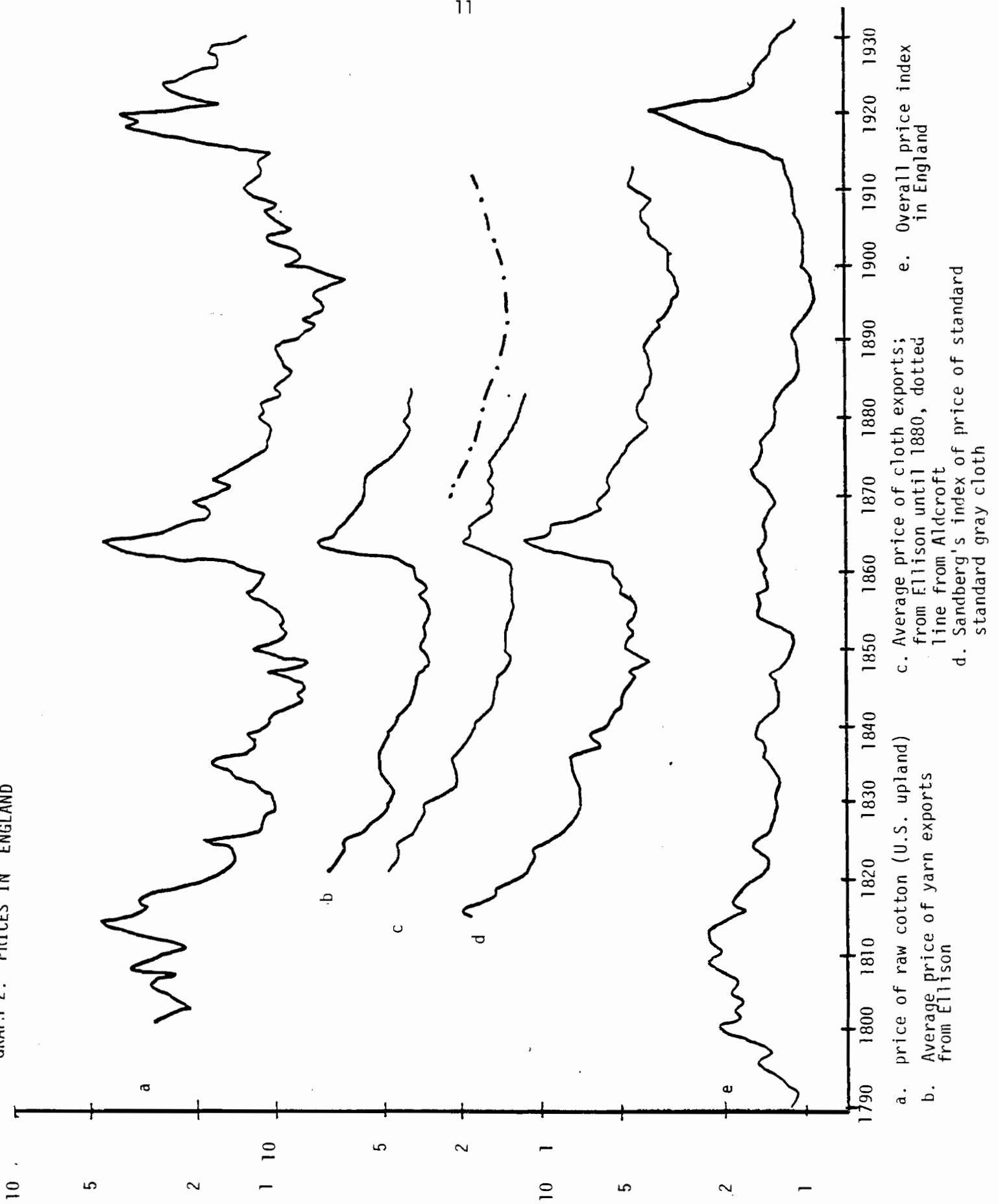
e. Overall price index
    in England

TABLE 2. British Exports by Region, 1820-1910

		EUROPE	TURKEY & MID-EAST	SOUTH AMERICA	U.S.A.	BRITISH EAST INDIES	CHINA and JAPAN	ALL OTHERS	TOTAL
1820	Cloth	6.2	0.5	2.7	1.2	0.8		1.0	12.2
	Yarn	2.3	0.05					0.5	2.5
	Total	8.5	0.5					1.5	14.7
1830	Cloth	4.4	1.3	4.5	1.6	1.5	(..)	0.6	14.1
	Yarn	3.6	-0.1					0.1	4.1
	Total	8.0	1.4					0.7	18.2
1840	Cloth	4.1	1.5	5.7	0.7	3.0	0.6	0.6	16.3
	Yarn	5.5	0.2			1.0	0.1	0.3	7.1
	Total	9.6	1.7			4.0	0.7	0.9	23.4
1850	Cloth	3.3	2.7	5.5	1.6	4.8	1.6	0.9	20.5
	Yarn	4.4	0.2			1.0	0.1	0.6	6.4
	Total	7.7	3.1			5.8	1.7	1.5	25.9
1860	Cloth	2.9	5.2	7.7	3.3	12.0	4.7	3.1	38.9
	Yarn	5.8	0.1			1.5	0.4	1.1	9.9
	Total	8.7	5.3			13.5	5.1	4.2	48.8
1870	Cloth	4.8	9.6	10.6	1.3	15.0	10.3	6.0	57.6
	Yarn	7.4	1.1			2.4	1.6	2.2	14.8
	Total	12.2	10.7			17.4	11.9	8.2	72.4
1880	Cloth	4.4	6.9	10.0	0.9	21.2	7.7	4.2	55.4
	Yarn	5.3	0.7			2.6	2.6	0.8	11.9
	Total	9.7	7.6			23.8	10.3	5.0	67.3
1890	Cloth				1.3	19.9	6.7		
	Yarn								
	Total								74.4
1900	Cloth				1.7	17.1	6.6		
	Yarn								
	Total								69.8
1910	Cloth				1.8	24.5	8.7		
	Yarn								
	Total								105.3

Sources: Calculted from Ellison and Sandberg. Ellison's table, p. 63, gives first year of decade, quantity of exports to these parts of the world, 1820-1880. Using average export prices (his appendix - Table 2). Values of yarn and cloth exports are calculated. From 1890-1910, Sandberg's Table 43 is used, and Robson's Appendix 2. 1820 and 1830 data for India, China and Japan also from Sandberg - Table 43.

Table 3. Changes in British Exports, by Region 1830-1910

	EUROPE	TURKEY & MID-EAST	SOUTH AMERICA	U.S.A.	BRITISH EAST INDIES	CHINA/ JAPAN	OTHERS	TOTAL
1830	-0.5	0.9	1.8	0.4	0.7		-0.8	2.9
1840	1.6	0.3	1.2	-0.9	1.5		0.2	5.3
1850	-1.9	1.4	-0.2	0.9	1.8	1.0	0.6	2.6
1860	1.0	2.4	2.2	1.7	7.7	3.4	2.7	23.7
1870	3.5	5.4	2.9	-2.0	3.9	6.8	4.0	19.4
1880	-2.5	-3.1	-0.6	-0.4	7.0	-2.1	-3.2	4.2
1890				-0.4	-0.2	1.4		-1.2
1900				0.4	-2.8	-0.1		-4.6
1910				0.1	7.4	2.1		35.5

SOURCES: First differences from preceeding table, except Total, which is calculated directly from Robson. Data from 1890-1910 is change in value of cloth exports only.

imports for domestic consumption may have equalled net domestically

produced exports in 1790, but as we can see in graph 1, these were in-

significant in terms of later production and consumption totals. More

intersting is the data in Table 4, which indicate, wither by weight or value,

British consumption of cottons was always smaller than consumption of woolens,

and cottons were especially unimportant when the industry started to take

off in the late eighteenth century. In other words, cotton textile import

substitution cannot have been very costly to the English consumer. Wool's

dominance was of course more marked in production than in consumption in

1790, perhaps motivating Milward and Saul's comment that new textile tech-

nology was more quickly applied to cotton, ". . .partly because it was a

new industry lacking in established tradition."[12] In any event, by 1820

the production of cottons had surpassed woolens, and we leave Britain to

look at other countries.

Table 4. UK Textile Consumption, 1770-1899

m£

YEAR	WOOLENS	COTTONS	LINENS	SILK	TOTAL
1770	15	1	5	2	22
1805	15	6	7	3	31
1820	20	14	11	6	51
1849	28	21	10	10	68
1899	48	20	6	4	76

SOURCES: Basic method is to estimate consumption as the difference between
production and net exports. For cotton and wool, value of production, ex-
ports and/or exports as a percentage of production from Deane and Cole.
1770 value of wool inferred using average wool price (comparing 1772 and 1805
average prices of long cloths from Schumpeter, pp. 39 and 43), and total
raw wool imports from Deane and Cole. For linen, value of production from
Deane and Cole, exports from Schumpeter, and Mitchell and Deane, (although
her totals did not include Irish exports, they were mostly directed to
England). Silk production from Deane and Cole, exports from Schumpeter. These
sources had somewhat different measures of 1770 cotton good imports, exports
and re-exports, but they would not appreciably change the 1770 total for cottons.

China

In a way, China's story is the easiest to tell. Imports were slow
in penetrating the country and factory production accelerated quickly once
established in 1892. There is also simply much less data. Three factors
inhibited the growth of imports: 1) conscious Chinese policy, 2) an
internal excise tax, called a likin, 3) British producers were not able to
produce a cloth suitable to the Chinese needs which was economically attractive
to the peasant masses. The first factories in China were established with
government support; later, both British and Japanese investors figured
prominently in the growing industry.[13]

Before 1900, Chinese production of raw cotton was so large that im-
ports and exports cannot have had an important effect on aggregate domestic
production or consumption. The apparent increases in production in the first
three decades of this century accompanied a significant increase in (net)
imports, hence we may conclude that import competition did not harm domestic
production of raw cotton.

