CHAPTER-3

TEXTILE INDUSTRIES DURING 18TH CENTURY: PRODUCTION, TECHNIQUES AND TRADE
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INTRODUCTION

With the dawn of 18\textsuperscript{th} C Northern India in particular experience great many change took place more particularly on the economic front. This happened due to the slow decline of the mighty Mughal Empire and arrival of numerous European trading companies who were to change the course of the entire economic setup in the coming decades. With them the interaction between Europe and Asia had begun with western ideas and institution finding place in India. The question of textiles industry was to come extremely vital as it was the product which had become source of friction between the European companies, particularly the British East India Company and the local indigenous producer. The local technology was to suffer in the coming decades as Europe was transferring itself into industrialized continent, particularly industrialization. In England had to challenge the India's Indigenous industrial setup.

This whole chapter is devoted to the study of textile craft technology and its produce apart from understanding several of its pros and cons and issues related to it.

Before the invention of spinning and weaving machine in Britain in the second half of the 18\textsuperscript{th} c., the Indian subcontinent was probably the world's greatest producer of cotton textiles. The overseas market in Asia and Africa were of course long dominated historically by the Indian products, and to the demands of these two continents Europe added its own in the 17\textsuperscript{th} C. While hand weaving of cotton goods was indigenous to most of the countries which had access to local supplies of
raw materials, the finer the luxury products were almost entirely supplied by India. Even as late as 1772 Henry Patullo’s comments suggest, in the course of time the demands for India’s textiles manufactures could never lessen because no other nation on the globe could either equal or rival their quality.¹

This observation may not conclusively prove that the contemporaries attributed Indian supremacy in textiles industry to the mastery over problems of technology, but it reveals at least a wide spread awareness of the unique position of Indian products and the role played by manufacturing quality and the world demand for these textiles goods. There were certainly many plans for the creation of a cotton textiles Industry in England during this period.

The proposal of John Barkstead (a goldsmith in London; captain parliamentary infantry under Colonal Venn, governor Reading 1645; in 1648 he was appointed one of the king's judges) in 1691 for the incorporation of a company manufacturing Calicoes was followed three decades later by other memorials addressed to the Board of Trade stressing the benefits which the country could expect by substituting domestic production of the Indian imports.²

Before the invention of machine spinners, hand spinners in Europe could seldom equal the quality of Indian yarn, and the textile fabric utilizing cotton were widely woven in Europe with thread imported from India.

The prohibition laws enacted in the early part of the 18th c and directed against the wearing of cotton materials probably also discouraged any idea of importing technical knowledge from abroad. Finally there was the fact that businessmen engaged in the cotton trade already had vested interest in importing and distributing cotton textiles from cheap producing areas on commercial terms that ensured them
semi-monopoly profits. India thus possessed two major advantages in locally produced raw materials and human capital. India had natural endowments which gave its cotton industry a distinct lead in cost.

Although the cotton textiles industry was of such obvious importance to the economy of India in general, there are few studies that attempt to analyse its structure and development. It is clear from the records of the European trading economies that the industry did not exist in an unchanging state and that there were varying responses of the different regions in India to shift in demand and other external conditions.

The subcontinent was not geographically or even administratively a homogeneous area and it was to be expected that the fortunes of the textiles industry would be tied to the state of a regional agriculture, density of production, transport facilities and the quality of political rule. It is admittedly of formidable task to undertake an analysis of the Industry in the 17th and 18th centuries from European sources alone. In attempting to explain the dominant position of the textiles manufactures in Coromandel and Bengal, Robert Orme, the 18th C historian of the company, put forward the unique suggestion that it was due to the low physical strength of the inhabitants, since weaving was a sedentary occupation and required the minimum possible effort. Orme’s martial races theory of Rajasthan, Punjab, and the gangetic plain having more industries are not very important. It may seem strange that they should have overlooked something that was clear to most of the company’s servants in charge of the textile trade that the cotton industry in India was organized on the basis of caste groups which were to be found in all parts of the country and that its diffusion had little connection with the specific genetic characteristic of the people. But the question raised by Orme still stands.
The general picture regarding the location of the cotton handloom industry was clear enough within India a substantial inter-provincial trade had developed based on fine textiles which were supplied from special centers. The muslin from the Dacca district in Eastern Bengal had their counter parts in the Silk goods and taffetas (a medium-weight or light weight fabric of nylon, ryon or silk) of Kasimbazar, also in Bengal. Towns in Western and Central India such as Ahmadabad and Sironji provided fine embroidered quilts, satins Chintz and famous transparent Muslin (*Ab-i-ravan*), meaning flowing water. The finest varieties of pointed cloth in India, as the servants of the East India Company so often described came from the area around Masulipatnam. In the case of Dacca and Kasimbazar an important encouragement to specialization was certainly to be found in the proximity to the supply of suitable raw materials. The quality of the Dacca Muslin in our period was in a great measure due to the quality of the raw cotton grown in the area.

Technical considerations such as these were reinforced in every case by commercial forces. It is obvious that areas of special textiles manufactures like Dacca and Masulipatam had expanded on the basis of urbanization and allied industries there will skilled artisans around.

