
UNIT 18 NON-AGRICULTURAL PRODUCTION

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18.1 INTRODUCTION

Commenting on the state of medieval crafts Francois Bernier (1656-68) mentions that ‘This is not owing to any inability in the people to cultivate the arts, for there are ingenious men in every part of the Indies. Numerous are the instances of handsome pieces of workmanship made by persons destitute of tools, and who can scarcely be said to have received instruction from a master. Sometimes they imitate so perfectly articles of European manufacture that the difference between the original and copy can hardly be discerned...’

‘Want of genius, therefore, is not the reason why works of superior art are not exhibited in the capital. If the artists and manufacturers were encouraged, the useful and fine arts would flourish; but these unhappy men are contemned, treated with harshness, and inadequately remunerated for their labour. The rich will have every article at a cheap rate.’

Bernier’s statement points out two basic contrasts: a) There was no dearth of craftsmen and their craftsmanship could be equally matched with their counterparts in Europe; and b) the tools possessed were very simple; they were ‘remunerated inadequately, and lived miserably’. In the course of our discussion we will attempt to return to these issues off and on. Another issue, perhaps the most problematic of all, is the nature and pattern of non-agricultural production – Whether it was static or dynamic; whether it could lead to capitalistic or semi-capitalistic form of production? Answers are probably not so easy to find in certain terms particularly in the light that the data available to us to explore these issues is negligible and indirect. It will also be interesting to find where we can place medieval artisan – *urban*, *rural*, or *rurban*. You will find that the vast battery of artisans involved in the production process may not necessarily be residing at the urban centres only. As for technology pertaining to the concerned crafts, we are going to discuss it in detail in Unit 23 of the present Course. Here our emphasis is more on the finished goods/crafts; its production process; persons involved and how the production was organised. However, we have avoided discussion on the social status of craftsmen for all these details you will find in our Course MHI-06. Further, we have included those products that are not related to agriculture as well as products for which raw material may be derived from agriculture, but they were treated before finally sold off in the market. The Unit not only focusses on the products but also on its creators – the artisans.

18.2 AGRO-INDUSTRIES

Let us begin our discussion on those crafts that depended for its raw material on agricultural products.

18.2.1 Textiles

Textiles could be said to have been the 'heavy industry' of the pre-industrial age around the world. Textiles occupies foremost place among India’s crafts since time immemorial. Textile production was widespread throughout India. Pelsaert says that from Chabaspur (Shahbazpur) and Sonargaon (east Bengal) to Jagannath (Puri) all lived by weaving industry. Almost every town was filled with weavers. In 1620s at Masulipatanam alone 7000 weavers are recorded. Similar numbers were mentioned to be present at Benaras in 1640s. Proximity to raw material and proper transport facilities were prime considerations for developing a textile centre in the medieval period. However, certain weaving villages also emerged on account of greater demand, particularly by Companies for a specific variety of cloth. During our period of study in south India you will find a shift in the settlement pattern of the weavers. Earlier their large concentration was in the temple premises. During the seventeenth century, barring a few votive records of Kaikkolla weavers that we find in the temple complex, donative inscriptions of the weaving community during this phase are more frequent at secular places than in the temple complex. Gujarat, Bengal, Indus plains, and Coromandel were the chief centres of production. Gujarat, after 1630s famine lost its importance and place to Bengal. Her further decline in the 18th century was caused on account of loss of Persian Gulf market owing to disturbed political conditions. Maratha disturbances during the 18th century also played a negative role and contributed to its decline. In Bengal, however, it is interesting to note that cotton that was an important crop grown during the medieval

period almost disappeared later in the 19th century in the region. Ibn Battuta (d. 1377) records that the finest cotton cloth was sold in Bengal at extremely cheap prices of 30 cubit for 2 *dinars*. North Coromandel region (north of Pulicut) produced white Guinea cloth that had great demand in the Red Sea and the Levant. Similarly, south Coromandel was known for its blue, red, and striped cloth. Aurangabad and Burhanpur were famous centres of white cloth production. Chaul was famous for linens and Cambay for its quilts. So famous was the town of Masulipatanam as it was known as city of dyers and weavers. Pondicherry emerged as one of the important centre for bleaching. Painted cloth was also exported from Pondicherry.

English factory records mention more than 150 varieties of cotton textiles. Muslin was largely produced in Bengal and Dacca. *Qaimkhani* was a fine variety of muslin chiefly purchased by the Mughals and the elites. Delhi, Agra and Patna were famous for its chintz, Negapatanam for calico and chintz. Machhiwara (*suba* Delhi) was famous for *bafta* (high quality calico). Many centres were so acclaimed that the variety of cloth named after the centre – *Dariyabadi* (Dariyabad, Bulandshahr district, Uttar Pradesh), *Khairabadi* (Khairabad, Sitapur district, Uttar Pradesh), *Semianoes* from Samana, *salahati* (from Sylhet), Devgiri (from Deogir), *kanchivani* from Kanchipuram, *tanchera* from Tanjavur, etc. Certain varieties came to be known after the weaving community e.g. *Jedara* silk after *Jedara* community. Tents were in great demand among the royalty and the elites during campaigns. Abul Fazl mentions ten such varieties. The cheapest one fetched the price of 10,000. Long cloth was largely produced at northern Coromandel and north India.

In medieval Karnataka Maggadavaru, Neygeyavaru, Salesasirvaru, Devanga and Jedaru continued to enjoy prominence among the weaving communities. However, Kaikkolars replaced the old Saliyas of Tamil Nadu. Weavers even made grants to the temples to enhance their status in the social hierarchy.

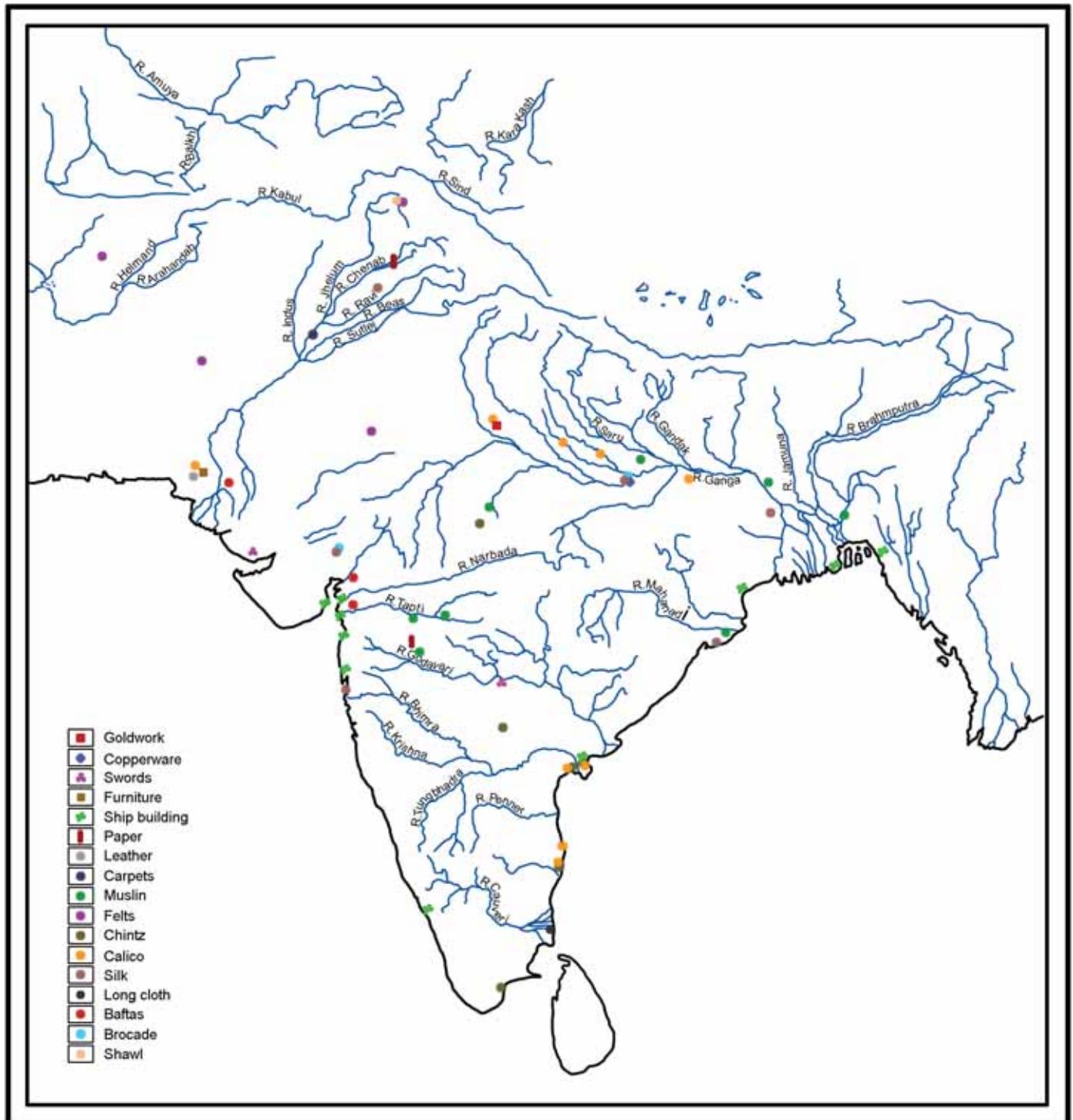
Under Turkish and European influence pattern of using motifs also undergone certain changes. The traditional motifs in south India were based on the themes of epic *Mahabharata* and *Ramayana*. Kalamkari was the finest example of this.

Broadly the ‘poor’ could afford a coarser variety (*kamin*) while finer variety (*mahin*) was the ‘exclusive’ preserve of the elites. Introduction of *charkha* (spinning wheel) and *pinjana* (cotton carder’s bow) during the Sultanate period led to sharp increase in cotton textile production during the medieval period. (for technology see Unit 23) Irfan Habib has assessed that spinning wheel enlarged the efficiency six-fold. In general, one finds that overall consumption as well as production of textiles appears to have increased during our period of study. In the south as well technological changes occurred under Muslim contacts. Besides the earlier patterned loom draw loom also became common. But its usage seems to have largely confined in South India among the Muslim community. The Tirumalai-Tirupati Devasthanam inscription speaks in great detail the looms used by the contemporary wearers:

while we are assembling here... in the course of weaving by handlooms, one-third of the *Sadisarakkudam* or *achchukkattu* should be drawn lengthwise and two-third of the cotton yarn should be used in cross-wise weaving. This mode of weaving *should be done only by the Muslims* (and not by the Hindus). As a reward for their services (in this style of weaving) they are authorized to collect the income from the gifted lands for their weaving.

Tirumalai-Tirupati Devasthanam Inscriptions, ed. S. Subramanya Sastry and V.V. Viraraghavacharya, Madras, 1931-38, Vol. IV, No. 112. Vijaya Ramaswamy, *Textiles and Weavers in Medieval South India*, OUP, 1985, p. 126.