The analysis of total cloth or yarn production hinges precariously
on the original assumption about cotton production of which little is known.
We will discuss two main sources, Feuerwerker assumed that total production
was the same in the 1870's and 1900's; Chao's estimate of production in
1905-09 was 50% higher, and is arguably consistent with Perkins' estimate for
1914-18.[14] When estimating textile output, another significant cause of
uncertainty is the fact that the Chinese used to insulate their clothes by
stuffing the lining with unspun cotton, on the extent of this our two main
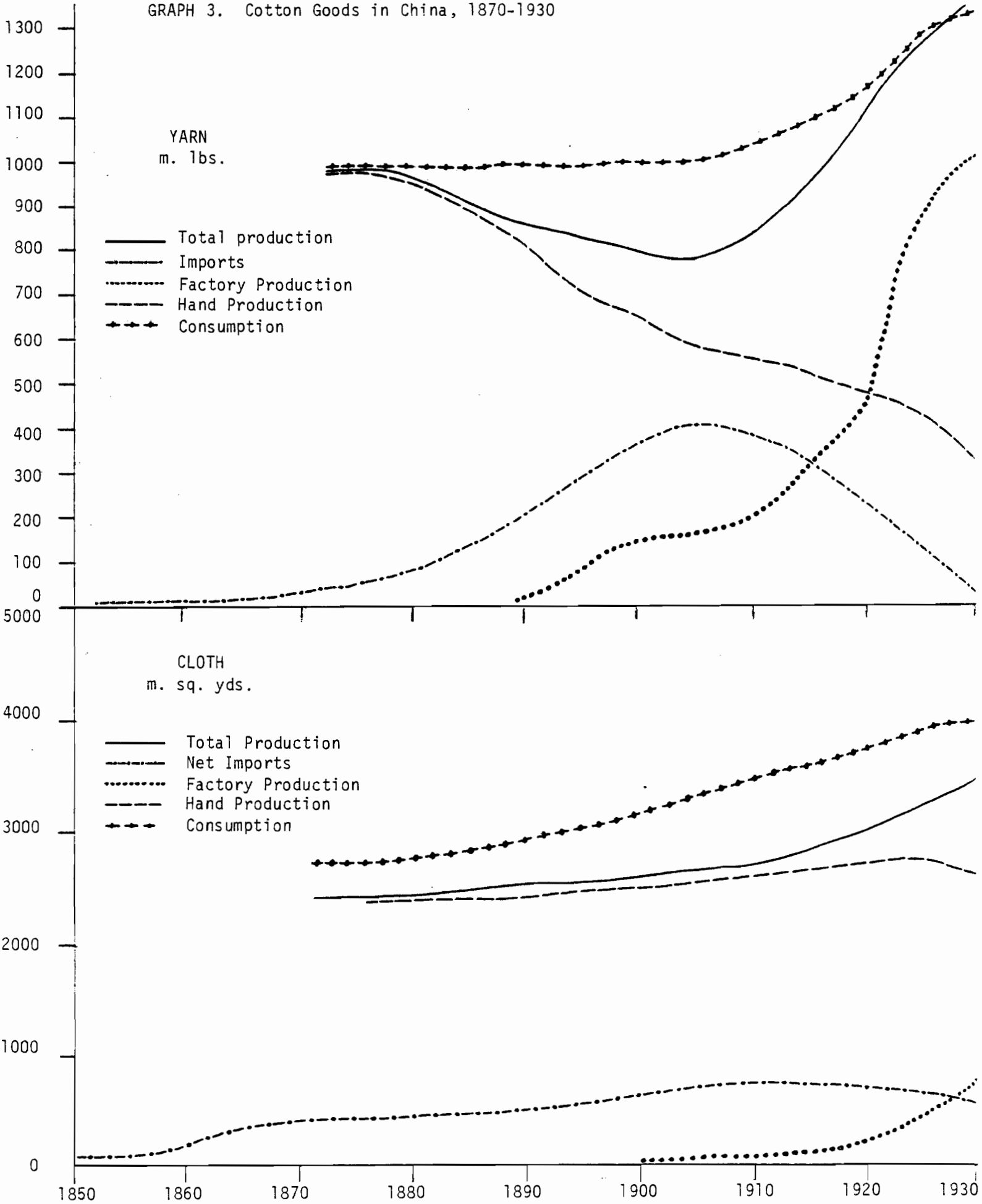sources also differ by 100%. Nevertheless, certain tendencies seem clear.

Factory yarn and cloth production started in 1890. Imports of yarn were negligible in 1870, but may have been equal to 40% of total production-factory and cottage-by the turn of the century. Cloth imports were perhaps 15% of total consumption in the 1870's, and around 20% during 1900-10. Domestic hand spinning must have decreased during those three decades, per-haps by half. Given the late start of factory production, imports must have been the leading factor in this, and we note that India, and later Japan, were the main source of imports. However, domestic factory yarn production grew quickly, passing imports during WWI, and China was a net exporter of yarn by the end of our period.

Although cloth imports almost doubled between 1870 and 1900, handicraft weaving also increased, if for no other reason than the increase in available yarn due to imports. Chao's data suggest a decline in handicraft weaving only in the late 1920's, by which time machine made cloth production was great-er than imports. Total consumption of cloth increased during the 1870-1930 period, with per capita consumption of cloth hovering near 8 sq. yds./yr., and effective consumption of raw cotton at 4.5 pounds/person/year.[15]

Although our sources' original estimates of cloth production for 1901-10 or 1905-09 are quite close. there are three areas of difference which cancel out: 1) Chao's import of yarn is much lower, 2) Chao's assumed production is much higher, 3) Chao uses a higher assumed per capita wadding consumption. Chao's import data for 1905-09 is neither consistent with Feuerwerker's nor with direct data on Indian exports to China.[16] Chao's data for 1905-09 is recalculated in column F. Feuerwerker argues there was no change in production between 1871-80 and 1901-10.[17] However, for comparability with his 1871-80 calculation, we have recalculated his data for both periods

GRAPH 3. Cotton Goods in China, 1870-1930

YARN
m. lbs.

1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0

——————— Total production
—·—·—·— Imports
·············· Factory Production
— — — — Hand Production
◆—◆—◆ Consumption

5000

CLOTH
m. sq. yds.

4000

——————— Total Production
—·—·—·— Net Imports
·············· Factory Production
— — — — Hand Production
◆—◆—◆ Consumption

3000

2000

1000

0

1850   1860   1870   1880   1890   1900   1910   1920   1930

using the higher production and wadding capita data of Chao, which are
presented in column C and D.

As their methodology forms the basis for our subsequent country
tables, a few comments are in order. The basic procedure is to convert raw
(ginned) cotton to yarn, at close to a one to one ratio, then convert yarn
to cloth at another ratio. Knowing yarn production from industrial sources
yields hand spun yarn by subtraction; similarly for woven cloth. Imports
and exports are easily included in each stage. Now, neither author allows
for any wastage of harvested cotton, but both allow for wastage in spinning
and weaving, of varying amounts less than 10%. The important equivalency
ratio of pounds of yarn to square yards of cloth differs between mill and
handicraft production, being about 2.6 for the former, 3.5 for the latter.
These ratios are based on data from different Chinese studies. Data on
British world exports suggest a ratio of almost 5 for cotton cloths/linear
yard,[18] while Desai concluded that a rate of 4.5 was suitable for 1930's
India.[19] There is also a question of conversion rate between linear yards
and square yards. For handloom production this varies with the strength
of the looms and fiber used (Feuerwerker using a factor of two), while with
machine looms a commonly used ratio is 1.1 linear yards per square yard.
Given the roughness of our data, inconsistencies of available estimates, and to
be consistent with one important source (Utley),[20] we shall use the rate of
4 yards of cloth per pund of yarn, for either linear or square yards. At
this level of approximation, calculation for wastage are superfluous, and
will be omitted.

TABLE 5. COTTON TEXTILES IN CHINA, 1870-1930

m.lbs.	A Feuerwerker 1871-1880	B Feuerwerker 1901-1910	C Feuerwerker revised 1871-1880	D Feuerwerker revised 1901-1910	E Chao 1905-1909	F Chao revised 1905-1909	G Chao 1924-1927	H Chao 1928-1931
Raw Cotton produced	933	933	1480	1480	1480	1480	1860	1807
Net imports	18	-90	18	-90	-89	-89	133	292
Domestic consumption	951	842	1498	1390	1391	1391	1993	2099
Wadding and Other	266	333	467	585	585	585	624	637
Domestic cons. of cotton for yarn	685	488	1031	805	806	806	1369	1462
Mill production	0	141	0	141	174	174	821	977
Hand spun	650	326	978	618	550	550	409	338
Net imports	13	315	13	315	12	309	40	-31
Total Domestic cons. of yarn	663	782	991	1074	719	1000	1189	1187
Mill cons. yarn	0	8	0	8	16	16	119	198
M. sq. yds.								
Mill produced cloth	0	24	0	24	58	58	433	720
Hand woven	1612	1849	2409	2665	1876	2617	2845	2636
Net imports	376	654	376	654	631	631	578	518
Total Production	1612	1873	2409	2689	1934	2675	3278	3356
Total Consumption	1988	2527	2785	3343	2565	3306	3856	3874

SOURCES: Feuerwerker (1970), Chao Tables 26 and 27, and Text.

India

The cotton plant was domesticated in India, and Indian cotton fabrics have been found in the tombs of Egyptian pharohs. Under the East India Company, cotton textile exports increased considerably, expanding from an intra-Asian trade towards Europe. As England had raised tariffs and other restrictions on importation of Indian textiles in the early 1700's, much of the textile exports to England were re-exported to the continent. In the decade 1790-1800 exports of calicoes and muslins may have averaged 50 m. yds. per annum, with 8 m. staying in England.[21] Two factors weakened this trade in the late eighteenth century: 1) the adoption in England of mechanical techniques producing a fabric fine enough to substitute with India's, at a much lower cost; and 2) wars in Europe (including the French Revolution) and the import substitution policy subsequently adopted by Napoleon. The Indian export production had occurred in factories located near ports, and many of these had failed by 1830,[22] by which time India had become a net importer of textiles.[23] India's cloth exports did not stop, however, although raw cotton soon became much more important.

A very rough estimate of the fraction of cotton utilized for exports in 1790 would be less than 5% of production,[24] so the loss of the cloth export market did not harm agricultural production. On the contrary, the rapid expansion of raw cotton exports to England was one of the keystones to the alleged "de-industrialization" of India.

Some important expansions in cotton acreagae in India can be documented during the second half of the nineteenth century. There is evidence that acreage increased 71% in six important provinces during the decade of the
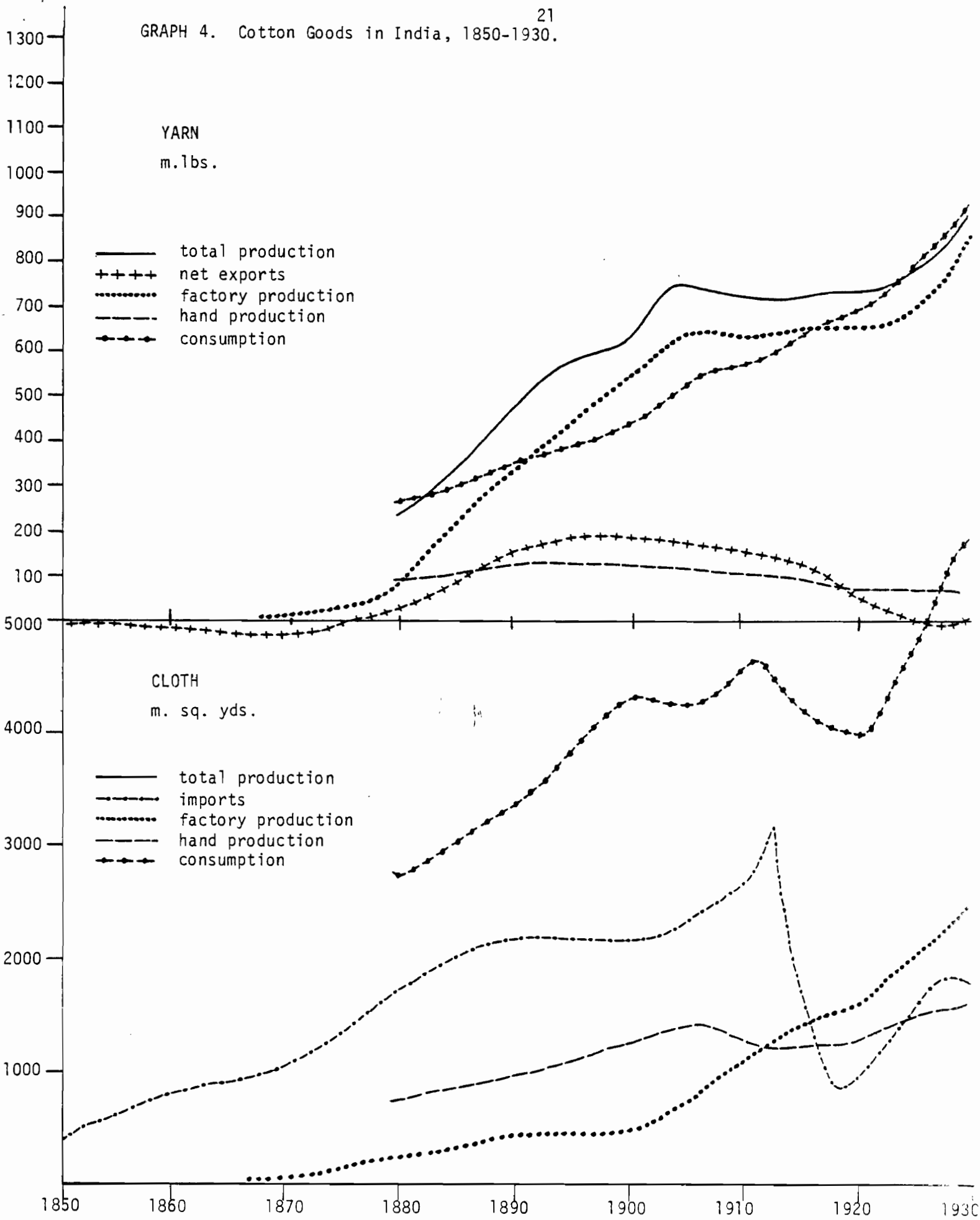
1860's,[25] partially as a response to the American Civil War caused English cotton famine, and also, transportation improvements. Blyn's data suggest a further increase of production of 72% in British India in the 1890's.[26] More reliable "all-India" data in the years before WWI indicate strong fluctuations around a stationary average output of some 1800 million lbs. This compares to mid-nineteenth century estimates of production at between 1000 and 3000 m. lbs.[27] Further increases in output would have to come from irrigation and improved varieties,[28] because total acreage of India, Pakistan and Burma in 1961-1965 of about 21 million acres,[29] was equal to the estimated acreage of 1921 and about only 30% higher than that estimated for 1894.[30]

