CHAPTER II

TYPES OF INDUSTRIES AND THEIR DEVELOPMENT

This chapter aims at taking an over-view of the development of crafts and industries from the time of Harappan civilisation (c. 2500-1750 B.C.) to the end of 6th century A.D. It must be admitted that the term 'industry' is used here in a rather broad sense to denote various types of handicrafts and cottage and small scale industries. The evidence of the existence of heavy industry in the modern sense of the term is hardly available in ancient India. The only industry which can be termed "heavy" in ancient times, is probably that of mining. In a vast country like India one cannot expect uniform and unilinear development of crafts and industries in ancient times. An attempt has been made here not only to enlist diverse types of industries, but also to find out where and when these emerged and how these developed. The elements of continuity and change in the development of a particular industry or industries and the overall industrial scene have also been taken into consideration.

We notice for the first time definite traces of a regular industrial economy in the Indus Valley sites of Harappa and Mohenjodaro which were urban centres. Two outstanding features of Harappan civilisation are — (I) its early and easy maturity and (II) overall cultural uniformity. The
striking uniformity of Harappan culture seems to have been ensured by a central organisation which controlled the material life of the people to a considerable degree. Economic wellbeing of the Indus Valley civilisation was the result of industrial and trade enterprise of the urban people depending on the agricultural surplus of the hinterland. Naturally there was diversification of crafts and industrial productions of which ample specimens have been unearthed during archaeological excavations. Of the industries the most important were house-building, pottery, metallurgy and textile. Congested nuclei of houses highlighted the house-building industry. Brick manufacture clearly points out the growth of industries of house-building, road-construction and laying of drains with bricks. Two or three storied houses in the hub of the cities may be marked out for the well-to-do section of the community. The rows of smaller houses of not more than two rooms in the lower part of the township were presumably inhabited by commoners. Some degree of specialization was probably achieved by men engaged in the craft of house-building.

Wheel-turned pottery with black-on-red painted designs must have been the highlights of Harappan crafts. The skill acquired by the craftsmen engaged in the Pottery making is evident from specimens decorated with "Incised" designs "polychrome" and "glazed" wares. In addition to numerous domestic
articles made of earthenware, finds of clay toys\textsuperscript{5} indicate the ingenuity of clay modelling by the Harappan craftsmen.

Textile was also an important industry in the Harappan civilisation. The spinning of cotton yarn was common in the house of Mohenjo-daro is evident from clay spindle and spindle whorls found at the site.\textsuperscript{6} Not only spinning but also weaving of cloth, some with embroideries developed as an industry. Our evidence about dress of the Indus people is however scanty. A steatite male figure wearing a long shawl embroidered with trefoil design illustrates the excellence acquired in the textile industry which was not confined to cotton but might have included woollens also. Thus some degree of diversification and specialisation is noticed in the textile industry.

Metallurgy also developed to some extent in the Indus Valley. Copper\textsuperscript{7} and bronze\textsuperscript{8} as well as gold and silver objects have been found though iron was not known. Smiths in bronze and copper produced weapons, vessels, and implements of various shapes and forms. Gold and silver were used for the manufacture of personal ornaments.\textsuperscript{9} It can thus be presumed that there was a flourishing craft of the jeweller working in gold and silver pieces along with semi-precious stones and beads.\textsuperscript{10}

Besides these, other industries based on antlers and bones, conch-shells\textsuperscript{11} and ivory also grew up in the Indus
regions as we find needles, bodkins and combs made of these articles at Mohenjo-daro and Harappa. Manufacture of wheeled-carts as means of transport of commodities on overland routes and boats for plying on rivers as well as for coastal voyages formed an important aspect of the industrial activities of the Harappans. This is but natural for a people depending on trade and commerce.