Vijaya Ramaswamy (1985:66,126-127) on the basis of above inscription counters Irfan Habib's argument that *kar-chob* i.e. square wooden frame came to be used in India during the seventeenth century. She claims that *Sadisarakkudam* referred to in the Tirupati record is 'very similar to *kar-chob*' literally means 'a four cornered frame.' She has further expressed her reservation over the usage of draw loom in India that Irfan Habib accepts it a seventeenth century incorporation (see Unit 23). He links the innovation to vertical loom. However, Vijaya Ramaswamy argues that 'the vertical loom seems to have been the most primitive type in existence in India.' She cites the 1184 AD inscription of Vira Ballaladeva's reign in Jambur village (Shimoga district) that refers to 'looms which are tied to the roof with a rope.'



Craft Products of the Mughal Empire

Source: Irfan Habib, *An Atlas of the Mughal Empire: Political and Economic Maps*, OUP, Delhi, 1982.

18.2.2 Silk

In India silk was produced both by the mulberry-feeding (domesticated) and non mulberry-feeding (wild) worms. The major silk producing regions in India were Gujarat, Bengal and Kashmir. Chaul was famous for silk weavers. (for details see Block 5, Unit 23.2) Sericulture was also practised in Medieval Orissa.

Peasants used to cut the old mulberry trees into small pieces and tilled them after ploughing in October. In a few days time the shoots come out and they were plucked daily to feed the worms.

Indians used the same reeling techniques for all variety of silks. They were not aware of the Chinese method of reeling. Reeling starts just before the moth was about to break the cocoon. The cocoons were first put in hot water and then in fresh water before reeling. The thread was just softened during the process of reeling. This way Indian system was considered better than Chinese and Persian methods. Wheel reeling in India began with the introduction of spinning wheel in India in the 14th century. The filaments from better quality cocoons were *pattani* and lower grade cocoons were known as *potti* or *poot*.

Alauddin Khalji sent *abrad-i kambayati* (stripped silk cloth of Cambay) to Il Khanid minister Rashiduddin as present. Initially Gujarat was heavily importing raw material from China. But by 17th century Bengal emerged as one of the chief producers of silk and ousted China. Tavernier mentions that Qasimbazar alone exported 2.4 million lb. At Rajmahal in Shah Shuja's garden a fine variety of mulberry *Tut* was produced. *Juz*, *koila*, and *mashru* (mixture of cotton and silk) were produced at Delhi. *Patola* was the most sought after variety of silk produced in Gujarat. Bhagalpur (in Bihar) was known for *tasar* production. However, its production declined sharply in the 19th century. Tavernier also mentions the production of Assam *muga* silk.

Besides cotton textiles and silk, carpet weaving was also widespread. Warangal and Masulipatanam were famous centres of its production largely producing for exports.

18.2.3 Indigo

Indigo was one of the most important cash crops during the medieval period. It is surprising that Thakkara Pheru (c. 1290) does not refer to indigo among his long list of crops mentioned. It was a dye largely cultivated in Alwar (Mewat), Bayana (near Agra), Sehwan (Sind), Telangana and Sarkhej (Gujarat) regions, though coarser variety was produced all over India. On the Coromandel coast Naglewanch produced good quality indigo. However, indigo produced at south Coromandel was of inferior quality. Indigo was also produced at Dabhol and Wengurla in Bijapur. Nainsi and Peter Mundy (1630-34) mention that indigo was also grown in Merta region in Rajasthan. Similarly, Chetan Singh argues that the expression 'Lahore indigo' does not mean the indigo brought from outside and simply marketed here. He says that Lahore indigo was qualitatively different from Sarkhej or Bayana or that of Thatta. It was actually produced by peasants from locally raised crop in the region. In 1614 Masulipatanam indigo cost 12 pence a pound; Surat indigo 13½ pence; while Sarkhej indigo ranged between 15 and 20 rupees per maund. Pelsaert (c. 1626), writing a little later, mentions the price of Mewat indigo at Rs. 20 per maund when the Bayana indigo was selling at Rs.30 a maund.

Generally indigo was marketed only after being processed. But we do get the reference from Gujarat where peasants sold raw leaves. The crop was sown by the end of June. It provided three cuttings. The first one, *nauti*, was reddish in colour; the second, *jerry*, which was ready by August was actually the best and possessed perfect violet colour and was most in demand. The third cutting, *katel*, was brackish and was not of good quality at all. Production of indigo required special processing to be sold in the market. To process it a set of brick lined rectangular and circular vats (in some case two) were used. Inside walls were plastered with lime. Introduction of fine cementing material, lime mortar, during the 13th century made indigo extraction easier by making the walls of the vats waterproof. The rectangular vat was filled with indigo leaves and alkaline water (for best results) for steeping for 16-17 hours. During this period indigo colour of the leaves dissolves into the water. After steeping the material is transferred to a circular vat for beating/churning. At Bayana two vats were used for the processing but at Sarkhej and Mewat both the processing was done in one vat itself. At the churning stage the waste was removed. Pelsaert attributes to better quality of Bayana indigo to its use of alkaline water. K. K. Trivedi (1998) adds that the use of two vats separately for steeping and churning also produced better results. Besides, use of dry leaves in place of green at Sarkhej also affected the quality substantially. Trivedi has calculated that approximately 502 metric tons of indigo was produced during a season at Bayana.

Pelsaert's Account

The true Bayana indigo, which is made near that town, does not amount to more than about 300 bales, but it is much superior to the produce of other neighbouring villages. This superiority is due to the brackish water in the wells near the town, for the use of sweet water makes the indigo hard and coarse...brackish water will give indigo worth at least one rupee per maund more than plant cut from the same field, and worked with the sweet water.

Other places also yield large quantities of indigo, such as Koil (modern Aligarh) or Gorsa (modern Khurja ?), which lies 30 kos from Agra on the other side of the river. Most of its produce is brought up by Armenian, Lahore, and Kabuli merchants; is good indigo, but has not such a reputation as that of Bayana...

Mewat is a tract 30 kos from Agra...Indigo is made in many of the villages of this tract, and the annual yield is 1000 bales or more, but it is inferior and of low quality, and usually sandy. The method of manufacture is that of Sarkhej rather than Bayana; the steeping of the plant, and the working back and forward to extract the dye from the leaves, are done in a single *put*, whereas in Bayana or Gorsa two are used...The price is consequently much lower, 20 rupees for a maund in Mewat when Bayana is selling for 30 rupees...

W. H. Moreland and P. Geyl, *Jahangir's India*, The Remonstrantie of Francisco Pelsaert, Delhi, pp. 13-15.

Indigo was so prized a crop during the medieval period that Shahjahan aspired to monopolise it. Yaqub Beg, the governor of Broach forced English Company to buy indigo from him despite their objections. Its production declined particularly towards the close of the 17th century largely on account of unequal competition the peasants had to face from the West Indies market. Further, political instability in the regions, particularly in the areas around Agra and Delhi on account of Jat (1670-80s) and Satnami (1672) uprisings, also contributed to its gradual disappearance. Gujarat famine of 1630-32 also took the toll of indigo production in the region. It declined since then in the region. Tapan Raychaudhuri (Cambridge, 1982) highlights citing the case of decline of indigo in Gujarat the importance of 'price responsive character of India's agro-manufactures.' 'The peasants' choice to cultivate particular crops

depended on the 'price it fetched.' After Gujarat famine prices of food grain crops increased greatly resulting in peasants' opting to cultivate food grain crops in preference to cash crops. It is interesting that in the production of indigo, particularly at Sarkhej merchant capital was also invested.

There was another dye *al* (a red dye) that was produced largely in lower *Doab*, Bundelkhand and Malwa regions but comparatively at lesser scale. With the introduction of manufactured dyes its production almost ended.

18.2.4 Sugarcane

Sugarcane production was widespread throughout north India and listed among all the *dastur* circles in the *Ain*. However, one finds sugarcane practically absent from the medieval list of crops produced in western Rajasthan, though the crop is listed in eastern Rajasthan. Steel and Crowther observed that, 'all the country betwixt Agra and Lahore yields great store of powdered sugar.' Maham in *sarkar* Hissar Firuza, *suba* Delhi was noted for high quality sugar. The best and the cheapest sugar was produced in Bengal. Dutch's annual export of Bengal sugar to Persia alone in 1640s constituted around 400,000-450,000 lb. However, sugarcane production in Bengal shows signs of decline during the 19th century though it still remained an important crop of the region. For making sugar and *gur*, 'The juice was obtained from the cane by the use of worm-gear wooden rollers worked by oxen in the southern regions, and by the stone-mortar-pestle mill, also turned by oxen, in the Gangetic zone. These mills were replaced by iron-rollers only by the close of the nineteenth century. The juice used to be put in iron cauldrons serving as boilers; and *gur* and various varieties of sugar were produced by different degrees of refining.' (Habib, 1963)

18.2.5 Oil Production

Telis (oil pressers) occupied an important place in both the rural and the urban settings. Oil being the essential commodity made the presence of the community in almost every big village. Apart from the extraction of edible oils certain centres were known for its odoriferous oils – Midnapore for oils from flowers; Gwalior produced *chambeli*; and Orissa *gingelly*; while Rander and Navsari (Gujarat) were famous for aromatic oils and scents.

In Karnataka the community involved in the profession was known as *telligaranakhara*, *telligara kottali*, *telligaseni*, *telligaraivottokkalu* and *ganigarokkalu*. By 13-14th centuries oil pressers in Karnataka also involved in oil trade due to increase in production. The use of the titles like *gavunda* and *setti* for them in Karnataka is quite interesting and suggests increase in their status.

In Maharashtra oil pressures belonged to the category of *alutedar* (village artisans whose services were not regularly required by the village). *Litacharita*, a Marathi biographical work of the 13th century mentions oil shops in the *hat* (local weekly market). The oil pressures are mentioned busy extracting the oil from the *ghana* and their wives busy selling the oil sitting in front part of their houses. This shows that the *telis* used to work on their own mill using their muscle power to extract the oil. Though we do hear references to *bail ghana*, i.e. the use of the bull power for extracting the oil. Oil was extracted both in the oil-press (*ghani*) and oil mill (*jawaz-i kolhu*).

Its use for lighting the lamp made it an item for endowment. We do get frequent references to *madad-i maash* grants under the Mughals for lighting lamps in the

temples as well as mosques. Inscriptions from Maharashtra also mention that one *do* (wooden ladle) and one jar of oil to the temple priest from each *ghana* was required to be given for endowment. Inscription from Patan records that *telikars* had to supply oil to the *maths* regularly. It is probably that the state instead of taking tax from the *telikars* in cash was taking and diverting it in the form of endowments to educational and religious institutions. In Maharashtra they appear to be earning good profits to emerge as money lenders operating at small levels in the rural settings.

Alauddin appointed Sirajuddin as superintendent (*shahna*) to control the fraudulent practices of the oil merchants of Delhi and neighbouring areas. The oilmen had their own guilds like organisations in the region of Bihar.

Fishing was another important profession. Mogar and Mukkuvan fisherman of Malabar made good fortunes out of their profession.

18.3 METALS

India was rich in mineral deposits. Among the metals mined diamond occupied the foremost place. India was also known for its iron and steel. However, she had to largely depend for her gold and silver on imports.