Between 1890 and 1925 cotton exports were about half of the total raw cotton production. Having expanded production earlier, it was more diffucult for her to increase cotton exports at a high rate.[31]

Yarn and cloth factory production was attempted very early in the nineteenth century in India, successfully in 1851. India became a net exporter of yarn in the early 1880's, perhaps some ten years after domestic mill production surpassed imports. Domestically manufactured cloth production surpassed imported cloth during WWI, whereas India became a net exporter of cloth piece goods only during the 1940's.

During the first three decades of this century, Indian mill produced cloth grew from 11 to 50% of total Indian consumption, which itself increased by half. Hand loom produced cloth retained a rather constant share of total cloth consumption, indicating that the growth of domestic industry replaced imports. The data strongly suggests that earlier increases in imports had replaced hand loom products. Per capita piece good imports rose from about

GRAPH 4.   Cotton Goods in India, 1850-1930.

YARN

m.lbs.

	total production
+ + + +	net exports
....	factory production
— — —	hand production
• • • •	consumption

CLOTH

m. sq. yds.

	total production
—•—•—	imports
....	factory production
— — —	hand production
• • • •	consumption

1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
5000

4000

3000

2000

1000

1850   1860   1870   1880   1890   1900   1910   1920   1930

1 yard in 1840 to almost 10 yards/person in 1913, out of a total consumption of about 17 yards/capita.[32] Our very sketchy data indicates a per capita consumption of closer to eleven yards in the 1880's and 1890's, which would suggest that hand loom production also may not have declined considerably, but the margin of error (due to yield estimates especially) is at least three yards/capita.

A rough calculation suggests the increase of raw cotton exports in the 1860's was not more than the increase in production.[33] This is also in-dicated for the 1890's - 1910 period during which retained cotton production (net of exported yarn) increased. This does not preclude the possibility that cotton acreage expanded at the expense of food crops, especially before WWI.[34]

The decline in overall cloth consumption after WWI deserves some commentary. During the war shipments from Britain were greatly hindered, but post-war imports remained lower. This is in spite of an overall increase in purchasing power, and perhaps even per capita income.[35] Some writers attribute this decrease to prices, especially exchange rates. Some Indian authors prefer to attach more importance to the Swadeshi movement, which agitated for a boycott against foreign (mainly British and Japanese) exports.[36] This should have resulted in a much larger increase in domestic production than our data indicates, but nevertheless, must have been an important factor.

It is interesting to note that hand spinning did not die out in the midst of a strong machine spinning industry, and was estimated at around 65 million pounds in 1930.[37] This was about 6% of total domestic production and (also) consumption of yarn, and contributed perhaps 5% of total consumption of cloth. Estimating earlier hand spun yarn production from raw cotton pro-

TABLE 6

23

RAW COTTON (m. lbs.)

	PRODUCTION A	EXPORTS B	APPARENT CONSUMPTION C	MILL CONSUMPTION FOR SPINNING D	NET AVAILABLE FOR HAND SPINNING E	ASSUMED HANO SPUN F
1880		394	.	120		150
1885	792	507	285	233	52	150
1890	992	603	389	395	-6	150
1895	1281	478	803	526	277	150
1899-1903	1704	655	1049	618	431	100
1904-1908	1700	682	1081	754	264	100
1909-1913	1678	880	798	792	6	60
1914-1918	1718	984	734	841	-107	60
1919-1923	1927	897	1030	821	209	60
1924-1928	2308	1593	715	837	-122	60
1929-1930				928	61	60

YARN (m. yds.)

	MILL PRODUCTION G	IMPORTS H	EXPORTS I	TOT. DOMESTIC CONSUMPTION OF MACHINE YARN J	TOTAL DOMESTIC CONSUMPTION K	TOTAL DOMESTIC PRODUCTION L
1880	(99)	47	36	108	258	249
1885		49				
1890	(327)	45	(180)	192	342	477
1895						
1899-1903	532	28	234	325	425	632
1904-1908	652	35	251	436	536	752
1909-1913	651	35	193	493	553	711
1914-1918	566	34	130	570	630	726
1919-1923	662	45	82	625	685	722
1924-1928	734	50	32	752	812	794
1929-1930	850	36	24	862	912	910

CLOTH (m. yds.)

	MILL PRODUCTION M	HAND PRODUCED MACHINE YARN N	HANDSPUN O	IMPORTS P	EXPORTS Q	INDIAN CON SUMPTION OF MACHINE MADE CLOTH R	INDIAN CONSUMPTION OF INDIAN PRODUCED CLOTH S	TOTAL INDIAN CONSUMPTION T	TOTAL INDIAN PRODUCTION U
1880	(250)	(182)	(600)	1750		(2000)	1030	(2780)	(1032)
1885			(600)	1740					
1890	(400)	(368)	(600)	2020		(2420)	1368	(3338)	(1363)
1895			(600)	1719					
1899-1903	493	357	(400)	1972	115	2350	2379	4351	1750
1904-1908	744	1057	(400)	2190	121	2813	2080	4270	2201
1909-1913	1105	991	(240)	2477	127	3455	2209	4686	2336
1914-1918	1444	981	(240)	1695	201	2938	2464	4159	2665
1919-1923	1676	1049	(240)	1212	197	2691	2768	3980	2965
1924-1928	2086	1255	(240)	1768	182	3672	3409	5177	3591
1929-1930	2491	1370	(240)	1897	133	4183	3896	5793	4029

NOTES: $C = A - B$ $E = C - D$ $J = G + H - I$ $K = J + F$ $L = G + F$ $R = M + P - Q$ $S = M + N + O - Q$
$T = M + N + O + P - Q$ $U = M + N + O$

NOTES FOR TABLE 6

A. 1885, 1890 area from U.S. (1895), yield from Blyn.

    1903-1923 Prod. Wheeler p. 7.

    1924-1927 Todd p. 29.

B. 1880, 1885 Great Britain (1886);

    1890, 1894 U.S. (1895); 1901-1903 Great Britain, 1907;

    1904-1904 India (1912).

    1910-1924 Wheeler p. 80, (net after 1910), 1925-1928 Gandhi, p. 78.

C. $C=A-B$

D. 1880-1895, 1900-1913, 1915-1930 Govil pp. 17, 43. Consistent with
    Koh, p. 367.

E. $= C-D$, 1930 from Desai p. 77.

F. Assumed levels such that, for 1885-1928, Sum of E, $-10\frac{7}{0}$=Sum of F.

G. 1900-1914 Aldercroft p. 1-5, 1914-1930 Koh p. 382.

    1880, 1890 inferred from D and ratio of F to D for later years.

H. 1880 Ellison, p. 83; 1885, 1890, Ray p. 164.

    1900-1914 Aldcroft p. 105; 1914-1939 Koh p. 380.

I. 1880 Singh, p. 240; 1890 inferred from exports to Japan and China

    1900-1914 Aldcroft p. 105; 1914-1930 Koh p. 380.

J. 1880, 1890 $I=F+G-N$

    1900-1914 Aldcroft p. 105; 1914-1930 Koh p. 380. Consistent

    with Mehta, p. 89.

J^1. $= I-J$

K. $= J+F$

L. $= G+F$

M. 1880, 1890 inferred from data on looms, productivity as given in
    Koh p. 368.

    1899-1930 Utley p. 286.

N. 1880, 1890 data for $J \times 4 - M$

    1899-1928 Utley p. 286; 1929-1930 Koh p. 370.

O. $F \times 4$

P. k880-1895 Ray p. 163. 1899-1930 Utley p. 286. Consistent with Sandberg.

Q. 1899-1930 Utley p. 286. $R=M+P-Q$ $S=M+N+O-Q$ $T=M+N+O+P-Q=S+P$

·duction net of exports and mill consumption, our data suggests totals ·
ranging between 90 and 150 million pounds between 1890 and WWI. For
earlier dates even rougher estimates, assuming consumption at 10yds/capita,
and subtracting from that total imported cloth and net imports of yarn,
suggest that hand spinning might have been in the same range in 1880, but
nearer 200 million pounds in 1860. Before 1850 imports of cloth and yarn
cannot have had a significant effect on aggregate demand for domestically
produced clothing,[38] although certain subsectors of that industry must have
been affected.

Japan

The rapid expansion in the Japanese textile industry before WWI has
made it a classic success story. This fact together with a significant
decline in accessability of data for earlier periods has led to almost
exclusive emphasis on the evolution of Japanese textile production using
western influenced techniques. However, it is important to note that be-
fore 1850 three important changes had already taken place in Japan. First,
a domestic market for both raw cotton and cotton textiles evolved. Secondly,
import substitution of Chinese and Korean raw cotton and finished cloth
successfully took place. Finally, a few regions and national centers of
cloth production grew creating an institutional framework which was tech-
nologically constrained before the Meiji restoration of 1868, but was ready to
take off with the opening of the west.