Henry Bornford, a servant of the East Indian Company, wrote a lengthy report which provides much detail information on the location and route network of the cotton trade of Punjab. The white cloth woven in Panipat, for example was sent to Sirhind or Lahore for sale, while the products from the famous Calicoes town of Samana were directly exported to Isfahan and its adjacent markets by the Persian and Armenian merchant by way of the Kandhar. The fine textile from the Jalandhar doab were marketed through Lahore which Bornford described as ‘the prime city of traffic in India pointing out that all
commodities of the adjacent places being brought hither and are bought
by the wousbecks (Uzbeks) or Tartar and Soe transporated by Kabul
into these parts. During the first half of the 18thc Europe was
unquestionably Bengal's chief trading partner, its textiles industry had
not only expanded at a rapid rate to keep pace with the increased
demand, but had also fully adjusted its output to the special specification
required for selling in Europe. Bengal's location advantages were
attributed by contemporaries both to the lower cost of water transport
and the productivity of agriculture.

As per the comment of Court of Directors and the reply of
Council in comment we find the note useful in understanding the exact
situation; "Neither may you ever expect the commodity can be made here to be afforded
as reasonably as in Bengal, for all provisions of victual. When at the cheapest, is here three
times dearer then in Kasimbazar and Hugly. Where these taffetas are made, and
consequently the weavers and other workmen employed Industrial production therein can
maintain themselves at two-third less than those that shall be employed in this your
town". Industrial production could also be decentralized in Bengal
because the province had a cheap and highly flexible means of
movements in its inland water ways.

The geographically contrast between the north and the south east
was naturally reflected in the contrasting character of their Industrial
organization. The flat plains of northern India made it easier to construct
roads. As a result, cities were able to grow both in size and population,
and the same process contributed to the division of labour among the
Urban production units and the creation of external economies to a
whole series of related activities. One of the main discoveries made by
the European companies attempting to develop textiles trade with India
in the 17th and 18th centuries was the existence of a vertical link
between marketing and Industrial production. The Indian weavers
seemed to have adopted two distinct approaches to the problem of
adjusting out put to demand. There were those who more traditional and well know verities of cloth for the open markets. The function distinction between the two systems does not necessarily imply that they were mutually exclusive in practice.\textsuperscript{12}

The absence of central control in production has crucial implication for industrial organization and its form. Under such condition it becomes easy for traders to assume control over artisans through their greater experience of the market. The weaver on his part can strive to minimize his financial out lays and risk by selling the unbleached cloth to the wholesaler whole arranges the final stage of finishing. But here again specialization of technical function left a great deal of room flexibility, and the degree and extent of control exercised by the producer or the trader respectively over the successive processes was likely to determined by the weight of historical circumstances. What form the actual arrangement could take can be seen from a description of the cloth trade of Bihar dating from the early 17\textsuperscript{th} C. The province was well known for its middle quality strong white cloth trade of Bihar dating from the early 17\textsuperscript{th} C. The province was well known for its middle quality strong, white cloth, which was woven in the neighborhood of Patna. The administrative and town called Lakhwara some 30 miles of South. In a series of letters written in 1620, Robert Hughes pointed out that the cloth was daily brought to the latter market by the weavers from the surrounding villages and sold mostly in a raw state. After purchase the buyer delivered the ‘raw’ cloth to the bleacher who took three month to wash and starch and charged three rupees per 20 pieces. The price paid to the weavers for the unbleached cloth was daily brought to the latter market by the weavers for the unbleached cloth was fixed by the current market price of the finished product minus a discount of 25 percent. It is evident from this description that
while Lakhwar served as a wholesale centre, Patna had on internal consumption of its own because the cloth which the weavers sold there was already 'whited and cured.'

Although Hughes assured the Surat Factory that the region was capable of supplying 2000 pieces of cloth annually, he also made it clear that this would be difficult to organize from Patna for his own experience told him that what the weavers brought into town was finished cloth for the locals bazaars only limited in quality. Further more, the big merchants who arranged to buy cloth directly in countryside were not prepared to sell it in the local market at the going rates of profits as they could make a far greater gainer by exporting it to Agra, Lahore and other northern Indian cities.

To attempt to characteristic a craftsman as a kind of specialized trader is to ignore all historical reality. A situation in which the industrial producer sells directly to the consumer is likely to be a limiting case of an extreme kind. Such a condition would probably obtain only in a very primitive economy where the handicrafts do not provide more than a partial means of subsistence and where the division of labour has not proceeded beyond a primary level.

Access to a market extending beyond the immediate location of the artisan was therefore a necessary condition for complete specialization. Even in 20th century India a survey of the handloom industry revealed that in almost every major weaving centre were the weavers where wholly dependent on their trade for a year round livelihood. The output of cloth became too great to be disposed of locally, and the weavers were faced with the choice of either selling their products to the village dealer and disadvantageous prices or wasting much time and effort trudging from one local market to another with their goods trying to find better terms. The expansion in the
volume of European century called for an increased investment which took place in the first half of the 18th century in the system of production but this was a period when regularity was diminishing, and the textiles was being constantly disrupted by recurring famines, wars and invasion. The natural reaction of the merchants with definite contractual obligations to the trading companies would be in such situations to tighten their control over the artisans in an effort to insure against losses. The craftsmen on their part could well have demanded that advance financing should take the form not of money payments but the provision of yarn and food grains.18

Bengal alone seems to have escaped any fundamentals changes in industrial organization though ravages of the Marathas had ruinous consequences for the merchants, of course, in remote areas cut off from trade. The artisan still pursued the unchanging and recurrent rhythm of activity which characterizes a closed economy.19 The advance financing of production for a market was a vertical system, with the force of integration coming from the allowed the artisan considerable initiative in decision making and gave them a certain measure of economic independence. But when its twin pillars of support, an established social and political order and a steady demand, were shaken, both the merchant and the weaver were compelled to seek modification. Direct employment by merchant gave the artisan and assured source of income. But it reduced the flexibility which he had previously possessed and it was the merchant who now stood to benefit from the operation of competitive market forces.20

The 18th c was a period of very great change for India since the Mughals first established their power in the country two centuries earlier, for the textiles industry the century derived its distinctive character from a peak expansion in export out put reached in the earlier
half and the contrasting disruption and decline which marked its closing years. Some of the reason for this retrogression was to be found in conditions internal to India’s history. But the main challenge, which was to radically change the future course of events undoubtedly, came from the impact of Industrial Revolution in Britain.