18.3.1 Gold and Silver

Gold was not produced in India on a considerable scale. Gold mines of Karnataka exhausted long back. But what we hear from our period is the extraction of gold from river sands. Ralph Fitch (1583-91) mentions that people find gold by digging sand deposits at Patna. Gold was extracted from the sands of river Ganga and its tributaries. But the extraction process was very expensive and the margin of profit was almost negligible.

As for silver mines, references to its extraction are very meagre. Though Abul Fazl mentions the presence of silver mines in Kumaun hills and there were some traces of silver mines in Sirmur hills, largely gold and silver were pumped to India through favourable balance of trade.

Nonetheless, craft of jewellery making was a flourishing one. Bernier (1656-68) remarks, 'it may be doubted if the exquisite workmanship of those articles can be exceeded by any European goldsmith.' In Karnataka they were called *akkasaliga*. They are mentioned in the inscriptions as taxpayers, receiver of grants and even as donors. They even constructed temples.

18.3.2 Diamond and Precious Stones

Chhotanagpur plateau (Gondwana region) in central India was known for its diamond that tempted Jahangir to send two expeditions in 1612 and 1615. Huge booty of diamonds was collected from Durjan Sal. Tavernier (1640-67) also records diamond mining at Soumelpour in Lohardaga district of Chhotanagpur. In Bihar, Kokradesh was famous for diamond mines. Ibrahim Fath Jang, governor of Bihar sent the emperor nine diamonds. But after 1612, all traces of it are lost.

Golconda was known for its famous diamond mines of Raolconda and Kulur. Diamond mining was a state monopoly and were leased out by the kings to merchants.

In Kulur mine alone the workers employed during the seventeenth century were approximately 30-60,000. The expected revenues from the diamond mines of Golconda in 1680 was one crore and twenty lakhs of rupees.

Jacques de Courte's account of the Diamond Mines of Golconda c. 1592-1622

... The kind of soil in which diamonds are found are part rocky and part soft which breaks under a little pressure, and are of the same colour as mengui with white and black shades. The natives, fifty thousand in all, are very poor, having little to eat, particularly those in the mines...Being too poor to fend for themselves, they band together into groups and offer themselves to merchants who pay them their food, provided they hand over the diamonds they find that month to them. The merchants buy them very cheap after discounting the expenses borne in their regard. The workers continue in debts for months, since the diamonds they find are too few to cover their expenses.

... They pay Gopal Raya, nephew of the emperor and the master of the mines, half a pagoda per person per month to work there. Diamonds above seven carats belong to the master and those below to the finder. The workers are always watched for any big diamond.

Before they begin to dig any part in the mine, they prepare a ground enclosed by a ditch half a foot deep. Near it they erect a pagoda...After this, they begin to dig with iron implements and the earth is placed in a sieve made of cane and lined with hide, which they place on the pavement, till it becomes a heap the size of a man to be spread around for washing. In order to hasten this process they move the earth with thier feet the way a farmer does in a field. After this seven to eight men sit on the pavement and beat the heap into powder with square granite stones a span long.

When they reach the edge of the pavement, the mud is carried away by the wind and the stones are left behind. Thus the earlier heap of a man's height is now half a yard in height and consists of little stones. The seven then begin to look out for diamonds, big and small, but usually find the latter according to the luck of each. They do not speak when sorting and at times work two or three months without any success. They watch each other while they sort, lest one or the other steals the bigger diamonds. There are the guards and merchants at the edge of the pavement besides. Yet they manage to steal and sell it to foreigners for less than half its value. Violations are punished with loss of life and property, which applies likewise to those who buy. The miners are not allowed to sell to the foreigners, but only to the merchants who provide for them. This prevents evasion of duties due to the master which are 2 % from the buyer and 2 % from the seller too. There are many tax farmers and guards, and the foreigners can buy only from the merchants.

Work in the mines is very hazardous. While there, I once saw a mine give way and trap fifty persons in it...

...My trips from Bijapur to the mines were at least nine in all, over a year and a half. I spent some time in each of them. Each mine had its own master, and I covered eight of them, namely, the mines of Langapur, Ramanakota, Poli, Dwanikuthi, Marmur, Gotoal, Kotakonda and a new one in the territory of Qutb Shah, all yielding diamonds. Another mine in Qutb Shah's domain is known a Kodapoli, and yields soft stones like garnets, sapphires, amethyst, marine water, hyacinth and others of different colours.

Teotonio R. de Souza, 'A New Account of the Dioamond Mines of the Deccan', in A.R. Kulkarni, et. al. (ed.), *Mediaeval Deccan History*, Bombay, 1996, pp. 127-128, 130.

After the occupation of Golconda by the Mughals (1687) diamond production in the Golconda region could only be started in 1692 almost after a gap of five years. Mines were placed under the direct supervision of a *faujdar*. The arrangement was not very different from what was prevailing earlier. It was given to private contractors who with the help of hired labour mined specified plots of land for diamonds. Diamonds over the weight of a gold *hun* (3/8th of an ounce) belonged to the Emperor as was the case earlier. The only change that had occurred was earlier Hyderabad was the hub of activities for diamond trade now the centre shifted to emperor's Camp. Another important aspect was on account of political instability of the region mining areas were now walled and garrisoned.

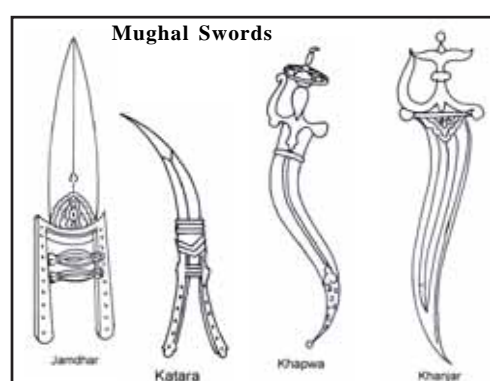
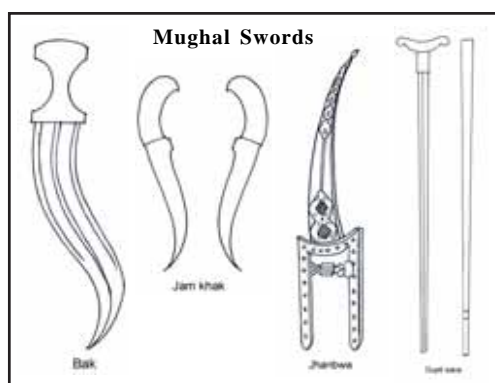
Marco Polo (1298) speaks high of the pearl fishery of Tuticorin in south India. Kazor in *pargana* Mahakanta (in Gujarat) was also famous for pearl fishing. At Limdora near Cambay carnelian was mined from a hill. Cambay exported beads to different places. Here artisans prepared articles from stone and pearls with such fineness that Barbosa (c. 1518) remarks that it is difficult to distinguish from the real ones. It was also famous for ivory bracelets. Lantegree was famous for coral polishing.

18.3.3 Copper

Copper was extensively used for coinage as well as it was important for production of arms. In the north copper mines were located amidst the spurs of Aravallis. Rajasthan was known for its copper mines. The copper mine tracts in Rajasthan were Sojat, Toda Bhim, Bairat, Singhana, Udaipur, Kotputli, and Narnaul. South-east Bihar was also rich in copper ores. Raja Bahroz of Kharagpur (1631-76) exploited the rich mineral deposits to his advantage. We also hear the presence of copper and iron mines in Suket-Mandi.

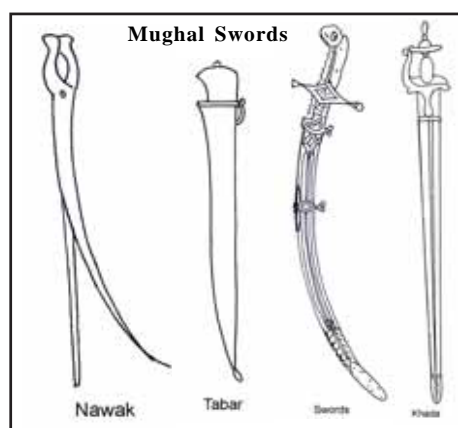
18.3.4 Iron

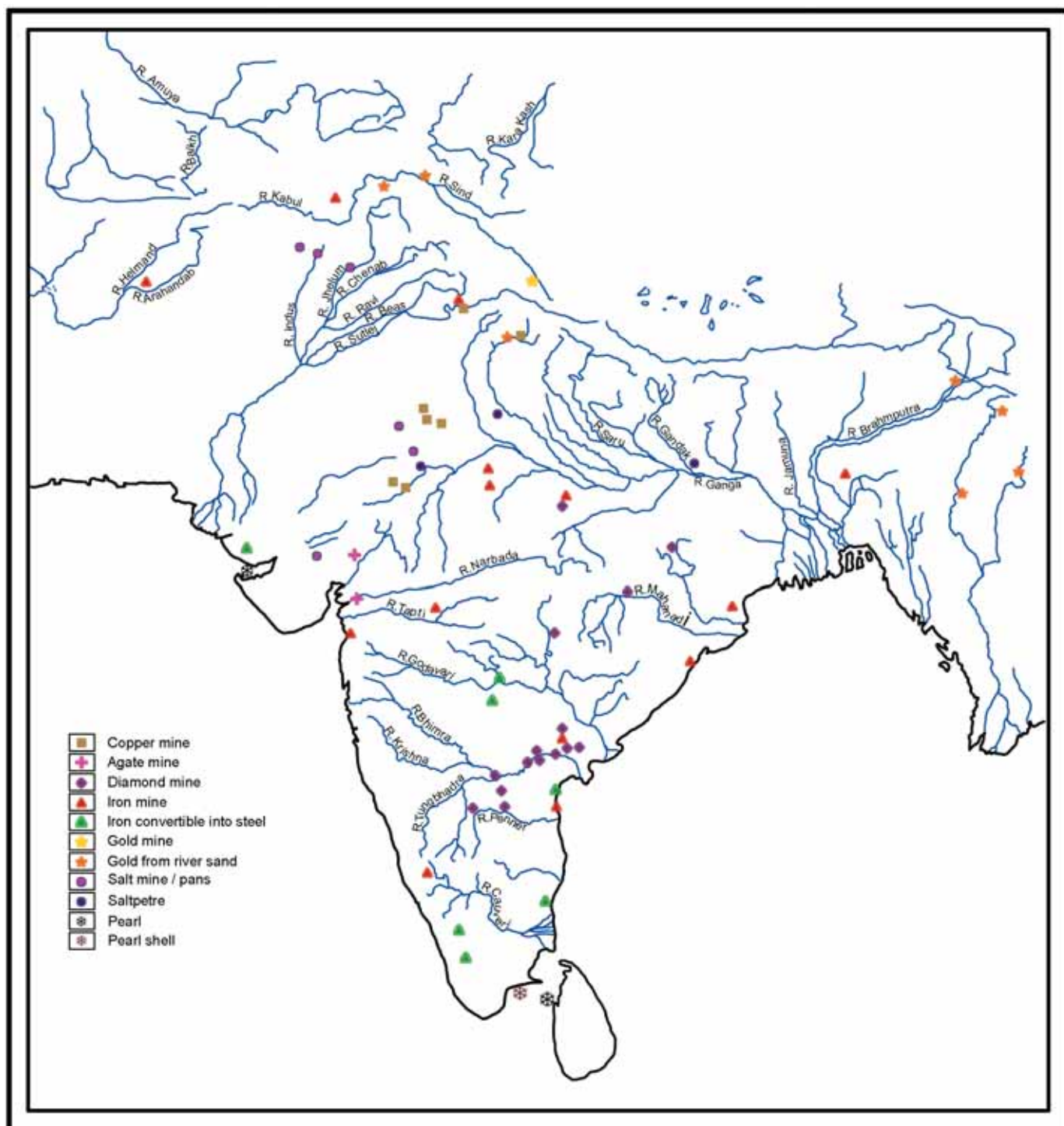
Shihabuddin-al Umari (d. 1348) is full of praise for Indian iron and steel. (see Unit 23 for details) Iron ores were largely located in the hilly tracts extending from Gwalior to down south. The neighbouring spurs of Himalaya (Kumaun and Siwalik hills) also possessed iron mines. Deccan was exporting iron to the Middle East. Masulipatanam, Petapoli (modern Negapatnam), Pulicat, etc. were major centres of iron export. Sea coast town of Chikhli in *sarkar* Surat also possessed iron mines.