.Cotton was introduced into Japan via Korea and China, and its cul-
tivation was known in the early sixteenth century.[39] Amongst domestic alter-
natives were flax and silk. One reference gives pre-Meiji cotton production
at about 50 million pounds, (as opposed to 66 million pounds in 1886) which
would have given a per capita consumption of about 1.9 pounds.[40] Silk pro-
duction in 1868 was about 2.4 million pounds, of which 1.5 were exported.[41]
1874 production of hemp, flax, jute and ramie totalled 8 million pounds.[42]
So we can roughly surmise that over half of Japanese clothing came from
cotton.[43]

Commercial production, marketing and processing of cotton developed
considerably in Japan during the Tokugawa period (1603-1868), during which
the country followed a policy of virtually no foreign trade. Osaka, the

central cotton good market, hit its peak volume in the early 1800's,
declining thereafter because its guild system broke down with the growth
of rural processing. But during 1804-1830 it may have received as much as 20
million pounds of raw cotton, and another 96 million yards of cloth, indicating
an overall marketing through Osaka of over half of national production.[44]

Given these developments during what used to be considered a station-
ary period, it is not surprising that our first data on post-Tokugawa im-
ports is 35 million pounds in 1868, or over half of our earlier stated pro-
duction figures. These imports did not completely replace domestic raw
cotton production for another three decades. At first Japan tried to pro-
duce enough cotton to fulfill its own needs. The recognition of their in-
ability to do this in cotton apparently coincided with a similar realization
regarding other crops,[45] and after 1896 import duties on raw cotton were
abolished.[46]

Although the acceleration of raw cotton imports came after the successful introduction of modern spinning in the 1870's, we must note that in earlier years significant cotton imports implied a strong traditional domestic spinning industry. Japan repeated China's experience of importing relatively more yarn than cloth. Factory yarn production using western techniques (and with governmental assistance) was first tried in the late 1860's, but took two decades to take off. The apparent decline in hand spinning through 1885, which may have amounted to 40% of the total, may have been caused by the scarcity of the raw material due to the country's autarchic policies, as well as import competition. We are not able to conjecture whether this affected farm families or traditional 'industries'. However, an important factor in the rise of the modern spinning factories was the flow of young

female migrants from rural areas (erstwhile spinners) who worked in dormitory factories for very low wages, a cause of much concern internally and externally.[47]

Japan became a net exporter of yarn in 1895. In 1903 she was a net exporter of cloth. As cloth exports then were greater than modern factory production, we conclude that it was possible to compete in the world market without having dominated all the modern technology. Once again we should emphasize the continuity of Tokugawa-Meiji period cotton industries in the creation of a market for raw cotton, yarn amd cloth, as well as unskilled labor. This is in addition to other elements also traditionally emphasized, such as the importance of samurai, merchants and the government as entrepreneurs.
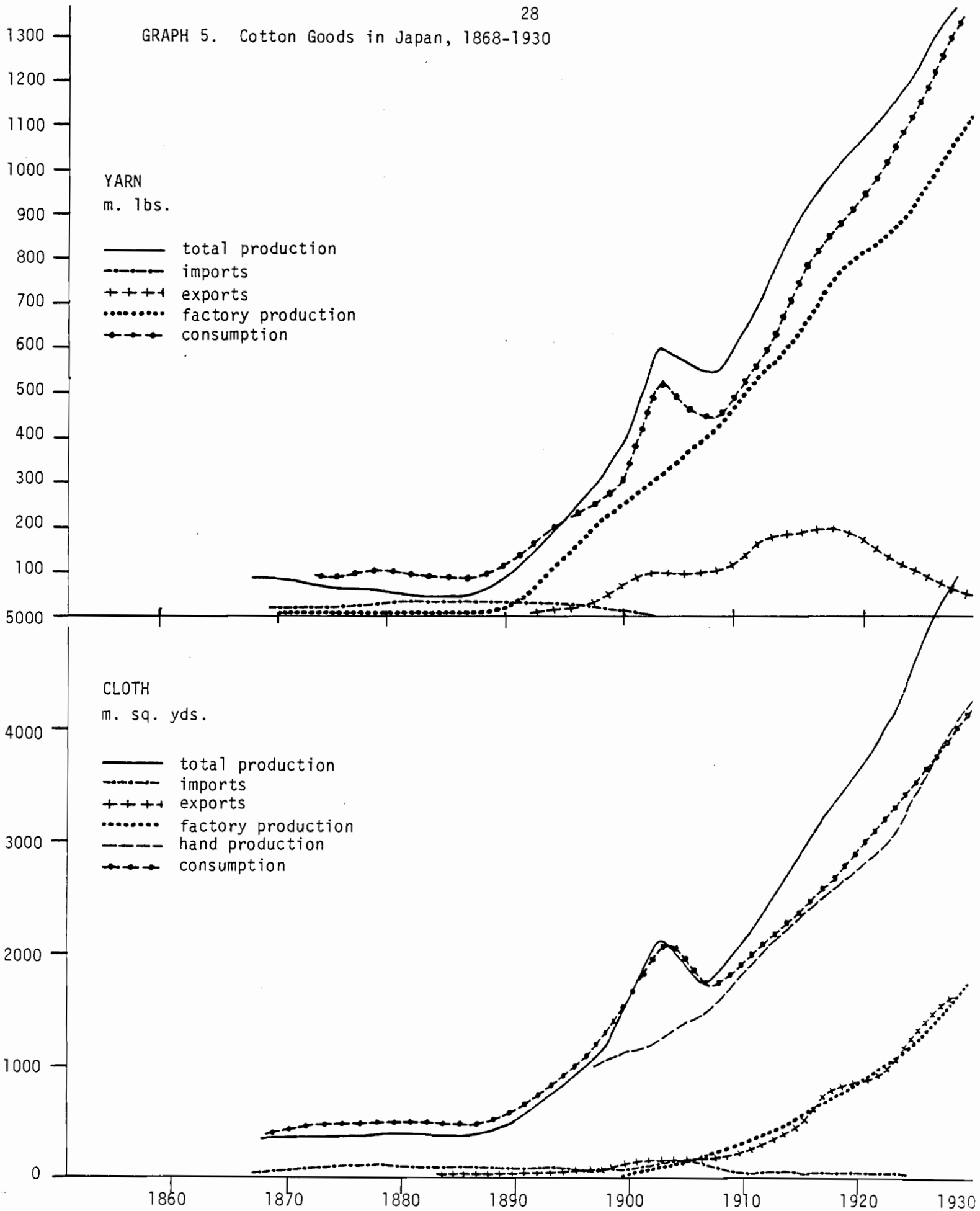
GRAPH 5. Cotton Goods in Japan, 1868-1930

YARN
m. lbs.

——————— total production
—·—·—·—· imports
+ + + +‑ exports
·········· factory production
◆–◆–◆ consumption

CLOTH
m. sq. yds.

——————— total production
—·—·—·—· imports
+ + + +‑ exports
·········· factory production
— — — — hand production
◆–◆–◆ consumption

TABLE 7. COTTON TEXTILES IN JAPAN 1865-1930

	RAW COTTON ᵐLBS			COTTON YARN ᵐLBS					CLOTH ᵐSQ. YDS.					
	Domestic Production A	Imports B	Apparent Cotton Consumption C	Machine Production D	Apparent Hand Production E	Imports F	Exports G	Apparent Domestic Consumption H	Implied domestic prod. Cloth I	Factory Production J	Hand Woven J1	Imports K	Exports L	Implied Domestic Production Cloth M
1865-1869	46	37	83	0.6	82	10		92	368		368	28		396
1870-1874	41	38	79	0.9	78	17		95	380		380	60		440
1875-1879	41	24	65	1.0	64	36		100	400		400	91		491
1880-1884	45	3	48	3.2	45	39		84	392		392	59	4	447
1885-1889	56	15	71	12	59	40		99	396		396	59	8	447
1890-1894	39	106	145	77		22	1	163	664		669	66	18	712
1895-1899	25	302	327	215		7	61	273	1092		1092	96	55	1133
1900-1904	11	584	595	286		5	94	506	2024	78	1946	90	104	2010
1905-1909	5	508	513	379		3	95	421	1684	142	1542	130	171	1643
1910-1914	2	751	753	482		1	163	591	2364	317	2047	67	266	2165
1915-1919	2	994	996			1	179	818	3272	611	2661	14	724	2562
1920-1924	2	1098	1100			2	121	981	3924	959	2965	18	823	3119
1925-1929	2	1400	1402			2	62	1342	5368	1337	4031	13	1482	3899

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NOTES FOR TABLE 7

A.   1874-1895 Ohkawa et. al., p. 178, converted at 8.72
     lbs=1 kan, assuming data is "seed cotton", therefore reduced by
     2/3 for raw cotton. Data is consistent with Shimbo, p. 57, Seki,
     p. 104 for 1886, and Japan (1893 and 1904). Also Institute of
     International Agriculture, first data interpolated to be con-
     sistent with pre-Meiji production of 50 m. lbs.(Koh p. 311).

B.   Seki, pp 302-303. Figures are net of re-exports. The only
     evidence exports of Japanese cloth are to England during the
     cotton famine, in a small amount.

C.   =A+B

D.   Koh p. 399. 1889 Seki, p. 311 afterwards.

E.   =C-D. It would seem that after 1890 increases are due to accu-
     mulation of stocks of cotton; at this point machine production
     probably had surpassed hand spinning.

F.   Seki pp. 304-305.

G.   Seki, pp. 304-305.

H.   =C+F-G

I.   =H×4

J.   Seki, pp. 306-307.

K,L. Seki, pp. 306-307.

M. = I+K-L

J.   1903-1929 Koh, p. 350, 346 data are linear yards. (Consistent
     with Pease p. 22, 129).

J^1.= I-J Clearly is an overestimation due to non-incorporation of stocks.

Import Substitution and Foreign Competition

The data in the appendices, which is summarized in Tables 8 and 9 will help us evaluate the relative importance of import substitution and competition from other countries as factors leading to the decline of the British cotton good exports.

In England, yarn exports were no more than a quarter in value of cloth exports. Asia was not a large buyer (most exported yarn was very high quality and sent to Europe), and Indian and Japan were fast becoming net exporters themselves. China never played a role as an importer of British yarns, and was already exporting in the twenties. Of course, competition between Japan and India for the Chinese yarn market was quite important for the development of those two countries. Basically, however, Britain's story should be told in terms of cloth.

The main export market for British cloth was of course India, and its drop in volume from 3100 to 900 million yards between 1913 and 1919 was the equivalent of 30% of 1913 exports, and over 20% of total British production. Exports to India recovered somewhat during the 1920's. Japanese exports to India in that decade involved about 12% of the pre-war total; this was certainly significant, but not overwhelming. From Graph 4 or Table 6 we see that Indian consumption dropped after 1913. A couple of factors are at work: 1) 1913 was a boom year in imports; 2) India's consumption of all machine made cloth declined, partly due to price changes, partly due to war time scarcity and the nationalist boycott of imports.