The Harappan Civilization ceased to exist after c. 1750 B.C. The Harappans were followed by the 'Aryans', the speakers of Indo-European languages. Not only do we encounter new people but also significant changes occurred in economic life. The main source of our information for the period (c. 1500-700 B.C.) is the voluminous Vedic literature, consisting of the Rgveda (the earliest of all Vedic texts), the three later samhitās (viz. Sāma, Yajur and Atharva), the Brāhmaṇas, the Ārenyaka and the Upanisadas. The striking contrast between the material life of the Aryans and the Harappan people does not lie in the use of metals but in the almost complete absence of towns in the Rgvedic period. If we recognise the exploits of Indra recorded in the earliest Indian hymns, the Aryans appear as the destroyers of towns. The Rgveda demonstrates that cattle rearing was the most important economic pursuit of the people and cattle formed the principal wealth. Under such circumstances agriculture, industry and commerce could hardly flourish. Some indications are
there in the Rgveda that cultivation was practised, but that was secondary to cattle rearing. In fact the Rgveda represents a gradual transition from cattle rearing society to a sedentary society. The requirements of the agriculturists led to the growth of some agro-based crafts. A tendency towards diversification in the industry is found in the Vedic hymns. The mention of a Rathabha (chariot-maker) separately from Takṣaṇa (common carpenter) shows that some carpenters particularly excelled in the art of manufacturing chariots. The fashioning of the wheels, the fitting of tyres, the construction of chariots of special shape and design like those with three wheels with ornamental pillars are referred to in the Rgveda. The words Kulāla and Uṛtpāḍa denoting pottery are mentioned in the Yajurveda and Maitreyani Upanishad. As the evidence on iron terminology is found mentioned in Rgveda under the term 'Anas'. Iron developed as blackmetal in terms like Syāman, Syāmayāsa, Kārṇīyasa. The process of smelting the ore by the smith is mentioned in the Rgveda. The smith termed as Dhaśtri smelted the ore in the furnace, using the wing of a bird instead of bellows to fan the flame. The smith manufactured Abha, Sspaḍa, Dāīra, Phala for agricultural purposes and Aśi (denoting a sacrificial knife) as well as spear used in war, parasu (axe) and Pavira (lance), arrows, spears and daggers, short-edged swords and sharp-pointed shafts for war. The poles of chariot were also made of Ayas for protecting warriors and
ensuing victory to them.

The later Vedic period (1000 B.C. – 700 B.C.) witnessed the gradual expansion of the Aryans from the Punjab and Western U.P. into Eastern U.P. and Northern Bihar. Later Vedic texts give some clue to the material basis of this expansion. It is known from the Vedic references that the Aryans knew the use of the different types of metals. Among all the metals, iron played an important role in the later Vedic period. The knowledge of iron may have come to India presumably around 1000 B.C., which may be suggested as the provisional date for the introduction of iron smelting into India. Of course, it is not possible to determine the exact point of the beginning of iron on the basis of literary data. The evidence is clear enough to suggest that iron was associated with agriculture at least in the upper-Gangetic Valley and the Indo-Gangetic divide around 700 B.C. In the middle-Gangetic Valley, there is positive literary evidence that iron was used in agriculture in c. 500 B.C., but this does not mean that there was no earlier use in this region.

The Vaidyanayi Samhita mentions also the use of 'Ayas' The Maitri Upanishad mentions a lump of 'iron' overcome by fire and beaten by workmen passing into a different form. Thus a suitable process of producing different types of iron-made products was certain in later Vedic Aryans. Of course the high
temperature required for melting iron cannot be obtained without a mechanical blast which in Ancient India was absent. The metal when heated left a spongy mass which was completed into a bloom by prolonged hammering. It could not be cast like copper and bronze but was forged or wrought by means of hammering. "Small fragments and shapeless bits" of iron occur at Kausambi. At Hastinapur iron slag and ore were found in the uppermost layers of period II in association with Painted Grey Ware. The excavations at Alangirpur similarly confirmed the association of iron with the P.G. Ware, iron objects together with those of copper were found throughout the period II. Sravasti also yielded iron in association with the Painted Grey Ware. The Painted Grey Ware is usually taken to be coeval with the Iron Age in India. The wide distribution of this ware over large areas of North India would imply the spread of iron-using people over that area. These phenomena are usually associated with the literary references to the expansion of Vedic people from the Indus Valley and the Punjab towards the Gangetic Valley. The earliest levels of Period III at Rupar yielded implements of iron. At Purana Qila copper had been supplemented by iron. Iron weapons such as spears, arrow-heads have been unearthed here from the Period I assigned to c. 700-500 B.C. A flourishing iron industry is evidenced by the large quantities of iron ore, slag and finished iron objects found in the deposits of Period III. A blacksmith belonged to the
second phase of the sites' life. The layers of Period II at Bahal yielded iron-black and red ware assigned to c. 600-300 B.C.