Perhaps for the first time in its history India was placed in the position of having to import to textiles goods from a foreign country, and more than a century was elapse before it was able to recapture some of the earlier vitality for her cotton production with the help of imported technology what had gone wrong that made it so difficult for India to maintain the competitive position of her most important industry? To answer this question is to find an explanation why and how technological transformation takes place in the production processes. Why did Industrial revolution originate in Britain and not elsewhere, and why did occur at the time did? In spite of the ingenuity and attention that have been lavished on the problem, historians have not seeded beyond merely pointing to possible. Combinations of circumstances which brought about of rapid diffusion of new production technique of Europe as one of the contributory factors as it was suggested earlier, was the role played by the Indian cotton imports. The development and application of a whole range of machinery, from mechanical carding and cleaning of cotton of spinning and weaving were intended to create an important substituting industry it would be wrong to treat this as a deliberate act of human will. But the English woolen and silk manufactures treated the imports as a clear threat to their economic interests, and the desire for the creation of domestic cotton industry had been long sought. Without the cost reducing function of machinery, it would have been impossible to overcome the comparative advantage
possessed by India. And the East India Company, at least, was fully aware of the differential wage rates which prevailed Europe and India.\textsuperscript{21}

In 18\textsuperscript{th} C India the empirical basis for an industrial revolution was amazingly lacking. There had been no marked progress in scientific knowledge for centuries, and the intellectual apparatus for a diffusion and systematic recording of inherited skill was seriously defective. To these institutional problems must be added the much more regions causation. The absence of economic incentives for improving the productivity a labour for the workman in India there were two scourges, commented Francisco Pelsaert, one was low wages and the other was oppression by the ruling elite.\textsuperscript{22}

But even without this restriction the rationality of the entrepreneur's choice from among a number of different techniques can be dictated by economic factors alone in a situation where there is surplus labour leading to how wages and the production technique characterized by high out put to fixed ratio, there may be an actual distinctive to use more capital intensive method.\textsuperscript{23} But the question of India's stagnation in technological development can be cast in a new form by asking a different question, historians have traditionally sought an explanation for the occurrence of technological progress in one place and time as apposed to its non-occurrence else where.

However, was there any compelling economic and social reason why India should have embarked on a search for new techniques and production methods at this particular stage of her history? Was the India is wearing technique inferior and backward in comparison to these of other countries? And what foreign threat was there to existing supremacy in cotton textiles? When the threat did materialize in the nineteenth century, the necessary technology was imported from abroad by Indian businessmen themselves. Once again, it can be said that the
the Indian context was no more historical accident.

That the technical processes embodied in the Indian cotton Industry in the 17th and 18th centuries had reached there a high limits at the end of a logistic growth curve dye fixing technique which require a fairly complex series of chemical treatments of the cloth 'painted' with multi-colored pattern is an obvious example. 24

The process was based on an traditional and hereditary knowledge of the physical properties of the various kinds of dyes used and not knowledge of modern chemistry. But it was effective against the frequent and often rough washing methods employed in India. It is true that there were certain colors in silk piece goods which the Indian dyes were unable to produce, and the company sent out skilled craftsmen from England whoever to teach their Indian counterparts how to produce the gloss back and other colour favoured at home. 25 From the foregoing review of some of the urban centers in Hindustan during the Mughal rule it is abundantly clear that, with political peace in the background it was the industries and commerce that had rendered their position viable. As cultivation was the backbone of village economy, industries constituted the main source of producing and earning wealth requisite to the sustained growth of town and cities of our region are textiles and allied industries, sugar and metal wares manufacture of paper does not appear to have been anything like universal, or that of salt by any means urban.

Textiles, however, was the most important of all industries, cotton, silk, wool and hemp yarns were being woven into fabrics but silk and wool did not enjoy a fraction of the ubiquity of cotton. Sack and sack cloths are undoubtedly mentioned in local contemporary sources 26 and the cultivation of hemp was being carried on in almost all the
The silk industry was concentrated upon their decline, at Banaras, where a nuclear of industry that had already existed was then expanded. And important factor in the growth of the industry at Banaras was the easy availability of raw silk from Bengal, which continued unabated even after the latter and capitulated to the English. Within our region woolen goods were being produced chiefly at Lahore. It is possible in other parts as well. The cotton textiles industry was universal topping the list of all manufactures within our region during the Mughal era. No city, town, Pargana, Casbah or village seems to have been devoid of this industry.