What about other markets? In retrospect, we see that the British were correct in their judgement of the non-importance of the Japanese market, but
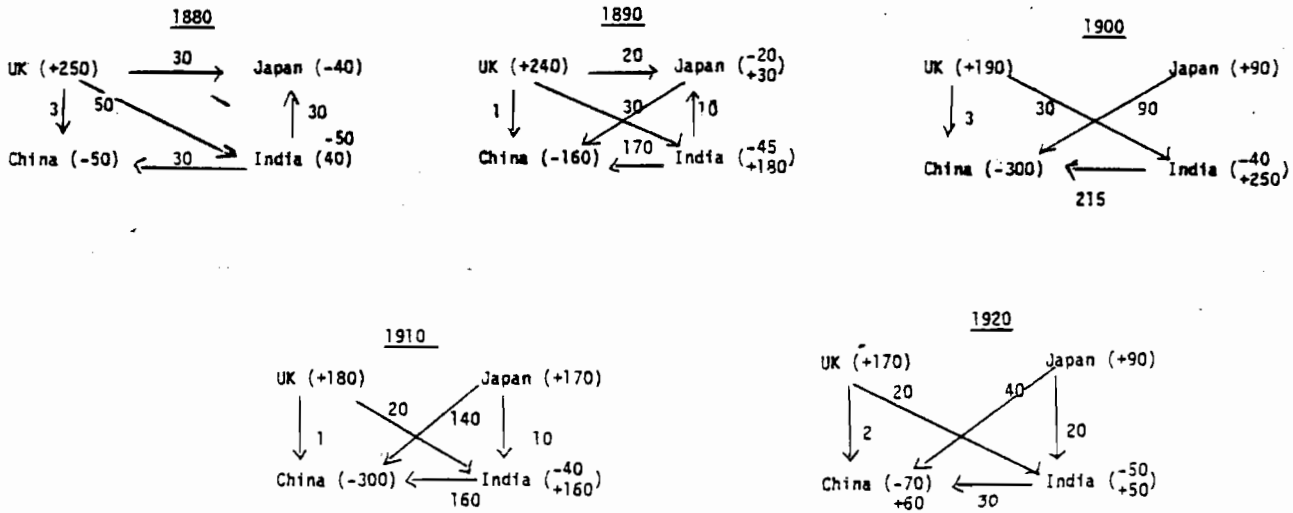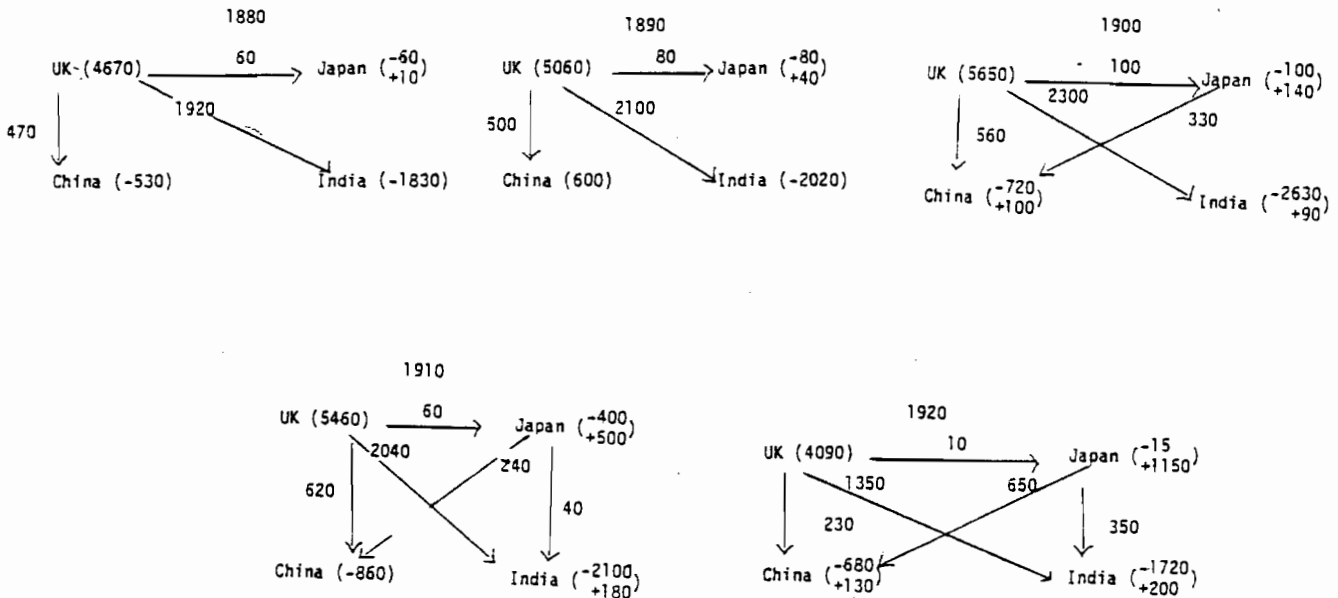
TABLE 8. YARN FLOWS, 1880-1920 (m. lbs)

__1880__

UK (+250) ──30→ Japan (-40)
3↓ 50↘ ↑30
       -50
China (-50) ←─30─ India (40)

__1890__

UK (+240) ──20→ Japan (-20/+30)
1↓   30↘ ↑10
China (-160) ←─170─ India (-45/+180)

__1900__

UK (+190)   Japan (+90)
↓3   30↘ ╱90
China (-300) ←──── India (-40/+250)
        215

__1910__

UK (+180)   Japan (+170)
↓1 20╲ ╱140
China (-300) ←──── India (-40/+160)
        160   ↓10

__1920__

UK (+170)   Japan (+90)
↓2 20╲40 ↓20
China (-70/+60) ←─30─ India (-50/+50)

TABLE 9. CLOTH FLOWS, 1880-1920
          (m. yds.)

1880

UK (4670) ──60→ Japan (-60/+10)
470↓   1920↘
China (-530)   India (-1830)

1890

UK (5060) ──80→ Japan (-80/+40)
500↓   2100↘
China (600)   India (-2020)

1900

UK (5650) ──100── Japan (-100/+140)
        2300╲ ╱330
560↓
China (-720/+100)   India (-2630/+90)

1910

UK (5460) ──60→ Japan (-400/+500)
   2040╲ 240╲
620↓   ↓40
China (-860)   India (-2100/+180)

1920

UK (4090) ──10→ Japan (-15/+1150)
   1350╲ 650╱
230↓   ↓350
China (-680/+130)   India (-1720/+200)

SOURCE: See Appendices

         Data in paranthesis are exports (+) and imports (-)

         Arrows point from exporter to importer

for the wrong reason.   Japanese cloth imports never became significant
(to Great Britain) because the Japanese very quickly produced their own,
not because they were too poor.   China was the only other important prospect
in Asia.   Once again, her total imports peaked during the second decade
of the century, and fell thereafter.   Although Japan took an increasingly
larger share of China's imports, the process of import substitution in
China had already progressed too much to make that market the boom to
Lancashire that India had once been.

Our collective data permit some rough calculations of what British
cloth exports would have been under different circumstances, which are pre-
sented in Table 10.   Rows B, C, and D suggest that import substitution was
more important in India, as a cause of the decline of British exports, while
import competition was more important in China, and, in aggregate, the former
effect was more important than the latter.   Of course, if Britain had been
able to dominate the Chinese market in 1930 as it had dominated the Indian
market in 1880, as shown in Row E, her cotton textile exporting problems
would have been significantly ameliorated.

TABLE 10. BRITISH EXPORTS UNDER ALTERNATIVE ASSUMPTIONS

(m. linear yds.)

		1870		1900		1928	
		India	China	India	China	India	China
A.	Actual exports	909	394	2018	575	1453	177
B.	Assuming 100% of total imports			2050	720	1850	680
C.	Keeping 1880 fraction of total consumption			2687	445	3646	523
D.	Extending 1870-1900 growth of exports to 1930					4480	527
E.	Achieving Britain's 1880 share of Indian market in China by 1928						2433

SOURCE: Data from appendices and country tables.

The Lewis Fei Ranis Model

Although our analysis has not been directed towards investigating
the Malthusian aspects of the Lewis-Fei-Ranis model, a few suggestive
comments may be in order. We have seen impressive evidence of expansion
of agricultural production in India, China and Japan, which was associated
with expanding demand, caused either by new foreign markets, or new
domestic markets created as a result of newly introduced technology or
reduced transportation costs. The success of manufactured textiles in
the rural areas consistently belies a conjectured zero marginal productivi-
ty of labor. The Hanley Yamamura book is a broad based attack on the
application of that model to Tokugawa Japan; we suspect that the same
argument is valid for China and India.

The Growth of Manufacturing

If we leave aside for a moment handicraft production, and compare the various countries in terms of the growth of their power manufactured yarns and cloth, their cases are seen in a different perspective. After all, it took England almost a century to become a net exporter of its own cotton textiles after domestic producers succeeded in obtaining governmental aid in the form of tariffs and other import restrictions.

We have seen that England, Japan, and India, consumption of cloth increased markedly with the introduction of manufatured techniques; this is also true for post WWII China. In each country machine spun yarn came before machine woven cloth, and in the Asian countries these had to compete against freely imported foreign goods. Given the different dates of initiation of powered machine production, the growth rates are not all that different in terms of dominating the domestic market.

Japan and India bear a closer examination, for their two experiences with industrial production are much more similar that is usually acknowledged, especially when seen in absolute, and not per capita levels. India's first successful mills were established in the early 1850's, Japan's were twenty years later. Both competed successfully against imports and hand spinning, as mentioned, and both became net exporters of yarn within about thirty years. Mill woven cloth did not dominate either market during our period, and Japan's growth pattern is a two decade lagged mirror image of India's until 1930. Where they do differ is in the growth of cloth exports. But emphasizing exports clearly misses the obvious fact that India's market had been "opened up" or westernized long before Japan's, and India's

lag in exporting can be simply attributed to its prior task of dominating
the internal market. There are limits to this line of argument, of
course, such as their relative success in the China market, in which Japan
quickly overcame its time disadvantage and surpassed India in yarn and
England in cloth. More importantly, Japan later exported cloth to India.

The two main differences between those countries and China with
regard to domestic manufactured production are China's later start and
greater amount of handicraft, as opposed to import competition. But the
growth pattern of Chinese mechanized spinning compares well to others, and
one might have expected the earlier patterns to continue after 1929, based
on prior performances, if other events had not intervened.

De-Industrialization of India?

How important was British competition to traditional Indian manu-
facturing? Our analysis indicates that, in cottons, both hand spun yarn
and hand woven cloth still existed in appreciable quantities in 1930.
Moreover, in yarns, India had become a net exporter during the 1870's, so
any criticism of the decline of hand spinning after that time should probably
be directed towards domestic production. This is not true for cloth, as
we saw that doemstic production did not pass imports until WWI. On an
overall per capita basis, imports of both yarn and cloth were insignifi-
cant before 1830. Curiously enough, much of the most vitriolic criticism
of the British impact, including the quote which Marx later made famous, -
"The bones of the cotton weavers are bleaching the plains of India"[48] originated
before 1840. The explanation of this apparent inconsistency seems to be
that the previous.decline in handicraft weaving was due in part to the
loss of Indian export markets, and not the competition of British imports
for Indian consumption. True enough, the decline of those markets was due
in part to the growth of British production, and their imports continued to
absorb the domestic market. One cannot assert that India suffered because
of its introduction via the British world trade. It may be more accurate
to state that India's comparative advantage in cloth spinning and weaving,
due, as we now say, to its comparatively larger accumulation of human capital
in the handicraft industries, was lost because the new production technologies
although introduced in 1818, were not successfully adopted for another
40 years.[49] In fact, the slowness of adoption was partly because of primitive
power manufacturing's inability to compete with the domestic handicraft .

products, i.e. infant industry upside down.[50] It is beyond our ability
to investigate the extent to which the decline in Indian handicrafts was
also due to the loss of internal princely markets,[51] although many of
the ruined centers of production did lie near ocean ports. Nevertheless,
the contrast with Japan, which did not lose its higher income home market
with the introduction of foreign trade, is striking. The 1830's were an
important turning point in this regard because in 1833 the East India Com-
pany's priveleges were eliminated, and British cotton exports to India
accelerated. "Agency Houses" failed in the late 1830's.[52] Our data
suggests an increase in per capita cloth imports from 1 in 1840, 5 in
1870, to 10 in 1913. In this last year total consumption of cloth hit an
all time high of 17 yards/capita. Imports had a considerable effect on the
demand for labor, and, in contrast to China where yarn imports were important,
the cloth imports were replacing both spinning and weaving. The largest
part of this increase occurred between 1840 and 1890. Hence, Thorners'
conclusion of the absence of de-industrialization during 1881-1931 is
consistent with Bagchi's positive finding for the period 1801-1901 (al-
though for a much smaller geographical area).