The smelting process was highly labour intensive, using rudimentary furnaces and implements. (see Unit 23) No underground mining was practiced; instead deposits were tapped near the surface level. Usually when one bed was exhausted another shallow mine was dug elsewhere. Around Bangalore sand mixed with iron deposits was collected during the rainy season. Later the sand was washed to remove the earth. Then it was smelted.

Among the iron products, India enjoyed great reputation for its finest varieties of swords. Kumaun was known for its swords and daggers. The famous *korij* swords were made of Kutch iron. Indalwai (near Nizamabad) was an important centre for production of swords, daggers and lances. It largely used the raw material from Kalaghat hills. Ahmedabad was famous for its production of arms. Patan was known for its swords for water from a particular well provided good temper to steel.





Mines and Minerals of the Mughal Empire

Source: Irfan Habib, *An Atlas of the Mughal Empire: Political and Economic Maps*, OUP, Delhi, 1982.

18.4 MINERALS

During the medieval period the chief mineral products mined were – salt, saltpetre, sal ammoniac, sulphur, and borax. Borax was procured from the hills of north Bihar. Thanesar was known for its production of sal ammoniac; while sulphur springs were scattered all over.

18.4.1 Salt

The salt production in famous salt-ranges probably continued uninterrupted from Huan Chwang's (629-645) time. Commenting on the distribution pattern of the share of the produce from the mines Abul fazl mentions that out of the excavated salt $\frac{3}{4}$ th belonged to the worker; while $\frac{1}{4}$ th remained with the carrier. The owner's charge was 10 dams

(40 *dams* = 1 Rupee) per carrier. In Rajasthan Didwana, Sambhar, Pachpadra upto the Rann of Kutch was one of the biggest salt producing tract. Nainsi reports in Pachpada region alone 300-325 salt pits. In the Marwar region the Kharwal community involved in the manufacture of salt. In western Rajasthan two methods were employed to extract salt 'either by digging pits (*agar*) or obtaining it by spreading water over a patch of land (*partal*).' (Bhadani 1999) Salt was transported by the *banjaras* from Marwar to different regions of Rajasthan and Punjab by the local Banias. Railways, however, put a big blow to the industry in the region. Bhadani calculates that in 1660s salt workers involved in the region were approximately 2922-2965 as against 828 in 1891. Salt was traded in huge quantities (as much as 10,000 tons annually) from Agra to Bengal. On Gujarat coast Makbulabad, *sarkar* Broach, was the centre of salt production.

Konkan region was also known for its salt production. Pen, Panvel, Nagothane, Revdanda and Thana (all in modern Thana and Kolaba) were famous centres of salt production. Here largely peasants/cultivators were the salt makers. Thus it worked as subsidiary to agriculture. During Shivaji's reign salt manufacturers had to face stiff competition from the Portuguese of Goa. In Karnataka salt manufacturers were known as *uppaligas* and *upilakara* and their organisation was called *besavokkalu*. In Karnataka like other professions it was common among salt manufacturers also to join the state service as warriors/soldiers.

18.4.2 Saltpetre

In medieval period saltpetre was used for gunpowder and refrigeration. On account of its high cost it seems highly unlikely that its use for refrigeration was available for the commoner. Saltpetre from Bihar was considered to be the best for gun powder. Patna and Saran in Bihar were famous for its production. Ahmedabad and Agra were other important centres of its production. Chala-Babra and Malpur, *sarkar* Ahmedabad were important centres of production of saltpetre. In western Rajasthan it was an item of state expenditure. It was extracted from Jalor. Pelsaert (c. 1626) provides a detail description of the processing of saltpetre:

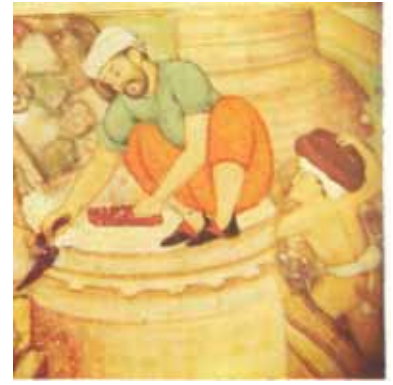
It is prepared from three kinds of earth, black, yellow, and white, but the black earth gives the best quality, being free from salt or brackishness. The method of manufacture is as follows. Two shallow reservoirs like salt-pans are made on the ground, one much larger than the other. The larger is filled with the salt earth and flooded with water from a channel in the ground; the earth is thoroughly trodden out by numbers of labourers till it is pulverised and forms a thin paste; then it is allowed to stand for two days, so that the water may absorb all the substance. The water is then run off by a large outlet into the other reservoir, where a deposit settles, which is crude saltpetre. This is evaporated in iron pans once or twice, according to the degree of whiteness and purity desired, being skimmed continually until scarcely any impurities rise. It is then placed in large earthen jars, holding 25 to 30 lb.; a crust forms in the dew during the night, and if any impurities are still left, they sink to the bottom; the pots are then broken and the saltpetre dried in the sun.

18.5 BUILDING CONSTRUCTION

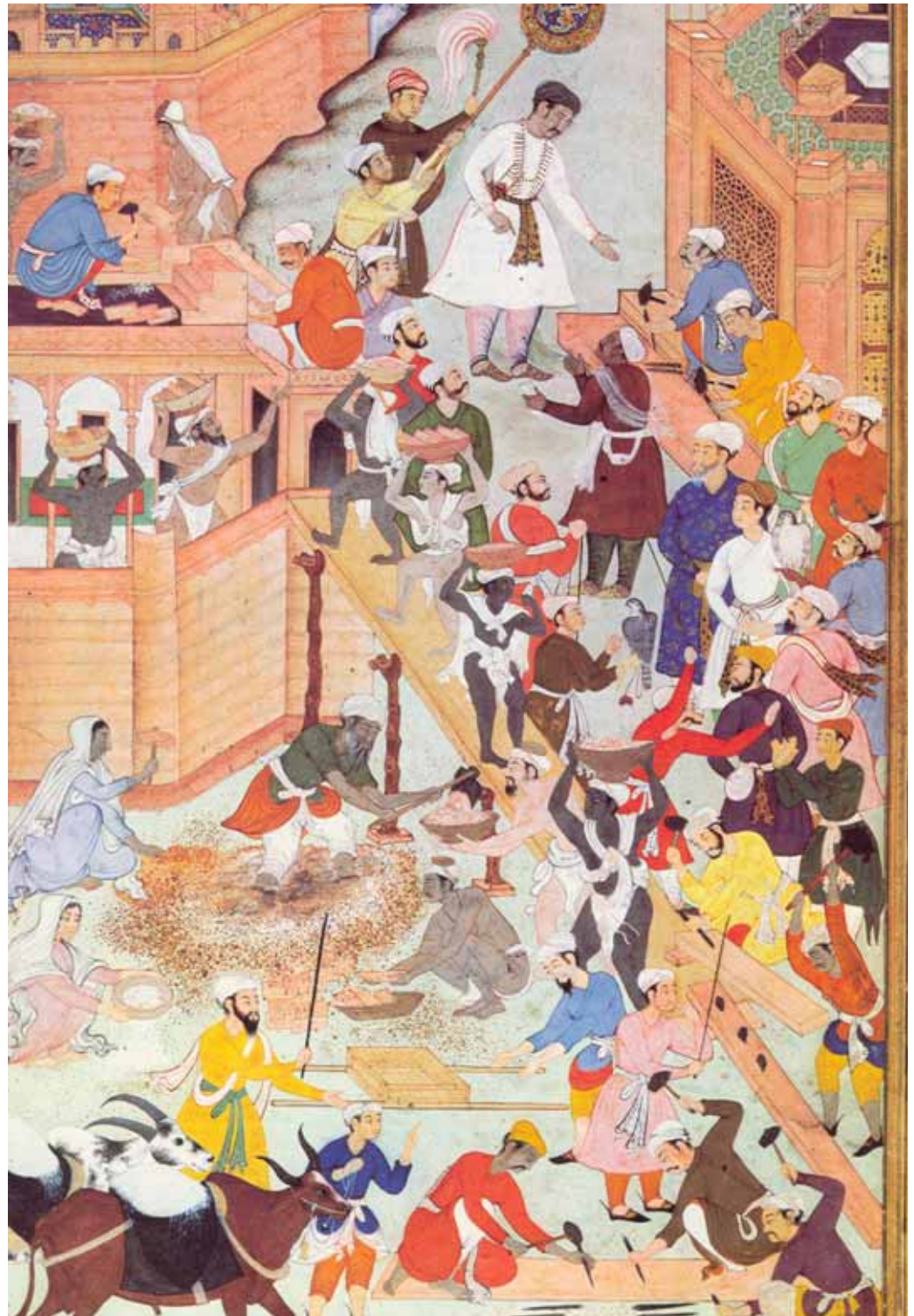
With the introduction of fine cementing material (lime mortar) and new techniques (arch and dome) one finds fast growth of brick houses in the cities. Alauddin Khalji employed 70,000 craftsmen for his buildings. The number of stone-cutters alone employed by Babur for his buildings were 1491.

In building construction role of engineers (*muhandis*) and architects (*me'mar*) and builders (*banna*) was most important. At first *tarah* (*naqsha*, plan) of a building used to

be chalked out on a sheet of paper and building was constructed as per the tarah. The master architect was known as *Ustad*. *Ustad Ahmad* and *Ustad Hamid* were the chief architects appointed for the construction of Shahajahanabad fort. A painting from Baburnama shows Babur inspecting the graph-sheet (*naqsha*) of a layout of a garden. 'Gardens' formed an integral part of Mughal building constructions. In Karnataka architects and builders were known as *ruvaris*, and *rupakaras*, *silpi*, *achari*, and *acharya*. They were involved in tank and temple constructions.



Mughal mason at work;
Akbarnama



Akbar inspecting construction of Fatehpur Sikri, A folio from *Akbarnama*.