Infact, as many as thirty two major centers of cotton productions are noticed in the sources, and not frequently we find that the movement in magnitude of out put of cotton goods, as with Sirhind, Khairabad or Daryabad. The cotton textiles industry, by virtue of its general diffusion and the extent of its production, came to exercise a direct impact on the economy on the economy of our entire region. In tropical climates cotton fabric are a necessity and silken and woolen stuffs a luxury a factor which ensured a steady, and with the multiplication of the population, a growing demand for cotton fabrics both within the country and abroad. In practice, it implied that these were the principal sources of earning foreign exchange or constituted the medium for increasing the aggregate wealth of the region under review. The Mughal emperors to undertake measures calculated to directly encourage this industry. Even as late as 1770 the east India company’s historian, Orme, commented that “cloth being the staple manufacture of India and trade in general is better encouraged here than in other despotic states: cloth happens to be one of the greatest resources of public revenue.”
From the Subah of Lahore, we have Lahore city itself producing cotton fabrics, ormesins, and quantity of white cotton goods from 1446 onwards the Machiwa baftas of finer quality were in demand by the East India factors.

Subsequently the industry seem to have expanded here as 'Haqiqat Hai Hindustan' enumerates several varieties, amongst its production. Similarly Sialkot as a textiles manufacturing centre is first observed by Sajan Rai. According to whom a part from other local varieties, the embroidered stuffs alone were sold for Rupees one Lakh every year in Gujarat, in the same subah surpassed even Sialkot in the output of 18th c. Bajwara is also noticed as producing quantities of cotton fabrics.

In the Subah of Delhi, Sirhind produced an assortment of cotton stuffs. Persian and Armenian merchants frequented this town were chiefly interested in its red salu and chintz, Later on Sultanpur too began to turn out quantities of Chintz, Samana and Sirhind leased to count in the cotton textiles industry after the rise of the Sikhs in the early 18th century Sirhind became a victim of the contending forces the Mughals and the Sikhs. The capital city of Delhi specialized in the production of Chintz and quilts. Its Chintzes are reported to have been inferior only to those of Masulipatam. Again it was the Armenian and Persian merchants who were chiefly interested in commodity. The fabrics of Panipat were of the same measurement as those of Samana and used to be sent to Sirhind and Lahore for the benefit of the said merchants. A village of Gokul in Mathura produced guzees. Agra produced large quantities of cloth. The best kind of cotton stuffs used to be available here for the European traders, especially the Dutch, Manucci's report also bears out the abundance of white cotton fabrics at Agra. It may be gathered from the testimony of 'Haqiqat Hai
Hindustan' that even during the last decades of the 18th century, Najibabad and Bareilly became well known centers of the cotton industry.48

While Shahjahanpur is noticed for the manufacturer of superior kinds of cotton goods,49 Saharanpur had enjoyed wide repute for the excellence of its Chantras and Khosa since the days of Abul Fazal.50

In Farrukhabad separate quarters were assigned to the Hindu and Muslim weavers,51 and during 18th century it gradually became once of the chief cotton manufacturing centers.52 In Oudh, Lucknow was one of the principal centers of cotton fabrics from the early 17th century and W. Finch had found great traffic in 'linen' here53, Pelsaret noted the production of coarse cotton stuffs in Oudh,54 English factory greatly interested in Lucknow's intercool's and daryabadis,55 though not its guzees.56 Dariyabad's,57 and Khairabadis,58 so much in demand among the European's trader were principally produced in Dariyabad,59 and Khairabad60, Nawgaon in the Hardoi district produced mercools,61 came to be noted for their cotton manufacture.62 During the 18th century the flourishing state of the cotton industry in Oudh it this period, when the major part of the cotton industry in Oudh at this period, when the major part of India was in turmoil, may be accounted for primarily by the stability that obtained in the kingdom and also by the prohibited duties that the Nawabs and imposed imported goods. Along with the cost in carriage the duties had effectively kept in sizable import of cotton goods into Oudh. They had helped to keep the local industries alive.63 Oudh stuffs used to be exported to Persia, Europe and South East Asia though the part of Kolkata,64 and presumably a smaller quantity to Central Asia overland routes. After the unruly Sikhs blocked the usual Lahore route the Carvanas were diverted to Najibabad and Kashmir for destination beyond Kashmir availability of outlets for the Oudh manufactures
further stimulated the industry and we find that in 1799 Lucknow was providing 5000, coats for the Delhi soldiers per imperial order. In fact by that time Lucknow was extensively producing a special variety called Sallam, which seems to have been suitable for soldierly for a part from the above order, it was being forwarded more generally to Delhi and Kolkata.

Jaunpur produced large quantities of cotton carpets, and other fabrics such as turbans, girdles, and white plan calicoes, 'Haqiqat Hai Hindustan' mention the manufacture of good Jhona variety here. At Jalabad and Mau in the Sarkar of Allahabad Jhoni, mihirkul and other varieties were being produced. Even as late as 1771, the English were intending to send their Gumasthas to Allahabad in order to buy piece goods. Hadiqatul Aqlim noted that Shahzadpur used to produce stuff suitable for tents and uses of kindred nature, but as the demand for these goods had declared their production too been reduced. In the other hand, the chintz and guzees of Shahzadpur hand still retained their position.

Mirzapur too is attested to have been producing white cotton goods for sale to these, who wished to buy them for trade purposes, at Mau and Jalabad Jholi and Mihirkul varieties were being beautifully woven. Besides specializing in the above varieties, Banaras also fabricated 'Shahes for the Moor,' The volume of the local output of cottons goods certainly impressed R Fitch while he was at Banaras. Similarly Pelsaret recorded the manufacture here if several varieties such as girdles, turbans, saris and Gangajal.

Manrique was so impressed with the enormous quantity and excellent quality of the cotton goods that he attributed the richness of the city to these products. The author of Ajaib i Duniya shared Manrique's view that cotton fabrics of Banaras were the principal source of the wealth. According to Tavernier the weaver cum sellers used to fill two
large galleries with their stock for sale. After hiatus several decades, by about the end of 18th century, Kindersley and Ghulam Mohammad Khan again testify to the presence of a considerably number of weavers in the city.