Our data suggests that it was around 1880 (give or take a decade)
where imports occupied the highest percentage of Indian consumption. It
is interesting to speculate about the magnitude of this effect earlier.
Indian National Income data is less than reliable for our period, with
Thorner not seeing a significant change in percapita income, while others
have argued for an increase of almost 50% between 1860 and 1930.[53] Since
during our whole period population at least doubled, aggregate purchasing
power must also have increased considerably.

Estimating previous consumption from our Table 6 and the income data, we can approximate production as the difference between consumption and actual imports. This procedure indicates a drop in production of around 300 m. yds. of cloth in the 1850's, and again around 350 m. yards for the 1870's. The 16 m. lbs., increase in yarn imports in the latter period would be almost as significant in terms of labor demand. Using Freuerwerker's data on labor time in spinning and weaving, we would estimate a decrease of about 500,000 man years in the 1870's, and 300,000 in the 1850's.[54] The Indian population was about 225 million in 1870.

We are now able to contrast the effects of foreign competition on domestic handicraft employment in China and India. To start on safe ground, India felt the competition perhaps 80 years earlier. Secondly, the only significant impact imports had in China was in spinning, at least after the 1870's. By that time India had become a net exporter of yarn, most of which went to

China. India's only significant competitor in China's yarn market was Japan. So the reduction in labor demand in China between 1870 and 1910, which Feuerwerker estimated at around 1.8 million man years (quite significant in a population of 450 million), was gained by Indian and Japanese machine spinning. There is some evidence of an increase in other farm activities (hog and poultry raising) in China's rural areas,[55] due to that released time.

How do we reconcile these results with the general impression that India was more affected by foreign competition that China? One could argue against our data, of course, starting from Feuerwerker's argument that

China's cotton production stagnated between 1870 and 1910. A weak point is our presentation of Indian hand spinning, although the earlier estimates are if anything too high, which would bias upwards any estimate of later

production decline. But there is a more important methodological point. Imports were sixty percent of Indian consumption in 1913; if instead of estimating the decrease in labor demand through actual production lost, we estimated it by using as a counterfactual that, in their absence, all imports would have been supplied by domestic production, then the lost labor in 1913 was about 5 million man years, i.e., over double that in China, and perhaps four times as large proportionately. (Incidentally, Indian cotton exports could have covered that increased internal demand of 650 m. lbs., leaving a bit for continued exports).

The same methodological point about comparing the effects of two processes can be made about the relative decline of the Indian labor market in the 1790-1830 and 1850-1880 periods. Comparing Robson's export totals with Prakash's productivity data (IESHR Vol. 13, 1974, pp. 159ff) would suggest that some 750,000 were employed in Indian cotton textile exports in 1790; two thirds of them in Bengal. (Milburn's figures, cited by Mitra and many others, give much smaller totals, and it is curious that Milburn's total Indian exports to England are larger than Davis').Bengal's cotton textile exports had virtually disappeared by 1835 (Mitra, after Trevelyan). Somewhat counteracting that collapse on a national level was an expansion of cotton cloth exports in other parts of India (see Appendix Tables IQ6,IV7,IV9), and, also, the expansion of silk piece good exports. These latter goods were much less labor intensive than the traditional muslins and calicoes, as were, most likely, the newer cotton cloth exports. The author is clearly in need of more data on these points. At the present stage of analysis, it would seem that some 500,000 equivalent jobs were lost between 1790-1830, due to the loss of the export market. As the reader will recall from footnote 11, in 1790 Inidan cloth exports were mainly directed to markets other than England, although english expansion in those third countries was probably more significant than their own import substitution as the cause of the decline of Indian cloth exports. Note that if one corrects the value of the decline of mid-nineteenth century exports by a relevant price index, the

,mid century impact was much greater.

Although this was a very severe blow to an important segment of Indian society, one also recalls that the poverty stricken state of Indian weavers had been noted with frequency before 1770 (see Chaudhuri 1978), for which famine and foreign competition can not be blamed. A completely open question is what happened to the cotton spinners, who in Indian society were virtually all women, and who were traditionally forbidden to work the land.

A comparison with these processes in England may also be attempted. As noted before, England became a net exporter of cotton goods around 1790. Cotton spinning was not a cottage industry-subsistence activity, although the "putting out" system exosted in mid-eighteenth century Manchester,[57] as it did in Japan,[58] India,[59] and early twentieth century China.[60]

English imports of raw cotton for clothing amounted to less than 1/4 lb/p in 1773,[61] when the acceleration of the industry was beginning, due to the development of machine spinning and later, weaving. So the amount of hand labor displaced by machinery cannot have been significant, viewed nationally. This was not the case regionally, as evidenced by the Blackburn riots in 1789,[62] which included the sacking of cotton textile factories. Of course the demand for labor was to increase so substantially that there was no long term negative effect, quite the contrary. Nevertheless, hand powered weaving continued to exist into the 1840's.[63]

Japan's experience would seem to be more similar to England's in that the expansion of textile factory labor absorbed a significant part of the labor force, in particualr young women from rural areas. Nevertheless, there was a gap between the opening of the country to foreign trade and the expansion of factory production, during which imports of cloth became as much as a fourth of consumption. The author has not encountered analysis of labor substitution for this period.

A final comparison can be made amongst our four countries with respect to tariffs and import substitution. England and Japan both had long periods during which imports were prohibited. A case could be made that England's initial developments in cotton textiles were not as much due directly to the infant-industry protective effect of that policy, but rather to the spin-off from the general technological improvements in textile manufacturing, woolen, and others.[64] Whatever the motives for a shutting off of Japan's trade, import substitution was not one of them. We have argued that some significant organizational changes took place in Japan during the Tokugawa period, but this author does not possess evidence that the important western technological innovations in spinning and weaving were introduced into Japan before it lost tariff autonomy in 1854.

In short, we are left with very significant import substitution withour tariffs. These three Asian countries did not gain tariff autonomy until the twentieth century.[65] Of course, lessening of foreign competition was quite helpful, as evidenced by the acceleration in production of all three countries during WWI. Nor are we arguing that higher tariffs would not have accelerated the process--certainly contemporaries in India felt so. In the light of current policy discussion in international economics, as applied to both developed and underdeveloped countries, the author finds this conclusion mildly surprising.

APPENDICES

These tables contain annual averages of quantity (Q) and value (V) of trade in cotton goods, presented by decades, between 1790-1930. They are organized by country, and trade flows between countries are listed under the exporting country. Two dots (..) indicates item was less than 0.01.

For conversion of local currency values into British Pounds, the following table of exchange rates was used.

	Ŀ/¥	Ŀ/HKT	Ŀ/Rupee
1870 and before		0.31	0.10
1880		0.26	0.08
1890	0.10	0.18	0.074
1900	0.10	0.14	0.066
1910	0.10	0.15	0.066
1920	0.07	0.14	0.05

Year	CQ1 Raw Cotton Imports m. lbs.	CQ2 Raw Cotton Exports m. lbs.	CQ3 Yarn Imports m.lbs.		CQ4 Cloth Imports m. pcs.	m. yds.	m. sq.-yds.		CQ5 Cloth Exports m. lbs.	m. sq.yds
1790									2.8[K]	
1800									4.2	
1810									2.4	
1820	50[A]								4.5	
1830	58								0.4	
1840	32									
1850	32									
1860	35	5[B]								
1870	22	4	12[C]	16[d]	11[G]	415[H]	376[I]		0.2	
1880	20	18	50		14				0.5	
1890	17	69	160		16				3.0	
1900	17	107	304[C]	320[E]	21[G]	721[H]	654[I]	739[J]	4.1	108[L]
1910	37	109		306[E]					6.4	
1920	267[A]	126[B]		74[F]				683[J]	6.9[K]	135[L]

Year	CV1 Total Imports m£		CV2 Total Exports m£		CV3 Yarn Imports m£	CV4 Cloth Imports m£	CV5 Yarn Exports m£	CV6 Cloth Exports m£	
1790								0.15	
1800								0.23	
1810								0.15	
1820								0.25	
1830								0.02	
1840									
1850									
1860	23[M]	20[N]	19[O]	19[P]	0.4[Q]	2.1[R]			
1870					1.1	5.6		0.02	
1880	21	21	19	20	2.4	5.8		0.04	
1890	29	23	22	16	4.5	4.9		0.16	
1900	54	46	32	27	8.3	10.1		0.20	
1910	76[M]	82	60[O]	66	10.0	15.6	0.08[S]	0.40	0.13[U]
1920		135[N]		108[P]	5.1[Q]	21.1[R]	1.29[S]	0.47[T]	1.00[U]

CHINA TABLES FOOTNOTES

CQ1 - CV6

CQ1 A   1821-1913   Chao, P. 104

CQ2 B   1821-1930   Chao, P. 104

CQ3 C   1871-1910   Feuerwerker. P. 344; D 1875-1879 Chao P. 93;
         E 1902-1913 Koh; P. 422; F 1922-1929 Chao P. 92. Consistent
         with Myers, P. 618. Yarn exports in 1920's was 60 - see
         Chao P. 92. See also UKQ5, JQ6.

CQ4 G   G Feuerwerker P. 344; H,I Feuerwerker P. 358. (second figure is
         net imports); J Chao P. 239. See also UKQ6, JQ8.

CQ5 K   1790-1929 Chao P. 82, (Item is handicraft cloth called nankeen);
         L Chao, P. 239.

CV1 M   Simkin P. 282; N Cheng, PP. 13, 32 converted from HKT.

CV2 O   Simkin, P. 282; P Cheng, PP. 13, 32 converted from HKT.

CV3 Q   Chao, P 89 converted from HKT.

CV4 R   Chao, P. 89 converted from HKT. Consistent with Koh, PP. 409, 423.

CV5 S   1912-1929 Chao P. 85 converted from HKT.

CV6 T   1791-1930 Chao P. 82 (handicraft cloth-nankeen), U 1912-1929
         Chao P. 85 converted from HKT.