Stone and bricks, both baked and dried, constituted prime building material. Next in importance was the lime/ lime mortar. Red sandstone was quarried from Fatehpur Sikri and Rupbas. Bihar was known for cutting and polishing of stone. Phalodi in Rajasthan had two stone quarries. Abul Fazl (c. 1595) records presence of two marble quarries at Rajgir and Gaya in Bihar used for making ornaments. Marble was quarried from Marwar. For Taj Mahal marble was brought from Udaipur region. The stones were transported on cart-loads. Lime was quarried from Broach and Patiali (near Aligarh). Limestones were used for white washing. Gujarat's *sang mahtabi* (a variety of lime) was known for its softness and whiteness. Lime from sea-shell was prepared in the region of Bengal. For making lime mortar *surkhi* (pounded bricks) was used.

Beldar specialised in laying out the foundation; *sangtarash* were the stonecutters. However, there were separate embossers (tracers, *naqqash*), inlayers (*parachinkar*), and for polishing the stone. Bricklayers (*raj*) constituted separate category. Ironsmiths though played active role in the building activities, as is evident from Mughal paintings, interestingly he is found missing in Abul fazl's list of building workers.

Carpenters (*najjar*) and sawyers (*arra kash*) were important part of building construction. In Karnataka, known as *badagi* and *varadhaki*, they enjoyed the status equal to *rathakara*. During the 14th century, in Irinjalakuta temple, Kerala we hear about the *Taccuta Kammal* (artisan priest, a carpenter), incharge of the construction activities in the temple. They were equally vital in both the rural and urban economy. They were essentially required for making agricultural tools and bullock carts in the village society.

18.6 OTHER CRAFTS

The list of sundry crafts during the medieval period is exhaustive. We do hear manufacturers of bamboo articles (*komti* in Maharashtra), image sellers (*but farosh*), bangle dealers, (*kasar* in Maharashtra). Cambay was known for its production of wooden furniture, perfumes, etc. Furniture manufactured at Baroda was exported as far as to Basra. Ahmedabad (Gujarat) and Sambhal (Uttar Pradesh) were important centres of paper manufacturing. At Sialkot and Sirhind several varieties of paper was manufactured (for techniques see Unit 23). Van Twist (c. 1638) mentions that Ahmedabad depended for the raw material for paper production on Malabar coast. At Ahmedabad vermilion was produced from mercury. Surat was another important centre of its production.

Potters formed one of the essential component of a village life. Potters of Patna were famous for their earthen ware. Their ware was so fine that it was not thicker than paper. It used to be sent as 'rarity' all over. They used to receive land grants or fixed proportion of crop in lieu of their services. They also served as warriors in south India.

Tanning was the craft that was solely the profession pursued by the Chamar caste. Saddles, water buckets, leather pots, shoes and similar other articles were manufactured out of leather. Sirhind was noted for quivers, greaves, shoes and sandals. Excellent shields were made at Sambhal out of the skin of rhinoceros. While at Cambay shields were made out of tortoise shells.

18.7 ORGANISATION OF CRAFT PRODUCTION

One finds fairly uniform pattern in the whole subcontinent as far as certain broad features pertaining to organisation of non-agricultural production is concerned. Largely the crafts possessed 'rurban' character. 'Caste' played an important role in the production process. Further, there were certain artisans attached to the village community while others were

independent producers. We can categorise the organisation of non-agricultural production broadly into four ways: a) Village artisans; b) Independent artisans producing with their own tool and capital; c) *Dadani* or putting-out-system, where artisans were supplied with money or raw material, and d) *Karkhanas*.

Village was the basic unit of production. Each medieval village had artisans attached to the village community (called *balutedars* in Maharashtra and *ayagars* in south India). They were the service providers to the entire village and largely production was not meant for sale in the market. However, skilled artisans did sell their goods in the *qasba* market – shoes, blankets, cloth, wooden articles, etc. We have already discussed in detail their role and functions as part of the village community in the previous Unit. Here we will discuss in detail how the production was organised under other three categories.

18.7.1 Artisanal Production

No organised labour force probably existed in medieval times. Individual artisans used to produce with the help of his own or family labour, and with his own capital at their respective homes. Though implements used by them were crude, they achieved high degree of efficiency. Marx has called it ‘asiatic’ and ‘petty’ mode of production; while Moreland calls it artisanal system of production. However, Irfan Habib characterises it as ‘medieval Indian production’.

In north India, particularly during the Mughal period, the state was the largest producer and best master craftsmen worked in their *karkhanas*. Still a large number of artisans were producing independently and enjoyed freedom of production for the local consumption as well as their goods were also in demand in distant markets. Lahore was famous for carpet production. Manucci (1656-1712) records 20 varieties of Lahore woollen goods were on sale in Agra market.

Non-agricultural production was deeply rooted in the agrarian setting. Commenting on Mughal period Tapan Raychaudhury (Cambridge, 1982) states that, ‘Manufacturing in Mughal India was predominantly a rural activity though most urban centres also had their artisan industries specially production of certain luxury and semi-luxury goods.’ Weavers and dyers did not constitute part of the village servants. But they did possess rural base. Spinning was almost exclusively done by women on payment. Weavers used to buy the yarn from the ‘independent’ spinners. The main centres of yarn production were Balasore, Qasimbazar and Broach. Cotton carders (*naddaf*) hire out their services as to this date in the villages and to some extent at the urban centres by reaching door-to-door. Artisans, particularly, weavers and oil-pressers used to market their products in the nearby markets. Fukazawa (1982), however, finds that in Deccan weavers and dyers were more urban than rural. In south also they formed very much part of temple-towns. K.N Chaudhuri referring to 17th century textile production in India finds that in north it was more town centric while in the south and Bengal the production ‘scattered throughout the country’.

In south India craftsmen of different professions and castes more commonly possessed ‘collective identity’ – *Panchala* (Karnataka), *Panchanamuvaru* (Andhra Pradesh), and *Kammalar* (Tamil Nadu). Craftsmen were at the centre of the growth and emergence of temple towns in south India. Craftsmen not only played an important role in the construction activities but also formed part of the temple complex in south India. Their settlements in the temple complex were known as *tirumadailagam*. It is interesting to note that the position of craftsmen involved with temple construction was much different to their counterparts working in the villages as simple blacksmith, etc. There existed huge socio-economic gap between the two. (Vijaya Ramaswamy, 2003) Interestingly, in south India though we do not find *karkhana* type of organisation, we do hear craftsmen

attached to the temple. Thus enjoyed patronage of the temple and right to participate in the temple management. They used to perform the services to the temple. Portrait sculptors derived their patronage almost exclusively from the royalty. (Vijaya Ramaswamy, 2003) However, in contrast to artisans working in the *karkhanas* they not only cater to their patrons but also to the market.

European factors used to operate through middlemen (brokers/*dallals*). They worked as facilitators in procuring goods from hinterlands. Money advances were made to the weavers, calico printers. Though initially it helped the weavers, in the long run gradually it led to merchant interference in the production process. To ensure the supply European Companies gradually encouraged weavers to settle down near the factories. This gave rise to increase in weavers' settlements around European factories resulting in the emergence of new set of settlements and new equations. French advanced around 30,000 *pagodas* to get the weavers settled in the nearby villages around Pondicherry. Interestingly, the indigenous soldiers employed by Francois Martin were used by him in times of peace for weaving.

We are not sure to what extent the guilds survived or whether there existed any formal organisation of guilds. However, men of the same profession lived in the same quarter/s of the town/village. In Maharashtra basic occupational organisation was caste. We do get references of *mehtare* (chief) in the Decaan. Burton Stein argues that powerful merchant guilds of the Chola period declined during the Vijayanagara period in the wake of the establishment of centralised bureaucracy. However, Vijaya Ramaswamy (1985:82) counters that 'in the sixteenth century textile trade continued to be in the hands of Ayyavole guild and its connection with the textile industry continued till the late seventeenth century.' We continue to get references to Ayiravar Nagarattar and Choolias in the seventeenth century. Nonetheless there appears to be a definite decline in the power and prosperity that they enjoyed during the earlier centuries. The declining powers of the guilds led merchants to associate themselves to a group of landholders who emerged as powerful private landowners and were organised as *chitrameli-periyanadu*.

In south India our period also saw emergence of weaver-merchant or master weaver employing artisans under him. It had an added advantage that it not only ensured involvement of the artisan but also of the entire household. Dutch had the largest dealings of this sort. Such contracts were signed by English East India Company with the chief weavers of Salawar and Janrawar weaving community. The master weaver in this case thus represented the interests of the weavers as well as the Company.

Our period is marked by the growing power of *kaikkolas* (weavers) of Valudilampattu region, particularly in the lower valley of Pennai and Gadilam and those of the *kanmala* (the smiths). Their association with local administration and temple management is suggestive of their growing power. During the 16th century records kanamalas are mentioned to have been exempted from *kanikkai*, *pavadai*, *parivattam*, and *mugantudai*.

Artisans were neither economically well off nor well treated. Pelsaert (c. 1626) lamented the condition of the artisans: 'For the workmen there are two scourges, the first of which is low wages...The second [scourge] is [the oppression of] the Governor, the nobles, the Diwan, the Kotwal, the Bakhshi, and other royal officers. If any of these wants a workman, the man is not asked if he is willing to come, but is seized in the house or in the street, well beaten if he should dare to raise any objection, and in the evening paid half his wages, or nothing at all.' Bernier (1656-68) has also made similar remarks over the prevailing condition of the artisans in Mughal India. The rich will have every article at cheap rate. 'When an Omrah or mansabdar requires the services of an artisan, he sends to the bazar for him, employing force, if necessary, to make the poor man work, and after the task is

finished, the unfeeling lord pays, not according to the value of the labour, but agreeably to his own standard of fair remuneration, the artisan having reason to congratulate himself if the korrah has not been given in part payment.'

In north India caste organisations did sometimes protest against exploitation. We do hear voices of protests on the part of artisans. In 1630 at Baroda weavers declined to supply *bafta* to the English unless they stopped buying the yarn from the market for it hiked the prices of yarn. Similarly, English factor (1634-36) mentions a case of Baroda where weavers resisted selling the cloths to the *faujdar* on prices dictated by him and threatened to leave the town. The large scale participation of artisans in the popular movements particularly the Satnami uprising, shows signs of artisans' resistance against exploitation.

South Indian crafts organisations did play active role in 'collective bargaining' and protested against 'enhanced taxation.' Increase in loom tax by Krishnadeva Raya in 1513 resulted in an en masse desertion of weavers. Abbe Carre (1672-74) mentions that, 'there was a firmly established custom (among the *kammalar* artisans) that if one of them is offended or wronged, all others shut their shops and abandon their work.'

The other side of the story is instances of cheating on the part of the artisans are also recorded, though such cases are a few only. English factors complained at times dyers supplying half-dyed clothes. After Gujarat famine when indigo production dropped sharply indigo manufacturers started mixing sand, oil, etc. with indigo.