With the advent of European traders at the beginning of the 17th century the industry seems to have been greatly stimulated. Amertees a coarse kind of stuff was largely woven in and around Patna in various grades as in recorded in the reports of the English factor. Pelsaret corroborates the production of coarse muslin at Patna. Ajaib i Duniya refers to another variety, mercool, which had perhaps been recently introduced here from upper India for it does earlier, while Manucci terms its piece goods as very fine white cloth, Khulasatul Tawarikh simply recorded that various kinds of cotton cloth were women at Patna. Kindersley's testimony of a coarse sort of painted calicoes, figured table linen, some ordinary wrought Muslin; and car pests reflects a further expansion of the industry though the variety still continued to be of inferior quality. The local merchants and traders may not have required superior material. But this trend to expansion according to Bolts, was checked after 1765 by the establishment of the English monopoly over the trade and production of a cotton goods at Patna. The growth of industry was arrested and it even began to decline. This wide growth of cities and towns as centers of cotton manufactures may be taken as primarily urban, at least in the region under discussion. Every town or city took to this industry as one of the principal means for multiplying its productive resources. The capital cities or even administrative centre such has Lucknow and Farrukhabad provide evidence of tendency.

As a matter of fact, in some cases the towns were entirely dependent upon this industry. The rise and fall of the town
corresponding with the growth and decline of the industry, Samna, Khairabad and Daryabad may be cited as example. In other's like Banaras or Patna, on the other hand, it occupied a complementary position to their commercial traffic. The relationship between the two cotton textiles production and commerce is plain enough. To whatever category the towns belonged, one factures was common among them all. They all produced there special varieties mainly with the object of export for example the embroidered of Sialkot and Gujrat. The chintz of Delhi and Sirhind, or the plain amertees of Patna were all meant of foreign markets.

Thus find that till the end of the 18th century, textiles production was chiefly concentrated around the capital cities, within a radius of about a hundred miles from each on them, though the industries of far flung ones like Banaras and Patna continued to thrive and expand.

Thus through the 17th century, town after town was being added to the existing centers of piece goods production. The emphases were on the western and far eastern regions. The central parts of upper Doab and Oudh were not being equally prominent after the death of Emperor Aurangzeb, however, the position shifts. The centers of the west then began to fall one by one within the threatened zone by anarchy when not his directly by violence and molestation of troops. Until about the middle of the 18th century no trace of their erstwhile prosperity remained. Lahore, by virtue of its size and importance, could sustain longer than others but its days too were numbered. Indeed, even eastward the situation had become so precious that the English factors decided to wind up their factory at Agra in 1654 as it was no longer sufficiently remunerative, on the other hand new principalities of Najibabad, Farrukhabad and Oudh, relatively peaceful administration and careful patronage of the industry by some of their competent, or
shall we say less incompetent rulers greatly stimulated it either by creating new bases, as at Shajahanpur, Bareilly, Farrukhabad, Khairabad and Daryabad, or by developing the existing ones, like the east towards the west after 1765, affected the industry altogether in different manner. While their monopoly of trade curtailed the aggregate demand for cotton good, there was however, no violent departure from the usual course of production nevertheless since the production would be affected by the shrinkage of demand, the growth of the industry came suddenly to a halt, as in Patna. Besides their were other than local factors which by the last decades of the 18th century began to exercise detrimental effects on the industry, such as the introduction of machine made goods in England's. The export of the mill produced English goods in England the export of will produced English goods proved disastrous to the cotton textiles industry of India in the ensuring unmatched competition between mill manufacture and hand made goods in the foreign markets, Indian fabrics began to lose market after market, which occasioned a further decline in the output. This feature is at all events, quite perceptible at Patna. So that we may conclude that there the industry had reached a stage wherever stagnation had set in.

In fact this was the very first occasion when the cotton textiles industry is seen to be suffering from sluggishness which gradually resulted in its decay. Indeed the industry had such an ancient antiquity that it has been regarded by some as indigenous to India. But the progress of this industry which was to continue in the succeeding centuries presupposes an abundant supply of raw cotton within the area as its transportation then was no easy proposition. The cultivation of cotton, infact occurs perhaps for the first time in a Sutra about 1800 B.C.
Kauṭilya, not enlarging upon the subject, seems to have taken its supply for granted. The existence of several varieties of cotton may be gathered from the Sanskrit texts but there were two main ones. First there was the herbaceous annual plant, about four feet in height, the other was the twelve year old tree bearing cotton flowers called *senebal*. The farmer was utilized for the manufacture of fabrics while the latter was better suited for stuffing and quilting. The annual cotton was common in India and people who had any kind of cultivation is as one. Unfortunately, we do not have any direct evidence of the sultanate period relating to the cultivation of cotton crops but its continuation during the Mughal rule and the prosperity of the industry bear ample justification for the inference that it was not only being grown but presumably had extended in terms land under the crop. According to Abul Fazl the per *bigha* yield of cotton was seven mounds twenty seer, and since in all our provinces cotton crops were being assessed for revenue. We may take it that its production was universal.

Terry, visiting the western regions attest to herbaceous cotton and regarded it as one of the staple commodities. Malt Brown felt that its cultivation was very lucrative, and when view the fact that in spite of the higher value it was assessed at the same rate as the cheaper food grains, the difference to both the state and the cultivator becomes patent. Abul Fazal has not quoted the price of raw cotton but an approximate deduction is possible from his other figures. The revenue assessment by cotton per *bigha* at Agra was 120 *dams* while the per *bigha* yield is stated to have been seven wounds, twenty seer and the proportion fixed for revenue was two wound twenty seer.