	IQ1 Yarn Exports m. lbs.	IQ2 Yarn Imports m. lbs.	IQ3 Yarn Exports to China m. lbs.	IQ4 Yarn Exports to Japan m. lbs.	IQ5 Cloth Imports m. yds.
1790					
1800					
1810					
1820					
1830	0.2^A				
1840	0.6				
1850	1.0^A				
1860					
1870		11^G 34^I	0.8^L 9^N		1121^A
1880	36^E	47	30°	29^T	1835
1890		45^I	180^L 165^P 179^{LL}	11^T 7^U	2019^A
1900	248^C 266^F	36^{GA}	113^Q 215^R 192^{LL}		2631^B
1910	171^D 145	29^H 37^J 44^K	65^M 83^Q 167^R 130^S		1809^B 2421^U
1920	53^D 60^F	52^H 47^J 49^K	3^M 36^S		1788^C 1668^D

	IQ6 Cloth Exports mpcs. m.lbs. m.yds.	IQ7 Raw Cotton Exp. m. lbs.	IQ8 Raw Cotton Exp. to U.K. m.lbs.	IQ9 Raw Cotton Exp. to China m.lbs.	IQ10 Raw Cotton Exp. to Japan m. lbs.
1790	5^E 0.8^F	50^E	1.1^S		
1800	1.3^F		4.1		
1810			15 39^V		
1820	4.1^G		19 16		
1830	0.2^I	134^L	54 39		
1840	3.1^H 6.6^H	153	79 66	78^W	
1850	2.2^H 5.2^H	230^L	155^S 152^V	63^W	
1860		570^M			
1870		399^N			
1880		450°			
1890		524^P	108^T	8^X	224^{AA}
1900	89^J	654^Q	37^U	24^Y	202^{BB}
1910	154 218^K	919^R		15^Z	
1920	167^J 223^K			132^Z	569^{CC}

	IV1 Total Exports m£	IV2 Total Imports m£	IV3 Imports Cotton Manufactures m£	IV4 Imports Yarn m£		IV5 Imports Cloth m£	
1790							
1800							
1810							
1820							
1830	11[A]	5[B]					
1840	11	6					
1850	18	12	5[C]	1.7[D]	1.0[F]	8.1[H]	4.5[J]
1860	33	24	11				
1870	55	35	19	2.8[E]	2.7[G]	15.7[I]	15.3[K]
1880	62	44	22	2.7	2.7	18.6	18.2
1890	75	54	22	2.3	2.3[G]	17.2	19.4[K]
1900	69	64	24	1.7[E]		17.9[I]	
1910	136[A]	89[B]	31[C]				
1920							

	IV6 Yarn Exports m£		IV7 Cloth Exports m£		IV8 Cloth Exports to U.K. m£		IV9 Raw Cotton Exports m£		
1790					1.7[Q]	1.2[R]			
1800				1.1[O]	0.8	1.0[R]			
1810			1.0[M]		0.5				
1820			1.2		0.4				
1830			0.6		0.3		1.7[S]		
1840					0.4		2.0		
1850			0.7[M]		0.4[Q]		3.4[S]	3.1[U]	3.6[V]
1860							20.1	7.9	
1870	0.8[KA]	0.8[KB]	1.5[N]	1.6[P]			10.5[T]	5.7	20.3
1880	1.3[KA]	3.0	1.6[N]	1.9			11.0[T]	10.9	10.5
1890		4.7		2.1				9.3	12.8
1900		3.7[KB]		1.7[P]				5.6[U]	6.2
1910									16.2[V]
1920									

INDIA TABLES FOOTNOTES

IQ1 - IQ4

IQ1 A 1831-1859 Mann P. 129 (imports into England, most of which
        were re-exported).
     C E Singh, P. 240; D 1913, 1919, 20-26   Todd P. 196.
     F Utley, P. 299.

IQ2 G 1874-78 Singh, P. 239, GA 1907-1909 India (1912) P. 133; H 1913,
        1919-1926 Todd P. 198.
     I 1870-1895 Ray P. 164; J Chao, P. 382.
     K 1913, 1924-1929 Utley P. 283, See also UKQ3

IQ3 L 1875-79, 1895-99 Chao, P. 93; LL 1892-1906 Ray P. 199; M 1911-
        1929 Sovani P. 114.
     N Singh, p. 239. O Singh, P. 240; P 1890-99 Chao P. 94.
     Q 1902-1913 Koh P. 422 R:1902-1913, Koh P. 422 assigning data from
        Hong Kong to India, as data from India (1912) suggests. See also
        UKQ5, JQ5 and CQ3.

IQ4 T 1887-91 Japan (1893). U 1890, 95 Koh P. 302. Consistent with
        Ray, P. 195.

IQ5-IQ10

IQ5 A 1870-1895 Ray, P. 163. B
        C Koh P. 383; D 1911-13, 1919-1939 Utley, P. 259, See also
        UKQ4.

IQ6 E inferred from Robson, P. 2; F (Bengal only) 1797-1806 Mitra,
        P. 70; G for around 1820, inferred from Chandhuri (1971) as
        follows: 2.6 mpcs from Calcutta P. 115, 1.3 mpcs from Madras
        using value and price data from P. 121, 0.2 m. pcs. from
        Bengal, P. 113; H 1840-1859 Mann, P. 117. Exports to or
        through the U.K. are small, see P. 129 of Mann. I (Bengal only)
        Chaudhuri, P. 113; J Koh P. 383; K 1913, 1919-1926 Todd, P. 196.

IQ7 L 1834-1859 Mann, P. 103; M 1861-69 Harnetty, P. 56.
        N (stat. Abs. 1879); O Great Britain P. 89; R Wheeler P. 80

IQ8 S 1790-1859 Mann, P. 103; T 1890-94 U.S. (1895), P. 36.
     U India (1919), P. 89; V 1815-1859 Mann, P. 112

IQ9 W 1840-59 Mann, p. 103; X 1890-94 U.S.(1895), p. 36;
        Y India (1912), p. 85; Z 1911-1929 Sovani, Table 7

IQ10 AA Ray, p. 195; BB India,   p. 89; CC Koh, p. 381

NOTES IV1 - IV9

IV1 A First year of decade, Simkin P. 294.

IV2 B Ibid.

IV3 C Ibid.

IV4 D 1857-1859 Harnetty, P. 13; E 1878-1901 Dutt, P. 530;
F 1850-58 Dutt, P. 161; G 1870-1895 Ray P. 164; E and G
converted from rupees.

IV5 H 1857-59 Harnetty, P. 13; I 1878-1901 Dutt, P. 530; J 1850-58
Dutt, P. 161. I and K converted from rupees.

IV6 KA 1876-1885 Stat Abs; KB 1878-1901 Dutt, P. 533 converted from
rupees.

IV7 M 1814, 1815, 1828-29, 1830-40, 1950-51
Chandhuri (1971) PP. 25-26; N Stat Abs. 1876-1885; O 1800-
1806 (Bengal only) Mitra, P. 70; P 1878-1901 Dutt P. 532.
After 1810 data is converted from rupees.

IV8 Q Middle three years of each decade. Davis Appendix, Data includes
exports of cottons and silks from Asia including China before
1834-1836. Later data indicates that Chinese silks were not
more than 10% of value, Chandhuri (1971) PP. 113, 115, 121
indicate India silk may have been one-third of the total around
1820. R 1797-1806 (Bengal only) Mitra P. 70. For value of
Chinese cloth exports, see CV5.

IV9 S 1834-59 Mann, P. 130; T Stat Abs; U 1859-1877, 1880-1901 Dutt
PP. 347, 532 (1880-1901 converted from rupees); V Simkin first
year of decade.

	JQ1 Yarn Exports m. lbs.		JQ2 Yarn Imports m. lbs.		JQ3 Cloth Exports m. sq. yds.
1860			6[C]	10[D]	
1870			19	26	
1880			39	39	7[E]
1890	31[A]	31[B]	24	15	36
1900	94	94	4	4	137
1910	134[A]	171	1[C]	1	495
1920		92[B]		2[D]	1152[E]

	JQ4 Cloth Imports m. sq. yds.	JQ5 Yarn Exports to India m. lbs.	JQ6 Yarn Exports to China m. lbs.		
1860	28[F]				
1870	68				
1880	62				
1890	81		29[H]		
1900	110		91[H]		82[J]
1910	41	14[G]	144[I]	146[I]	99[J]
1920	15[F]	21[G]	48[I]	36[I]	

	JQ7 Cloth Exports to India m. yds.				JQ8 Cloth Exports to China m. yds.	JQ9 Imports Raw Cotton m. lbs.
1860						
1870						
1880						18[Q]
1890						194
1900					31[O]	395
1910	40[K]		41[M]		242	846
1920	179[K]	340[L]	236[M]	459[N]	647[P]	1290[Q]

	JV1 Total Imports		JV2 Total Exports		JV3 Yarn Imports		JV4 Yarn Exports	
	m £	m¥	m £	m¥	m £	m¥	m £	m¥
1860						2.3^J		
1870	2.4^A	27^C	1.7^E	22^G		4.9		
1880	3.5	33	3.2	42		7.9		
1890	7.7	233^C	8.1	139	0.8^I	8.1	0.7^K	7^L
1900	48 50^B	496^D	43	337^G	0.3	2.5	2.7	27
1910	68^A124	1235	65^E 148^F	1484^H	0.1	0.9	8.5	85
1920	213^B	3048^D	194^F	2785^H	0.1^I	2.1^J	5.8^K	82^L

	JV5 Exports Yarn to China		JV6 Cloth Imports		JV7 Cloth Exports		JV8 Cloth Exports to China	
	m£	m¥	m£	m¥	m £	m¥	m£	
1860				2.5^Q				
1870				4.9				
1880				3.8		0.1^S		
1890	1.8^M	18°	0.7^P	7.2	0.1^R	1.1		
1900	2.0^M	20°	1.5	14.8	1.1	10.7	0.5^T	
1910	6.6^N	66^P	0.8	8.1	10.4	104	6.4	
1920			0.7^P	10.2^Q	23.2^R	332^S	12.0^T	12.4^U

JAPAN TABLES FOOTNOTES

JQ1-JQ9

JQ1 A 1868-1912 Koh P. 340; B 1868-1929 Seki, PP. 304-305.

JQ2 C 1868-1912 Koh, P. 340; D 1868-1929 Seki, PP. 304-305.

JQ3 E 1868-1929 Seki, PP. 306-307.

JQ4 F 1868-1929 Seki, PP. 306-307.

JQ5 G 1913, 1918-1929 Utley, P. 251.

JQ6 H 1892-1906. Ray P. 199; I 1913-1929 Chao P. 90 (gives two
        sources); J 1902-1913 Koh P. 423. (Exports to Hong Kong were
        less than 10% of exports to China, see Japan (1905) P. 95).

JQ7 K 1911-1920 Sovani, P. 118; L 1927-29 Koh, P. 381; M 1913, 1919-
        1929 Utley P. 258; N 1928-29 Singh, P. 244. Consistent with
        Govil P. 34.

JQ8 O Author's calculation using average export price and export value.
     P 1913, 1925-26 Utley, P. 34, 102.

JQ9 Q 1887-1929 Koh PP. 429-430.

JV1-JV8

JV1 A 1870, 80, 90, 1907, 1912 centered quinquennial averages - Simkin
        P. 353; B, D Okhawa (1979) Table A1; C Allen P. 229; B is con-
        version of D values.

JV2 E 1870, 80, 90, 1907, 1912 Centered quinquennial averages Simkin
        P. 353; F, H Ohkawa etal., (1979) Table A1 , E is conversion of
        F values; G Allen P. 229.

JV3 I,J 1868-1929 Seki PP. 304, 305. I is conversion of J.

JV4 K,L 1868-1929 Seki, PP. 304-305. K is conversion of L.

JV5 O 1894, 1899-1904 Japan (1905) P. 95; P 1911-1917 U.S. (1919) P. 72
        M and N are conversions of O and P.

JV6 Q 1868-1929 Seki, PP. 306-307. P is conversion of Q.

JV7 S 1868-1929 Seki, PP. 306-307. R is conversion of S.

JV8 T Calculated from Chao, PP. 89-97 and converted from HKT
     U Utley, P. 102 converted from yen.