18.7.2 *Dadani*

Dadan, a Persian language term, means to give. Generally the advances were made by the merchants to the weavers. The capital invested by the merchant, however, could be in the form of cash or raw material. Here artisan was producing not with his capital though still producing with the help of his tools and family labour. *Verlagg* in south India was similar to the *dadni* ('putting-out-system') where merchants used to provide raw material to the weaver as advance. In south India it started under the influence of the European trading companies who required the specific variety of cloth. The quantity and quality required, however, was determined and dictated by the investor. Thus, while still controlling the tools and labour the artisans' choice in terms of choosing raw material and the final product got restricted; their originality and creativity was lost under the dictates of merchants/companies to provide specific design and style of cloth. European factors instructed that 'those which you shall send we desire may be with more white ground and the flowers and branch to be in the middle of the quilt...whereas now most part of your quilts come with sad red grounds which are not so well accepted here.' (Vijaya Ramaswamy, 1985) The investor could be merchant or a broker. There was tendency on the part of these merchants to monopolise the areas of their investments through their agents and at times tried to impress upon price curves. Pelsaert (c. 1626) states that, 'The practice of giving advances to indigo producers proved very profitable since at that time the market price of a maund of indigo was Rs. 35-36 while by paying in advance they got it for Rs. 24-25.' Thus merchants became indirect organisers of production. In the seventeenth century we hear more of independent merchants than merchant organisations. The famous names were Mir Jumla, Virji Vohra, Chinanna, Kasi Viranna, Seshadri, Varadappa. They wielded lot of political power. Chinanna, when turned hostile against the Dutch besieged, though unsuccessfully, Fort St. Geldria. These merchants exploited the artisans to their fullest possible capacity. Somaji Chitta of Surat charged interests on the money be advanced to them. Instead of charging 1 per cent commission he charged them 12 per cent. In fact weavers lost their freedom in choosing the quality, fixing the quantum of production, and above all in determining the prices of the finished goods. It practically reduced them to the level of hired labourers and only

‘thin line separated them’. But at times they save them from official oppression. These merchant-brokers served as link between the Company and the artisans. It also reduced the level of risk for the Company; even at times they made advances to the Company.

18.7.3 *Karkhanas*

These *karkhanas* were not necessarily production centres. Some were, however, the real factories where manufacturing was done (*Qur Khana* – arms and armoury); while others served as royal stores (*filkhana* – elephant stable), *abdarkhana* (maintained water supply of the palace, etc.). Shams Siraj Afif (c. 1400) calls the first type *ghair ratibi* and the later types *ratibi*. The later one received fixed royal grants. In the present Section we will be focussing on the first type of *karkhanas* where actual production was done. In these *karkhanas* not only the things of daily use but also artillery and amunitions were produced.

The institution of *karkhanas* appears to be a Persian importation. *Karkhanas* known as *buyutat* (lit. house) were more in the form of royal workshops producing or storing items of value/needs required by the royal household. Persians exploited large numbers of war captives for the production purposes.

We hardly get much information on *karkhanas* prior to Tughluq period. Muhammad Tughluq had employed 400 silk weavers in his royal *karkhana*. However, Firuz’s reign saw the unprecedented growth of the institution of *karkhanas*. He maintained as much as 36 *karkhanas*. Afif provides a graphic description of the working of the *karkhanas* under Firuz.

The royal establishments (*kar-khana*) of Firoz Shah

Sultan Firoz had thirty-six royal establishments, for which enormous supplies of articles were collected, *** and the annual outlay on which was very large. Some of them were in receipt of a regular payment (*rayati*); others had no fixed income (*ghair-rayati*). Thus among the *rayati* establishments there were the elephant, horse, and camel stables, the kitchen, the butlery, the candle department, the dog-kennels, the water-cooling department and other similar establishments. These received a regular monthly allowance of one lac and sixty thousand tankas for their expenses, in addition to which there was the cost of their furniture, and the monthly salaries of the accountants and other officers, which also amounted to one lac and sixty thousand silver tankas. In the establishments which received no regular allowance, such as the wardrobe, the *alam-khana* or insignia, the carpet stores, and the like, new goods were procured every year according to orders given. In the winter season six lacs of tankas were expended on the wardrobe, besides the outlay for the spring and summer. 80,000 tankas were expended on the *alam-khana* in the purchase of articles, besides the salaries of the accountants and the wages of the work-people. About two lacs of tankas were expended in the carpet department. Each of these establishments was under the charge of a *khan* or *malik* of high rank; thus the wardrobe was under the superintendence of Malik’ Ali and Malik Ismail.***

Khwaja Abu-l Hasan Khan was charged with the general superintendence of all the *kar-khanas*, and through him all orders were issued to the respective establishments. There was a separate financial department (*diwan khana*) for the *kar-khanas*, in which the general accounts were kept, but the accounts were rendered to and recorded in the exchequer (*diwan-i wizarat*). So that the exchequer not only kept an account of the land revenues (*ikta*), but also of the expenditure of the *kar-khanas*. There were many accountants in the various *kar-khanas* who received monthly pay.**

Shams Siraj Afif, *Tarikh-i Firuz Shahi*, trs. Elliot, H.M., and John Dowson, *The History of India as told by Its Own Historians: The Muhammadan Period*, Allahabad, Vol. III, pp. 103-106.

Under the Mughals the institution expanded further. Akbar took special interest in its expansion. Jadunath *Sarkar* has counted as much as 70 types of *karkhanas* working under the Mughals. Speaking strongly for the institution Bernier (1656-68) comments that, 'The arts in the Indies would have long ago lost their beauty and delicacy if the monarchs and principal omrahs did not keep in their pay a number of artists who work in their houses, teach the children, and are stimulated to exertion by the hope of reward and fear of the *korrah*.'

These royal *karkhanas* were not only established at Delhi and other capital cities instead they had huge establishments at provinces as well. Shawl industry was largely concentrated in Kashmir. Akbar is credited with popularising the shawl industry of Kashmir to other parts of India, particularly Lahore. During Akbar's period they operated at such a vast expanse that Abul Fazl has equated them with a city. Akbar tried to develop shawl and carpet workshops at Patna, Agra, Delhi and Lahore. Abul Fazl mentions the existence of more than 1000 *karkhanas* of shawls alone in Lahore.

Ain 32 : On Shawls, Stuffs, etc.

His Majesty improved this department in four ways. The improvement is visible, first, in the *Tus* shawls, which are made of the wool of an animal of that name; its natural colours are black, white, and red, but chiefly black. Sometimes the colour is a pure white. This kind of shawl is unrivalled for its lightness, warmth, and softness. People generally wear it without altering its natural colour his Majesty has had it dyed. It is curious that it will not take a red dye. Secondly, in the *Safid Alchas*, also called *Tarhddars*, in their natural colours. The wool is either white or black. These stuffs may be had in three colours, white, black, or mixed. The first or white kind, was formerly dyed in three ways his Majesty has given the order to dye it in various ways. Thirdly, in stuffs as *Zardozi*, *Kalabatun*, *Kashida*, *Qalgha*, *Bandhnun*, *Chhint*, *Alcha*, *Purzdar*, to which his Majesty pays much attention. Fourthly, an improvement was made in the width of all stuffs; his Majesty has the pieces made large enough to yield the making of a full dress.

In former times shawls were often brought from Kashmir. People folded them up in four folds, and wore them for a very long time. Nowadays they are generally worn without folds, and merely thrown over the shoulder. His majesty has commenced to wear them double, which looks very well.

His Majesty encourages, in every possible way, the manufacture of shawls in Kashmir. In Lahore also there are more than a thousand workshops. A kind of shawl, called *mayan*, is chiefly woven there; it consists of silk and wool mixed. Both are used for *chiras*, *noital*, *fotas* (lion bands), etc. (pp. 97-98)

Abul Fazl Allami, *The Ain-i Akbari*, trs. H. Blochmann, Vol. I, New Delhi, *Ain* 87, pp. 97-98.

Aurangzeb's noble Bakhtawar Khan had wide network of *karkhanas* in Delhi, Agra, Lahore, and Burhanpur. Peter Mundy when visited Patna in 1632 found weavers employed by the governor Abdullah Khan in making fine linen for his harem. Ali Mardan Khan sent to Shahjahan woollen carpets and shawls produced in his *karkhana*. We also hear *karkhanas* maintained by Shahjahan's daughter, Princess Jahan Ara Begum. Raja of Kharagpur Bahroz (1631-76) was running his own workshops in which Kols, Neyas and Asuras used to smelt iron-ores and prepare lime for the Raja. In his workshops silver work was also done.

However, Aurangzeb did not extend such liberal patronage and number of *karkhanas* declined during his reign. But the tradition of maintaining *karkhanas* did survive in the regions (Jaipur, Bengal, etc.) during the 18th century.

They largely catered to royal demands, either for royal consumption or for gift purposes. Generally, luxury items and expensive materials were produced in

the *karkhanas*. However, later, for sure, production in the royal *karkhanas* was not only meant for the personal consumption of the royalty and the nobility rather it was also done for the market. Afif (c. 1400) mentions under Firuz the turnover of *jamadarkhana* in winter alone was 60,000; while that of *farrashkhana* (carpet weaving) 200,000 *tankas* (silver coin) per year and that of the *karkhana* of mines equalled the revenues of the city of Multan. G.S.L. Devra (1987) has calculated the profit of the Bikaner rulers from different *karkhanas* during 1694-1699 at Rs. 33,881. He concludes that it was fashionable among the aristocracy to use 'branded' products of the *karkhanas*. The articles produced in these royal *karkhanas* were supplied to various departments on market rates. This way they were huge revenues generators.

But these *karkhanas* could never develop into commercial establishments for their existence depended largely upon the state patronage or the patronage provided by the nobility. As soon such patronage was withdrawn they also declined.

In the kingdoms of Maratha and Golconda *karkhanas* also developed on Mughal lines. Shivaji is credited with establishing *karkhanas* in his dominion. Sabhasad records 18 *karkhanas* of Shivaji. The production was done largely for the royalty and not for commodity production and they worked as mere state departments. Interestingly, *karkhanas* in the Deccan under the Marathas also employed forced labour (*vethbegar*). (Fukazawa, 1982) The period of forced labour ranged from eight days to two months in a year depending on the nature of work. At times they were paid a small amount in cash or kind.

Organisation of *Karkhanas*

Under the Delhi Sultans each *karkhana* was placed under the charge of a distinguished noble who was in turn assisted by *mutasarrifs* (superintendents). These *karkhanas* were well equipped and efficiently organised. Abul Hasan was the chief *mutasarrif* of all the royal *karkhanas* during Firuz Shah's reign. Initially under Akbar *karkhanas* were placed under the over all charge of *diwan-i buyutat* and later *mir-i saman* looked after the office. During Aurangzeb's reign, the charge shifted to *khan-i saman*. However, *diwan-i buyutat* continued to look after the financial matters independent of *mir-i saman*. Each *karkhana* had a *darogha* (superintendent), *tahvildar* (cashier and store keeper) and a *mushrif* (accountant). *Darogha-i kacheri* was incharge of the general supervision of the office. It was *darogha* and *tahvildar* who were in direct touch with the artisans supervised and distribute the daily work and material among the artisans. *Mustaufi* was the auditor who was to verify and audit the accounts before sending it to the office of the *diwan*.

Manufactories

The first venture in this direction was undertaken by the English East India Company at Patna under Hughes and Parker in 1620-21. Approximately 100 artisans were employed in the *karkhana* for the production of silk. In 1646 the English constructed the dyeing house for them at Ahmedabad where they not only hired the artisans but tools also belonged to the master. In 1652, at Palakollu on Coromandel coast Dutch built 300 jars for the purpose of dyeing blue cloth. Similar dyeing workshops were built by English at Surat, Tegnapatnam, Fort St. David, Pulicat, and Fort Geldria. However, they largely operated through merchant-brokers.