In other words, 120 *dams* was the market price for two wounds twenty seer of cotton. Thus one wound of cotton would fetch roughly 48 dams or rupees 1.1/5 after having collected the cotton crop from the
fields the first job was to clean it in order to make it fit for the next process of spinning the yarn. The cleaning was affected by means of a foot roller which separated the cotton from its seeds, assuming that it was the inferior kind of cotton called *binaulay dar ruyi* and selling at Banaras in 1781 at Rupee two, eight annas per maund. This cleaning apparatus consisted of two teakwood rollers, fluted longitudinally with five or six grooves, revolving when in contact. While the upper roller was turned with a handle the lower one was carried along with it by a perpetual screw at the axis. The cotton was placed on one side and drawn through the revolving rollers. Since the opening was kept smaller than the size of the seed they were thrown out the side opposite the cotton. According to Watt, however, this type of roller was required for the cotton with hard seed only, while the charkha (Indian loom) was the more popular one. This *Charkha* was also incidentally, made of two wooden or iron rollers, fitted so as to revolve to each other. The rollers were drawn by hand labour applied to a crank or wheel.

If Watt's assertion that the *Charkha* was the more popular one is correct, then it would follow that the inferior variety of raw cotton was not popular. The other variety noted at Banaras was price at Rupees 10 per *maund*, as it was at Patna in 1800. Even of the seeds have been cleared cotton remains full of dirt and knots. The next part of the same process of cleaning is there for to get rid of these by means of ginning. The ginners (or the *dhuneys*) used a piece of bamboo stretched into a curve and joined together by means of a leather string called tent in the vernacular. Only the *senbhal* and *kapas* (herbaceous cotton) were cleaned thus. The ginners in India constituted a distinct functioned class as they still continue to do. They even now, may be seen playing trade especially during winter. F. Buchanan reports that 1811-12 one third of the ginners of Patna had capital enough to enable them to buy a
little cotton which they cleaned and then retailed.\textsuperscript{113} *Fatwa-i-Alamgiri* mentions the sale of both cleaned cotton as well as of cotton with seeds.\textsuperscript{114} The rest of the Patna ginners worked entirely for hire. A man and his wife could thus make Rupees three to four a month.\textsuperscript{115}

The *Fatwa-i-Alamgiri* also notices the sale of raw cotton for obtaining yarn\textsuperscript{116} by means of spinning. Spinning being comparatively a lighter and less technical job was quite often done by women.\textsuperscript{117}

Almost every house in the villages used to have a spinning wheel,\textsuperscript{118} and in the genetic plains spinning occupied the leisure hours even of the women of rank.\textsuperscript{119} The spinning equipments consisted of two sets, one a spindle for finer yarns, the other the spinning wheel used for coarse yarns. The spindle, while in operation was turned round with the left and the cotton was fed with right.\textsuperscript{120} Indian cotton were Z spun, that is by revolving the left to right. In contradistinction to spun which revolved it from the right to left and tended to come apart when washed. Z spun yearns or cloths can be washed with less damage to material.\textsuperscript{121} As the finger needed to be kept dry, the women while spinning used a chalky powder,\textsuperscript{122} no doubt as measure against perspiration. The yarn thus proceed was generally regarded as "very fine and tenacious"\textsuperscript{123} and extremely fine and yet strong yarns\textsuperscript{124} not burdened with any heavy equipment the women spinners could just as with knitting, carry on their profitable occupation as long as their hands were otherwise disengaged.\textsuperscript{125} The operators of the Indian wheel sat on the ground alongside the wheel. Some fibers of the end of spindle which is then evolved by turning the driving wheel with the right hand as the left hand holds the thread, feeding it with the right hand. As the left hands holds the thread, feeding it with more fibers until the hand is at about three feet’s distance from the spindle. The fiber glides off the spindle at each turn and thus the turning of the spinning wheel transmits a twist to the
stretched thread held at an oblique angle to the spindle. When a full arm length of thread has been spun the spinner stops the wheel and gliding it at right angles to the spindle, winds it up slowly by spinning the wheel in a contrary direction. In the same way yarn had to be dyed beforehand in all the cases of what fibers term pattern weavers, for example, lines in equal plain weave in colour or made by threads of different textures – self stripes either in warp or weft or checks, or from among the Indian varieties which the dying spread from Delhi the weavers used to dye the yarn itself. It is there for possible that the system existed Delhi too. At Dacca the shuttle was made of light wood of the areca-nut tree and had spear shaped iron points.

It was ten to fourteen including in length, three fourth of an inch broad and weighed about two ounces. There was a long open space for the wire upon which the reed wound with the weft, revolved. But it is possible that the shuttle used in Hindustan were of the similar make. Therefore W. Hoey’s description of the Lucknow practice has been selected here from his narrative there does not appear to have been any significant change from the ancient made of weaving though the account was written 1881. However since the other accounts are not contemporary either, the latter date may be of no significance, whereas the difference of place sometimes may imply important dissimilarity in details which had some bearing on the industry. There are used to insert the shuttle (nar) to make the woof (bana) and are wetted before use, on the larger reeds in wound the thread which is used for laying the tana or warp, as it is too laborious and time consuming process.