	UKQ1 Yarn Exp. m. lbs.	UKQ2 Cloth Exp. m. yds.	UKQ3 Yarn Exp. to India m. lbs.	UKQ4 Cloth Exp. to India m. yds.	UKQ5 Yarn Exp. to China m. lbs.	UKQ6 Cloth Exp. to China m. lbs.
1790						
1800						
1810	14[A]	227[B]		4.8[G]		
1820	37	320	3.3[C]	26	0.18[I]	1.6[M]
1830	85	552	6.5	60	1.5 3.4[J]	11
1840	136	977	17 16[D]	199	4.0 3.9[J]	.60
1850	163	1863	25[C] 21	507	4.5[I]	110
1860	138	2374	31	674		184
1870	218	3556	31	1189		402
1880	250	4674	47[D]	1918	2.7[K]	471
1890	239	5057		2097		495
1900	189	5649	32[E]	2304	2.9[K] 4.3[L]	562
1910	181	5460	24 25[F]	2761[G] 2040[GA]	0.8[K] 1.2	590[M] 716[N]
1920	170[A]	4087[B]	25[E] 24[F]	1352[H]	2.3[L]	229[N]

	UKQ7 Yarn Exp. to Japan m. lbs.	UKQ8 Cloth Exp. to Japan m. yds.	UKQ9 Raw Cotton Imports m. lbs.	UKQ10 United States Raw Cotton to UK m/ lbs.
1790			34[S]	
1800			59[S]	
1810			130[U]	64[V]
1820			190	123
1830			355	278
1840			606	498
1850			928	715
1860		22[P]	1090	419
1870		36	1476	888
1880	26[O]	57 58[Q]	1718	1242
1890	19[O]	83 50[Q]	1776	1400
1900		99	2000	1527[V]
1910		79[P] 47[R]	2091	
1920		12[R]	1621[U]	

	UKV1 Total Exports m£	UKV2 Total Exports Cotton Manufactures m£	UKV2A Textile Re-exports m.lb	UKV3 Exports Yarn m£	UKV4 Peice Goods Exports m£		UKV5 Yarn Exports India m£
1790	32^A	3^B	1148^CA		5^F		
1800	40	10	777	1^D	9^F		
1810	43	18	433	1	17^F		
1820	36	29^B 16^C	430	3	13^G		0.3^I
1830	44	21	406 35^CB	6	14		0.5
1840	99	26	450 81	7	16		0.8^I
1850	100	35	532^CA 91^CB	8^D	26		1.1^J
1860	160	53		10^E	14		1.5
1870	218	79		15	26	55^H	2.4
1880	230	73		12^E	41	55	2.6^J
1890	237	67			52	51	
1900	333	86			55^G	57	
1910	504	135				90^H	
1920	791^A	193^C					

	UKV6 Cloth Exports to India m£	UKV7 Yarn Exports to China m£	UKV8 Cloth Exports to China m£		UKV9 Cloth Exports to Japan m£	
1790						
1800						
1810	0.3^K					
1820	1.1	0.01^L	0.06^N			
1830	2.9	0.09	0.33			
1840	2.9	0.15	0.83			
1850	6.0	0.18^L	1.4			
1860	11.1		3.3		0.5^P	
1870	14.3		5.3		0.5	
1880	18.6	1.0^M	5.0		0.6	0.3^Q
1890	17.1		4.8		0.8	0.4
1900	21.9		7.3	5.7^O	1.3	0.7^Q
1910	31.0^K		8.0^N	5.9	.1.3^P	
1920				8.3^O		

UNITED KINGDOM TABLE FOOTNOTES

<u>UKQ1-UKQ10</u>

UKQ1 A   1815-1929 Mitchell Textile Table No. 4. Consistent with
              Ellison Table 2.

UKQ2 B   <u>Ibid</u>.

UKQ3 C   Mann, PP. 117, 118; D Ellison P. 63; E   ; F   Utley P. 251
              GA 1913 and 1919 Utley, P. 259.

UKQ4 G   Sandberg, Table 43; Consistent with Ellison, Mann, Koh; GA
              1913 and 1919 Utley, P. 259.

UKQ5 I   Mann, P. 119; J Chao, P. 93; K Koh P. 42; L Todd P. 185.

UKQ6 M   Sandberg Table 43; Q consistent with U.S. (1895) p. 32.

UKQ7 O   Japan P. 285.

UKQ8 P   Sandberg Table 43; Q Japan, P. 286; R Utley P. 32, 34.

UKQ9 S   Deane and Cole, P. 185; U Mitchell and Deane, PP. 180-181.

UKQ10 V   Mitchell and Deane, P. 180.

<u>NOTES FOR UKV1-UKV9</u>

UKV1 A   1796-1929 Mitchell and Deane, PP. 282-284.

UKV2 B   1790-1892 Mann Apendix (official values); C 1830-1929
              Mitchell and Deane PP. 302-306. See also Edwards and
              Robson.

UKV2A   CA (middle three years of decade) Davis Appendices, -includes all
              Asian cotton and silk textiles - see note to IV8; CB Mann, p. 129

UKV3 D   Mann, P. 98 (declared real value). E Ellison Appendix Table 2.

UKV4 F   1790-1819 Mann P. 97-98; G Ellison, Table 2 (first year of
              decade); H Aldcroft, P. 109 (first four years of decade).

UKV5 I   1820-1859 Mann, P. 115; J 1860, 1870, 1880 calculated from
              Ellison, P 63 and Table 2.

UKV6 K   1815-1913 Sandberg, PP. 258-262.

UKV7 L   1827-1858 Mann P. 119; M 1880 Koh P. 414.

UKV8 N   1827, 1834-1913, Sandberg, PP. 258-262, Consistent with Mann,
              Koh, P. 414; O calculated from Chao, PP. 97, 89.

UKV9 P   1864-1913 Sandberg PP. 260-262; Q various years, converted
              from Japan (1893, 1904, 1905).

Footnotes

1. See UN, pp. 496, 551, 949.

2. Mann, pp. ii-iii.

3. Deane and Cole, pp. 59, 212.

4. Elliston, pp. 86, 63.

5. See Ellison, p. 29, for a listing of relevant 18th century inventions.

6. Edwards cites (p. 15) data that high count cotton yarn, suitable for competition against Indian muslins, would cost 43 shillings a pound in 1779, and 4 shillings a pound in 1812, compared to Indian yarn costing 9 shillings.

7. See Mitra.

8. The author has been unable to find an index of textile goods' prices before 1815. This is an important gap, because during this period the drop in textile prices would be due to mechanization, and not the falling price of raw cotton.

9. Compare Utley, Kahn, and Farnie. Sandberg has a table (p. 219) showing the degree of self-sufficiency reached by many large countries in the early 1930's. Lowest on the list are India (77%) and Canada (75%). For tariffs in Britain's markets, see Aldcroft, p. 117.

10. See Ellison, Chapters VIII and IX; Farnie, p. 90.

11.   Davis' appendices present the following data for England

1,000 £

	1784-1786		1794-1796	
	TOTAL	ASIA	TOTAL	ASIA
Woolen exports	3882	160	5764	582
Cotton exports	797	0	3454	1
Re-exports of cotton and silk	395	1	1148	
Imports of Asian cottons and silks	1344	1344	1687	1687

See also appendix Tables C-5, C-24 of Chaudhuri (1978). and CV6

12.   Milward and Saul, p. 189. Landes, p. 82, does not agree, and prefers

to stress technical factors relating to the two fibers.

13.   Chao's book is excellent on these and other topics. It rivals

Sandberg and Farnie in terms of comprehensiveness; no mean feat consid-

ering the tradition of British scholarship. One looks in vain for a

similar treatment of India.

14.   Feuerwerker, p. 27; Chao, p. 233; Perkins, p. 283.

15.   Using revised data from Table 5 and population from Perkins, p. 16.

Perkin's population data is significantly different from Chao's, making

such comparisons for China more difficult and less meaningful.

16.   See India (1911), Myers , p.   , and Koh, p. 422.

17.   Not an idle issue, because of the incidents of fighting in important

cotton growing areas. See Perkins, p. 28.

18.   Robson, Appendix A.

19.   Desai, p. 88.

20.   Also Ghandi, p. 85. Students wishing to evolve more complex measures

of aggregate production are advised to re-read Sandberg beforehand.

21.   Robson, p. 1.

22.   See Mitra, p. 31, Chaudhuri, (1971) p. 18.

23. Mitra, p. 30, Farnie, p. 99, Govil, p. 12.

24. 50 m. yards equals approximately 13 m. lbs. At 2 1/2 lbs/person, and a population of 100 million, production would be 250 m. lbs. minimum.

25. Hanratty, p. 54.

26. Blyn, p. 288.

27. Dudley, p. 44, Gandhi, p. 78.

28. Blyn states (p. 196) that (British) India had only 13% of cotton acreage under improved varieties in 1922, and irrigated cotton land was only 17% of the total.

29. FAO (1972), p. 120.

30. U.S. (1895), p. 36.

31. This is a very different view from that g ven in the Lewis book.

32. See Table 6. Thorner's discussion of long term changes in per capita income in India argues against major changes in either direction, the chapter in Singh suggests it rose slowly.

33. Hanratty's increase of 3.2 m. acres multiplied times an average yield of 60 lbs/acre produces 200 million lbs. of cotton, as opposed to an increase in exports of about 250 m. lbs. Another way of guestimating this is to calculate the quality of land needed to produce 2 1/2 lbs/capita (Ellison's data, p. 63), and cover exports. This is about 13 m. acres. If Hanratty's 75% increase in acreage occurred over the whole sub-continent at constant yields, the increased output would be almost 600 m. lbs., more than double the amount needed.

34. See Blyn, Chapter 5.

35. Singh, p. 701.

36.   See Gandhi, also Sandberg, p. 186.

37.   Desai, p. 75. It was estimated at 100 m. lbs. post WWII, Robson, p. 19.

38.   Following the argument of Ellison, p. 63, who, if anything, under-
      estimated per capita consumption.

39.   Shimbo, p. 57, Koh, Chapter 1.

40.   Production, Koh, p. 311; population, Hanley and Yamamura, p. 52.

41.   Allen, p. 22.

42.   Ohkawa, et. al., (1966), p. 145.

43.   See also Hauser, p. 2.

44.   Hauser, p. 50.

45.   See Nakamura, Appendix B.

46.   Seki, p. 18. Assuming a yield of 60 lbs/acre, cotton utilized about
      1-5% of Japan's total acreagae, but was highly concentrated in some
      areas. See Hanley and Yamamura, p. 95, p. 372 ftn. 26, and Hauser.

47.   See Saxonhouse.

48.   See Sandberg, p. 166.

49.   See Gandhi, p. 52.

50.   Cf. Koh, p. 90. Other authors explain this in terms of the 'normal'
      infant industry situation, see Mehta, p. 6.

51.   See Mitra, Gandhi, Gadgil, Chapter III.

52.   See Chaudhuri (1971), pp. 20-24. Production and exporting continued,
      however, on a smaller scale.

53.   Thorner, Chapter VII, Singh, Chapter 25.

54. Using per capita income from Singh, pp. 701-02, population from
    Singh, p. 104 and Simkin, p. 294, and our data on cloth consumption
    by decades yields the regression equation ('t' statistics in parenthesis):

    log (Consumption) = 7.36 + 0.0014 Income R^2 = 0.62, n = 7
                (21.9) (2.86)

	1840's	1850's	1860's	1870's
Predicted consumption increases are:	107	174	294	512
Actual import increases are:	169	511	98	890
Implied production increases:	-58	-337	196	-378

    A regression using population alone predicted larger changes in con-
    sumption, hence smaller changes in production, with a somewhat larger R^2.

55. Feuerwerker, p. 376, ftnt. 57.

56. Mitra, Chapter V.

57. Dudley, p. 14.

58. Hauser, p. 136.

59. Mitra, Chapter 3; Chaudhuri (1966), p. 150.

60. Chao, Chapter 2, Koh, Chapter V.

61. From Deane and Cole: population, p. 8, imports, p. 185, cotton con-
    sumed in candlewicks, p. 184.

62. Mann, p. 15.

63. Farnie, p. 89. Landes traces it into the 1860's.

64. Landes can be read either way on this. Import restrictions surely
    existed, but he notes them mostly as an annoyance to wool producers.
    Like most discussions of technological change in Britain, he emphasizes
    human and technical factors, not governmental policies.

65. The 1920's for India, see Rider; 1911 for Japan, See Allen, p. 128;
    1918-1931 for China, see Chao, p. 91.

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