***Karkhanas* and the Artisans**

It will be interesting to find out the recruitment pattern of the artisans in these royal *karkhanas*. Whether they were employed on individual basis? Were they simply wage earners? What was their socio-economic background? Or what was their status in the society?

Our information on these aspects is sketchy. We know for sure that in the royal *karkhanas* not only the master craftsmen from India but also from Turkey, Persia, China and even from European countries were employed. Thus the *karkhanas* no doubt enjoyed the services of the best artisans. However, it is difficult to say once the artisan got enrolled into these *karkhanas* to what extent he was free to produce the product of his choice – whether in terms of design or shape or colour. Production was dictated as per imperial choice/wishes. Craftsmen had to work under *mutasarrif*. In return for his services he was paid wages. He had no say in the choice of raw material. It was supplied to him by the state. State provided raw material, tools, and space to work. Artisan was simple wage earner, produced as per the taste of royalty. Jahangir in his *Memoirs* mentions that, ‘I ordered the Ustads Puran and Kalyan, who had no rivals in the art of engraving to make dagger hilts of a shape that was approved at this time and has become known as the Jahangiri fashion. At the same time the blade and the sheath and fastenings were given to skilful men, each of whom was unique in his age in his art. Truly, it was well carried out according to my wish.’

Though it is difficult to analyse whether there existed hierarchy among the artisans, it seems that there did exist some sort of gradation among the artisans on the basis of their skills. Abul Fazl mentions a huge chain of artisans employed in building construction from stone cutter, plasterer, carpenter, sawyer, lattice maker, brick layer, glass cutter, etc.

In these *karkhanas* the artisans not only lost their freedom as producer they even received much below their ability. Pelsaert (c. 1626) has commented on the pathetic condition of artisans in these *karkhanas*, ‘artisans had to work from dawn to dusk only to get 5 or 6 tachas (dams) in the evening. He was enrolled by force. In case of resistance the reward was good beating and half the wages.’ Another major blow was once they got employed in the *karkhanas* much of their family labour used to go waste. On account of their poverty they were hardly in a position to bargain. It was not easy for them to take their goods to distant market in hope of high prices. Generally they sold their goods in the local market at low prices.

The chief transformation between artisanal and *karkhana* manufactory production was that the craftsmen who were owners, master, producer (worker) and seller started disintegrating and lost their freedom in the process.

18.7.4 Wages

We have very little information on this. The only information of substance is provided in the *Ain* by Abul Fazl. But that too represents prices prevailed at the capital city/royal camp.

Ain 87 on the Wages of Labourers in the Building Establishment

Gilkars (workers in lime): first class workmen, 7 d.; second class, 6d.; third class, 5d.

Sang-tarash (stone-masons): The tracer gets 6e. for each *gaz*; one who does plain work, 5d. A labourer employed in quarries gets for every man he breaks, 22j.

Carpenters, first class, 7d.; second class, 6d., third class, 4d.; fourth class, 3d.; fifth class., 2d. For plain job-work, a first class carpenter gets 1d. 17j. for one *gaz*; second class carpenter gets, 1d. 6j.; third class do., 21j.

Pinjara-saz (lattice worker and wicker worker): First, when the pieces are joined (fastened with strings), and the interstices be dodecagonal, 24 d. for every square *gaz*; when the interstices form twelve circles, 22 d.; when hexagonal, 18 d.; when *ja fari* (for rhombus-like, one diagonal being vertical, the other horizontal), 16 d.; when *shatranji* (or square fields, as on a chess board), 12 d. for every square *gaz*.

Secondly, when the work is *ghayr-wasli* (the sticks not being fastened with strings, but skilfully and tightly interwoven), for first class work, 48 d. per square *gaz*; for second class 48 d., per square *gaz* 40d.

Arra-kash (one who saws beams): For job-work, per square *gaz* 2½ d., If *sisau* wood; if *nazhu* wood, 2 d. A labourer employed for the day, 2d. There are three men for every saw, on above, two below.

Bildars (bricklayers): 2 2 first class, daily 3½ d.; second class daily., 3d. If employed by the job, for building fortress walls with battlements, 4d. per *gaz*; for laying foundations, 2½ d. ; for all other walls, 2d. per *gaz*; For digging ditches ½ d. per *gaz*

Chah-kan or well-diggers : first class workmen, 2d. per *gaz*; second class 2 d, per *gaz*, 1½ d., third class, 1½ d.

Ghota-khur, or divers : They clean wells. In the cold season, 4d. per diem; in the hot season, 3d. By the job, 2R. for cleaning a depth of 1 *gaz*.

Khisht-tarash, or tile makers : for 100 moulds, smoothened, 8d.

Surkhi-job (pounders of old bricks) : 1½ d. for a heap of 8 mans.

Glass-cutters : 100 d. per *gaz*.

Bamboo-cutters : 2d. per diem.

Chapper-band, or thatchers : 3d. per diem; if done by the job, 24d. for 100 *gaz*.

Patal-bank : 1d/ 4 *gaz*.

Lakhra : They varnish reeds, etc., with lac. Wages, 2d. per diem.

Abkash, or water – carriers : First class, 3d. per diem; second class 3d. per diem., 2d. Such water-carriers as are used for furnishing house- builders with water for mortar and quicklime, get 2d. per diem.

Abul Fazl Allami, *The Ain-i Akbari*, trs. H. Blochmann, Vol. I, New Delhi, 1977, *Ain 87*, pp.235-36.

d = *dam* (40 *dam* = 1 silver rupee); j = *jital*; R = *Rupee*

The artisans in the *karkhanas* were paid either monthly or on daily basis. In the eastern Deccan in 1620 blacksmiths, goldsmiths, etc. were paid 8.4-9.6 pice a day and their helpers approximately 2.8 to 3.2 a day. Similarly, wages of the workers in the Kulur diamond mines were 2 pice a day.

We do hear of protests against the low wages. In 1660 it was reported to Aurangzeb that the *karkhana* workers refused to accept the wages in devalued new coin; accordingly their wages were raised from 1 to 1.5 *tanka* (Mughal copper coin = 2 *dams*). In a similar incident Ali Muhammad Khan records a complaint of construction

workers of Ahmedabad in 1671-72 over the low wages. Aurangzeb instructed *diwan* of the *suba* to look into the matter and asked that they may be paid as per the established norm. While lamenting over the poor pay of the craftsmen Pelsaert (c. 1626) even attributes it as the main reason behind the lack of incentives for the craftsmen to produce quality products or increase productivity. However, in spite of low wages Moreland (writing in 1920s) analyses that the workers employed in Mughal *karkhanas* were 'better off than many labourers of the present time.' Shireen Moosvi's analysis (1987) also suggests that 'purchasing power of wages in terms of cereals was significantly higher in 1595 than in the latter half of the 19th century... [and] a distinct fall in the real wages of skilled artisan too.'

18.7.5 Specialisation of Crafts

During the medieval period though craftsman with his family labour produced wonders there did exist division of labour. We get definite evidence that specialist craftsmen were employed to perform specific activities in the royal *karkhanas*. Moreover, such specialisations can also be seen in artisanal production. Take the case of textiles, the 17th century painting given in Block 5 Unit 23 on page 45 clearly points towards various craftsmen performing specific roles in the weaving process. Weaver, the master craftsman sitting in the middle involved working with his loom while you can also see a separate winder rewinding the yarn, and also cotton carders and dyers busy doing their work. The cotton and cotton yarn were freely available in the Gujarat markets. Village Sobay near Gujarat was exclusively 'weavers and spinners' village. Broach emerged as a prominent centre for high quality bleaching on account of availability of good quality water and the presence of skilled artisans. From Ahmedabad, Baroda and Agra textiles were coming for bleaching to Broach. So famous were the Gujarati bleachers that their presence is recorded in Java in 1642. Even English factors requested to send some bleachers to Bombay. Weaving and printing were two separate operations. Similar was the case with yarn production. With great increase in demand there emerged special class of labourers who were involved in production of yarn only. Broach also emerged as famous centre for the production of yarn. Their production appears to be market oriented. When Gujarat famine affected the yarn production scarcity of yarn in the market led to fluctuations in the prices of cloth and affected other operations of textile production.

Indigo was another manufacture where such division of labour existed. The process required a group of persons and could not be performed alone. It could be hired labourers or family members. In Gujarat use of hired labour in the process can definitely be discerned for here producer of the crop and the manufacturer of the product were at times different. Those buying indigo leaves and manufacturing it definitely must be employing hired labourers. We do get evidence of Europeans buying leaves and getting the dye manufactured by employing hired labourers. Saltpetre production was also no exception. It required, as we have seen, efforts of groups of workers to process the production from mining to finished product. Duarte Barbosa (c. 1518) informs us that 13 persons were engaged in performing the operations from mining of carnelian rock to its final processing. In diamond mining use of hired labour was a common feature. John Fryer (1672-81) mentions coral being wrought at the house of a 'Hindu' and 'Moorman' cut all sorts of stones clearly indicates the existence of specialisation and division of labour.

There existed a thin line between the artisans and soldiers. In fact during the medieval ages when sword was the prime determinant in south India particularly we find people of all professions and different traits joining the profession.

18.7.6 Technology and Tools

Babur in his *Memoirs* praised India for its ‘unnumbered and endless workmen of every kind’ of craftsmen. Artisans developed occupational specialisation and technical mastery by learning the same profession from generations. The point is well illustrated by Bernier (1656-68): ‘The embroiderer brings up his son as an embroiderer, the son of a goldsmith becomes goldsmith...No one marries but in his own trade or profession, and this custom is observed almost as rigidly by the Mahometans as by the gentiles, to whom it is expressly enjoined by their law.’ Pelsaert (c. 1626) also echoes the same voice: ‘workmen’s children can follow no occupation other than that of their father.’ Though medieval artisan enjoyed high reputation but his tools were very primitive and simple as compared to Europe and China (for details see Block 5, Unit 23). Though spinning wheel brought wonders as for production of yarn is concerned but the yarn produced was coarse and for quality production artisans had to bank on traditional tools. The famous muslin of Dacca was not spun on spinning wheel instead a bamboo spindle was used. The implements used by them were crude, but they achieved high degree of efficiency and skill pursuing the same profession from generations. We do get some faint references pertaining to attention paid for the improvement of tools of the artisans in the *karkhanas*. With a wish to produce better textiles than Ahmedabad, Raja Jai Singh of Amber ordered that for the *karkhana* of Jai Nagar tools be made of special kind of wood. (The details on technology and techniques used in metallurgy are discussed in Unit 23 of Block 5)

18.7.7 Craft Mobility

During the seventeenth century European travellers were astonished seeing the mobility of weavers on Coromandel coast. The prime reason behind the mass migration was either instable political conditions or protest against enhanced taxation or natural calamity.