No reference is here made by W. Hoey about the weavers working in open, where as in Bihar W. Hodges (in 1781) came across men busy at their looms in the cool shade of trees attended their friends and singing soft music. Other also believed that weavers worked
outside as and when the houses were not large enough to accommodate their whole length of piece of cloth, though when feasible they worked within, even in Bihar the weavers it could be managed and then the roof of the shed was used for fastening the balance of the gear. After weaving the cloth was sent to the bleacher and then to dyers. The bleachers belonged to a particular caste in India who washed cloths in order to earn their livelihood. The bleacher used lime and some other local ingredients to boil their cloth, took it to a near by river or pond beat it vigorously on a stone slab with a bettle, or a heavy wooden stick, then washed it clean. This beating system was greatly disapproved of by the European traders as it was opt to injure the good of finer varieties causing reduction in their price on so doing he could save on the lemons. Lemon, according to Tavernier, was a necessary ingredient in bleaching, and a Dastural Amal of 1065 A.H. asserts that lemon and soap in a creation proportion were used by the washer man. As regards the unsatisfactory effect, the example may be cited of the improperly bleached Akbaris sent to London in 1642, or the advice that the Daryabadis needed more careful bleaching. It was due to this poor bleaching that the English factors in 1646 bought Daryabadis brown and got part of then bleached at Lucknow and forwarded the rest, as it was. A few years later in the 1650, it was discovered that the best plan was to buy the goods brown and send the entire Lucknow, Agra consignment to Broach. In Gujarat, where because of the large Lemon fields neighborhood, bleaching was done better than elsewhere. The amertees of Patna were equally poor with regard to their local washing, so that the factor's deemed it more desirable to buy them brown or even semi washed but unsearched at Patna have them bleached else where. A further cause of complaint in local washing was that the factors in conformity with the custom, but for
absence reasons, were required to tear off a bit from the cloth while giving it for washing, so that total length of the piece was shortened, a contingency that could not have been favourable to business.

**DYEING:** The cloth was now ready for treatment with colours, by printing, painting or dying, it may however, be remarked at the outset that though it is said that block, printing and mordanting technique had originated in prehistoric antiquity of India, and up to our times cool produce effective and even durable results, it nevertheless remained a rather elaborate, tentative and uncertain process.

Even in plain dyeing each of the various shades required a separate set of treatments. Thus a contemporary compilation entitled *Nuskha Khulasatul-Mujarrebat*, describing seventy seven process of dying (including some printing) for obtaining forty eight shade In this connection we may recall here that Agra was noted for the preparation of dye stuffs, that the Indigo manufacture of Delhi occupied a full ward and that the dyers of lakh were available in Lucknow. It is nevertheless evident from the above *Nuskha Khulasatul-Mujarrebat* that mostly the dyers themselves prepared their own decoctans in prescribed proportion combining together the two jobs of making the dye stuffs and dyeing and even printing.

Indigo or the blue on treatment with water gives a wondrous blend of purple and blue, the dye, even in its present form, must have been known and manufactured in the ancient past as it was being exported when piling wrote his natural history. And it remained a widely demanded commercial commodity till about the 18th century. The dye was cultivated from Lahore to Oudh though with varying degrees of excellence the dyes of Bayana and the surrounding areas were. Considered the best, it was a delicate plant requiring close attention and skillful handling. Indigo was employed in painting
varnishing door and windows, *chiq* (screen of split bamboo) white washing and bleaching purposes.

But it was used primarily for dying piece goods blue\(^{158}\) or in kindred shades – that is water blues grayish and sky blue\(^{159}\) blue black, dark blue, light blue, purple, lavender, mauve, lilac,\(^{160}\) emerald blue,\(^{161}\) dark blue green, sap green and yellow green.\(^{162}\) Especially for compounded colours like bottle green,\(^{163}\) Mango green,\(^{164}\) purple karari\(^{165}\) and the like colours. In which in view of Liotard's statement one would have expected it was one of the principal ingredients. Infact, Wardle too testifies to the alternative use of the seeds of the plant *Chankhana* (*cassiatava*) which abounded all over India as yielding a blue dye which could be fixed by adding lime water.\(^{166}\) Mordant and the dye then form a lake which adheres strongly to the fibers and this gives fast colour.

Several ingredients are mentioned which were being used as mordants in the dying industry of Hindustan. Among then rind of lemon,\(^{167}\) flower of Kapas,\(^{168}\) lime\(^{169}\). Though more often employed for printing\(^{170}\) it was used for plain dying as well as the red bands of carpets (cotton) being entirely dyed with it.\(^{171}\) The *Kharwa* cloths of Bundelkhand, used to be dyed in this at compound with other ingredients.\(^{172}\) Majetha or madder was like as found mainly in the southern U.P. and Oudh, Mau, Rampur and Hathras were again as with at the principals markets.\(^{173}\) Though Later writers such as Leotards and W. Hoey, attest to its more frequent use by the printers of calicoes than by the dyres\(^{174}\), The tun tree (*cedera Toona*) indigenous to the western and northern UP was particularly usefull for the dyers. Its bark is a powerful stringent; its flowers yielded red or yellowish dye, and the seeds produced a red dye.\(^{175}\) Wardle, how ever was more sure of the Indian mordanting and held that by adding them the colour was fixed.\(^{176}\)
On silk and tussur it imported bright yellow and gold coloured respectively.\textsuperscript{177} For performing there jobs in Hindustan, dyers required very few and in expensive implements of copper vessel to boil the infusion,\textsuperscript{178} and earthen vat\textsuperscript{179}. A wooden stick to stir the boiling infusion or cloth, a wooden club to beat the cloth into smoothness and some old muslin to starch of the solution it consisted of preparing the solution according to the prescribed proportions by means of pouching the ingredients and boiling them, dipping and boiling the cloth in the decoction, rinsing, drying it either in the sun, shade, or partly in both, rubbing the surface with the hand, process occur in the *Nuskha Khulasatul Mujarrabat* and else where, but there were cases where not all of these steps were necessary, for example in pink and orange shades (fleeting) boiling was not needed.\textsuperscript{180}

In order to illustrate the process further we may cite a few instances of dying some of the shades, though Liotard and Hoey describe some of the method of dyeing. The example given below are drawn from a translation of some quoted Persian sources.\textsuperscript{181} But mainly from the *Nuskha Khulasatul Mujarrabat* rapidly used above, because we know the latter to be a contemporary document and as regards the former, that too appears to have been a contemporary or near contemporary account.

**Printing:** Was a still more complex and tedious process than the ordinary plain dyeing of cloth. It is said to have been the "art of communicating different colours to particular parts while the rest of the cloth retains the white colour, or the whole of the cloth may be dyed in one colour excepting particulars parts to which some other colour are given."\textsuperscript{182}

The wide diffusion of thus art in our region may be inferred from the low prices of *chintz* which Abul Fazl quotes as two dams per yard.\textsuperscript{183}
At Lahore too, printing was more often done on coarse stuff so that the minimum price in Tavernier’s time was about there was recorded by Abul Fazl that is rupees sixteen to thirty per twenty pieces. In Agra it was the same as those at Lahore in of time Abul Fazl. Similarly at Patna the *Chintz* was printed on exceeding coarse cloth presumably because it was produced for local consumption of the lower classes, though the Portuguese and Armenian bought it for export as well. The *Chintzes* of Lucknow, and Farrukhabad, in the 18th century were however, held in high esteem and might have been relatively more costly.

Several types of printing were carried on in Mughal Hindustan, first there was the stamping of gold or silver leaf, genuine or invitation on coloured cotton fabrics. Thus were generally used as polongin coverings, curtains, quilts, *(razai)* (light quilts) and *toshak* (mattresses) Lucknow and Farrukhabad were specially famous for these printed stuffs.

*Patterns were stamped on thin fabrics such as tanzeb or muslin for chikan* work. Besides, there was the printing of cotton fabrics applied on fast colours for articles such as bedding prayer, carpets, *dustarkhwan* (Table linen) in addition to ordinary *chintzes* produce for duel wear. Finally, there was the tie-dying common in and around Delhi a practice which, during the declining days of the city was carried over to Bihar and Orissa by its migrant craftsman as mentioned before, incidentally, in our region there is no mention of patterns pointed by brushes or quils, such as is said to have been practiced in Gujrat or the Deccan.

In the first three types of printing, wooden were employed for stamping the patterns on the fabrics. But prior to being printed the cloth had to be submitted to washing alone took several days. It had to be boiled in improve carbonate of soda and other ingredients, beaten
smooth with wooden clubs, again boiled in a copper vessel and if the cloth were too coarse, the entire operation had to be repeated. Afterwards it was left sun to dry.

Bleaching was performed by scheduled cast chamars or dhobis, the dyer supplying the requisite material, except carbonate of soda. An emulsion of caster or linseed oil was prepared in which the cloth was dipped. Dried on grass under cover, some additive mixed in the emulsion of caster or linseed oil was prepared dried for an hour in the sun and from three to fifteen days in shade. The cloth, after a little washing in impure carbonate of soda and other ingredients was returned to the printers, chilippis in the Vernacular. Weighing one and a quarter pounds bahera (termmalia belleria) four ounces, galls of tamarix articulata four ounces, bel one and a half ounces and babul singri (Legume of accalia arabica) one and half pounds was prepared in castor oil.

The infusion could suffice for twenty pieces of cloth measuring five and one third yards by thirty eight inches. The cloth when dipped in this is ready to assist the mordanting affect of alume, as well as to create a base to produce a permanent block dye when further submitted to the action of iron compounds. The alum mordant is especially effective when the dyes are derived from the roots of plants such as turmeric, sappan wood, at and madder. The cloth is then beaten again order to even its surface for printing, for which the cloth was now in perfect order.
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106. No claim can be made for the exactitude of this figure, because with similar calculation regarding the wheat price we get about 16.6 dams per maund which we know is not correct, because Abul Fazl quotes its price at 12 dams and odd per mound A.A.I, 62. It is possible that the difference of 3 dams and odd per maund in wheat price might have occurred due to the difference in time, the assessment rates pertain to 6th and 7th years of emperor Akbars
region, where as the price list was compiled presumably at the time of writing of the Ain, i.e. c. 1595. At all events, there is no indication that the price was current in the 6th and 7th years of the reign as well. Further more in 1784, the English had fixed prices at Benaras for customs purposes, according to which wheat was 14 annas and cotton with seeds R.S. 2.8 as. Per md. Assuming that the ratio between wheat and cotton at Benaras in 1784 was the same as at Agra in 1595 and that Abul Fazl price was current at Benaras too, we may, by tracing, back the prices, get the cotton price at Agra as 35 dams per maund. This again, leaves a wide margin when compared to the above 48 dams per maund. But in spite of these discrepancies the above figure has been taken merely for the shake of a working hypothesis as being the best under the circumstances since its is based on may not be necessary. For the Benaras prices, see papers relating to India 1787 edition, Vol.I, pp. 304 and 308.


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