But sometimes such mobility was also restricted by the state. In 1622-23 governor of Broach denied permission to five carpenters shipbuilders to migrate to Surat. Similarly, famine condition also forced weavers to migrate. Gujarat famine was so severe that textile workers migrated in great numbers from the region. English attempt to promote Surat resulted in local Parsi cultivators opting for weaving as one of their profession. Soon they emerged out to be one of the finest weavers in Gujarat. Ovington (1689) mentions them as the main weavers of silken fabric. Alexander Hamilton records (1692) the presence of a tailor from Surat at Achin under whom ten workers were working. There are also references to the presence of Gujarati bleachers as far as Bantan (Indonesia).

Max Weber argues that in India caste system prevented inter craft mobility. Rejecting Weber’s argument Irfan Habib has emphasised that the vast battery of skilled/unskilled workers/artisans formed a sort of ‘reserve’ out of which on the one hand new classes of professions created; contrary to it under pressing circumstances they also withdrew to their original status being absorbed into the old village settings. At times more than one caste followed the same profession. Further, as Irfan Habib puts it they were never ‘eternally fixed in their attachment to single profession or skills.’ We do get references to craftsmen shifting to another profession under ‘economic compulsions’ Thus as rightly put by Irfan Habib that ‘caste did not represent an insurmountable obstacle to the mobility of craft labour.’

In the Deccan as well caste basis of organisation of production does not appear to be very rigid. Fukazawa (1982) mentions that during the early 18th century a section of tailoring caste joined the profession of dyeing. During 17th century on account of increasing demands for textiles there occurred large scale migration of weavers from Sindh to Gujarat. In Gujarat printers formed separate caste known as Bhadar. Similarly, dyers constituted a separate caste in Gujarat. Initially Bohras of Gujarat were involved in production as well as sale of saltpetre. Later *Banjaras* also began the operation. However, they had to leave the profession on account of excessive state interference.

In south India as well medieval period saw proliferation of weaving castes – Pattunulkarar (specialist in tie and dye), Mooree, or Caingaloon, etc. and there does not appear to be immobility of craft professions. (Vijaya Ramaswamy, 2003). In the Pudukkottai region some of the former military groups *kaikkolar* and *niyayattars* became weavers by the late 13th century. However, Alaev (1982), commenting on situations in south India, maintains that, 'Technological improvements were to a great extent checked by caste rules'. Nonetheless caste support 'served as a safeguard to their right.' He argues that these caste ties were more 'cohesive' in the towns strengthened by 'territorial' boundaries.

It is interesting to note that craftsmen (goldsmiths, weavers and oil pressers, braziers, carpenters, blacksmiths, etc.) in medieval south India find wielding swords and joining the state service as warriors/soldiers and their involvement in cattle raids. Mugabala (in Karnataka) inscription of AD 1337 refers to goldsmith Maroja's son Varadan died in a cattle raid.

18.7.8 Medieval Women and Craft Production

During the medieval period largely women's role in the entire production process was that of a 'subordinate' partner and were 'marginalised' in the whole processes.

Textile was the one craft where women's participation appears to be the maximum. Women largely involved in separating the cotton fibre from the seed. Though *dhunias* were largely men, scutching with hand-beating was done by women. Spinning was the area where women were in sole command. In bleaching, dyeing and printing probably both participated together. We do get separate word for male (*chhipa*) and female (*chhimpaka*) printers. At Cambay Duarte Barbosa (c. 1518) mentions the presence of Muslim washer-women.



Mughal Painting

A folio from *Akbarnama*; women at work

Besides textiles, women work hand in hand with menfolk in the construction activities. In the Mughal paintings women are shown involved in breaking stones, preparing lime-mortar, carrying it in pans. However, there is no evidence of women laying bricks or doing plastering, etc.

In south India women were allowed to use bellows but 'not permitted to forge the iron.' Women were also not allowed to assume the prime role of a designer while they were involved in the process of polishing, cutting, etc. in jewellery making. In one of the reference from Maharashtra, man is mentioned operating the oil mill, while woman was engaged in its selle.



Woman sieving the lime;
Akbarnama

18.8 MONOPOLIES

Monopoly had adverse impact on the artisans. It not only affected their freedom of work, state being the sole purchaser of the commodity, artisans used to get much below the prevailing market price. Manufacturing in the *karkhanas* was a state monopoly. English factors record that tapestry (a variety of textiles) at Lahore was the monopoly of the Mughal emperors. Skein silk was state monopoly and to purchase it one had to take the permission of the local *kotwal*. It was normally priced at 25-37 per cent higher than the actual price. The factor of the first commercial mission at Patna (1620-21) tried an unsuccessful experiment in winding skin from cocoons in a *karkhana* with 30 silk winders. Aurangzeb monopolised Bee-wax and salt in Chittagong, Dacca and Hugly. Mines and minerals had always been the state monopoly. Saltpetre was another industry where official interference was the utmost. In 1647 Mughal emperor reserved the right to employ saltpetre refiners in the imperial establishment and no where else. It affected English factory's fortunes greatly for they were doing the refining work themselves at Surat. As an important ingredient for gunpowder it was a sought after and prized product. In 1630 Shahjahan banned its export from Gujarat. John Albert de Mandelso (1638-39) records that foreigners were not allowed to export saltpetre, lead and gun powder without the permission of the governors. Tavernier (1640-67) refers to an interesting way of monopolising lime by the state, 'All the waggons which came to Surat from Agra and Jahanabad, are compelled to carry lime which comes from Broach, and which, as soon as it is used, becomes as hard as marble. It is a great source of profit to the emperor who sends it where be pleasure.'

Diamond mining was the monopoly of the rulers. Even stones of more than 10 (in some cases seven) carats were the property of the king.

Shivaji earned great profits out of his salt monopoly. Shivaji arbitrarily fixed the prices of salt at a higher level in the region of Prabhavati-Kalyana-Bhivandi (Ratnagiri and Thana districts). Fixation of higher prices on the part of Shivaji immediately turned the flow of trade in favour of Bardesh (Portuguese Goa). To combat that Shivaji imposed higher transit duties so that in the final analysis salt at Sangameshwar apparently appeared cheaper to the merchants than that of Bardesh. It appears that attempt was made purely to enhance the finance of the state but the local consumers within his own state must have severely been affected by the rise in salt price. But, since all routes to Goa (to buy the cheap product) passed through Shivaji's dominion

merchants could not avoid high transit duty resulting in balancing the lower prices of Portuguese Goa. Shivaji ensured protection for his own merchants from ruin.

Similarly, Governor of Baroda (1634-36) forced weavers to supply the cloth at prices fixed by him. In 1647 local governor at Ahmedabad forced indigo producers to pay Rs.250 to permit them to sell their commodities in the market. Above all when he procured indigo leaves in excess in 1656 he forced the producers to buy from him only at exorbitant prices or else not produce indigo at all. In 1620s Broach Governor made it mandatory to sell all narrow and broad *baftas* to him only.

18.9 DEBATES

Let us ascertain the growth potential of medieval Indian economy – whether it was static or dynamic and whether it possessed potential for capitalist production. If so then why could it not take off? We have already seen as far as agricultural production is concerned medieval economy was in no way stagnant and laggard. As for non-agricultural production, foreign travellers, particularly Bernier is all praise for enormous size of craft production. However, W. H. Moreland argues that such production was actually confined to big towns and certain specific centres of production. Otherwise, in general craft production was not to such an extensive scale as described by foreign travellers, particularly considering the ‘poor’ purchasing power of the common masses. However, Tapan Raychaudhuri (Cambridge, 1982) argues conclusively that, ‘the weight of the evidence is overwhelmingly against the view that the industrial map of Mughal India was marked by a few oasis of manufacturing centres hugging the trunk routes amidst an economic desert of subsistence agriculture.’ Another reason why the production could not assume capitalist manufacture, Alavi attributes it to the advent of Europeans.

The English attempts to procure saltpetre from Malpur (near Ahmedabad) and get it refined at Surat at their own establishment do suggest some element of capitalist form of production but on account of certain ‘extra’ factors (particularly political interference due to its importance for gun powder) the experiment was short-lived. Similarly, involvement of European capital in the manufacturing of indigo production does indicate some penetration of foreign capital in the indigenous manufacturing process. However, its effect were probably not as alarming as in the 18th-19th centuries but the process of colonization of Gujarat economy began.

Alavi agrees that in south India the ‘trade-artisan relationship contained some capitalistic features (particularly weavers ‘received not earnings but wages’) nonetheless the ‘relationship were interwoven with pre-capitalist ones, i.e. the caste solidarity.’ (Cambridge, 1982) He concludes that ‘all these forms remained within the limits of the traditional system which was not disrupted either by the activity of native capital or by the penetration of the foreign merchant capital.’

There is no doubt that during the medieval period free labour was available to sell his labour in the market, a pre-requisite to capitalist form of production. But to what extent the practice was widespread to assume a “capitalist form of production.” To analyse the issue in this context role of middlemen/brokers assumes great importance. Since the production was organised to a large extent on individual basis it were the middlemen worked as link to finally transport the goods to the consumer. Their role particularly became ‘pivotal’ with the increasing involvement of the Company trade. During this period merchant capital also dominated the production (*dadni*). Though merchant capital was visible in all crafts, it brought nothing but misery to the craftsmen.

(Gopal, 1975). We do find in certain branches of production some involvement of capitalistic features of production in certain regions, but it could not take off. Pavlov attributes it to 'deep roots of the feudal society'. Max Weber attributes caste system as detrimental to economic development/growth in India during the medieval period.

We would like to close the discussion on this issue with Irfan Habib's remarks that, 'In so far as capital, confined practically to the sphere of commerce, had failed to develop any independent basis for itself, its fortunes would lie with the Mughal ruling class, and, after its collapse, with such other classes as imitated or inherited the methods and institutions of that class. Denied, during the eighteenth century, the large market it had been provided with by the Mughal empire, merchant capital had no choice but to atrophy. With this also receded into the background those prominent economic landmarks, which on the better days of the Mughal empire might have been mistaken for capitalistic features.'

18.10 SUMMARY

We began our discussion questioning whether Indian economy was static or dynamic in the concluding remark let us highlight that the Medieval economy reached its pinnacle of glory during the closing years of our period. Indian artisan, with his master skills, caught the eye of European travellers. India achieved high state of monetisation, commodity production, there was presence of huge labour market with elasticity to be mobile. Merchant capital played active role in the production process. But in spite of the presence of such vibrant economy it failed to take off.

18.11 EXERCISES

- 1) Critically analyse the growth of textile production during the medieval period.
- 2) Discuss the potentialities of capitalistic development during the medieval period.
- 3) Compare the artisanal production with other forms of productions during the medieval period.
- 4) How was the artisanal production organised during the medieval period?
- 5) To what extent *karkhanas* can be equated with manufactories? In what ways were they different?
- 6) 'There existed no 'intercraft' mobility during the medieval period.' Comment.
- 7) What was *dadni*? How was the production organised under *dadni* system?
- 8) Critically examine the condition of medieval artisanal class.
- 9) How was the craft production organised during the medieval period?
- 10) Write short notes on the following:
 - a. Techniques of indigo-production
 - b. Techniques of saltpetre production
- 11) Analyse dominant features of medieval Indian textile production.
- 12) What role did the state play in the growth of non-agricultural production during the medieval period?