Next to iron, gold was an important metal for material progress in ancient India. Hiranyad in the Rigvedic as well as in later times denotes gold. Goldsmith is mentioned in the list of victims at Purusesadha (human sacrifice) in the Vajurveda. The technique of extracting gold from the earth was known, and the washing of gold is also recorded. Skill of workmen is also observed in the different types of ornaments viz. lanka (necklace), Kumba (head-ornament), ear-rings. Golden ornaments for the decoration of the chariots of warriors, golden yokes, golden armour and golden trappings for horses too were manufactured. Besides this gold is found in the different parts of ancient India in mainly two forms — in alluvial deposits and in reeds and veins. The two most important areas of alluvial deposits are in Chhoto Nagpur and in the valleys of certain Himalayan rivers. The districts of Singhbhum and Mambhum have long been known for their gold. The most remarkable and interesting group of old workings and mines is that which lies between Ratti Maski in the Raichur District. From the nature of the manufacturing items it appears that the Vedic Aryans not only concentrated in warfare but also engaged in some industrial pursuits. It is also evident that a group of men was engaged in industry for manufacture of the different
types of material. Besides gold and Ayas we come across references to Trapu (Tin) and Sisa (lead) which make it clear that diverse raw materials began to be used in the metal industry during this period.

The art of weaving was also well-known to the Vedic people. The words Tantum, Atum and Vayanti used respectively for warp, woof and web, Vaya meaning a weaver, kasaara used for a weaver's shuttle, vinan meaning a loom, Mayukh as referring to wooden pegs used for stretching the web indicate that the weaving industry was an important craft in the Vedic age. Besides these, there are references to the different types of fibres viz., Bhanga, Ksama and Sona. The Ryveda gives us some data about the development of quality and technique of spinning. The tripe-twisted thread was known to the Rgvedic Aryans. This shows that they could spin the finest type of cloth. The varieties of cloth worn were cotton, linen, woollen, silken and hempen.

Small but remarkable was the sugarcane industry. Iksu the term for sugarcane is mentioned in Atharvaveda. It appears that sugarcane was a common crop. The importance of the crop in the economy of the country was well appreciated. Thus it is observed that an important development in the later Vedic economy was the rise of diverse arts and crafts which have already been discussed above.
As we approach the 6th century B.C., interesting developments were taking place in the society and economy and also in the sphere of religion. The 6th century B.C. marks the rise of two protestant religions (viz. Jainism and Buddhism) and brisk industrial and commercial activities. One of the major problems of studying the history of this period is that all the Buddhist texts are much later than the period under review. Nevertheless it appears that these texts retain earlier traditions in them and hence may be useful for the present study particularly in absence of better sources. The prominent feature of this period is the development of urban economy which re-appears in north India after a lapse of about one thousand years. Taking the country as a whole there are sixty well known towns out of which there were six major towns. With the development of towns the industry gradually passed its formative stage. Due to growing demand of manufactured articles artisans and craftsmen had a better opportunity to produce more. Owing to the variety of demand and to face the competition in the market the craftsmen under the pressure of the circumstances were forced to specialise in their craft. Development of communication and transport facilities added to the expansion of the market. The specialisation of arts and crafts was promoted by several factors. The first is the knowledge and use of raw material and the discovery of tools. The second is guild organisation and the third is the expansion of the market. Lastly there is the protection and
Buddhist texts enumerate a large number of crafts and industries. Considerable light is thrown on the work of the Vaddhaki carpenter by Pali texts. The following passage as described in a Jataka indicates how the carpenter procured his raw material and brought the material by river. They also used this raw material for building houses. They received their wages for this work. This shows that this group of people worked under some authority and therefore were paid for their work. Of course a clear picture regarding their nature and contract of service is not available.

"They would go up in a vessel and enter the forest where they would shape beams and planks for house-building, then they brought down to the river bank after they received their wages."

A great development took place in the profession of the Vaddhaki in the time of the Buddha. The wood-worker's craft had reached a high proficiency in technique. The wood-worker is depicted as performing multifarious works. He manufactured spokes, rims, naves and all the other parts of wheels crafts. Besides, his profession included the construction of houses and furniture and also the building of ships. The woodworkers manufactured household furniture like chairs, seats, bedsteads, boxes, pegs, toys and various other wooden articles.
The growing use of iron in daily life and for war purposes since the Later Vedic times greatly enhanced the importance of the craft of the blacksmith. The Dīghanikāya throws some light on the process involved in a blacksmith's work. The following passage depicts process of heat-treatment of iron. "Men were to weigh in a balance a ball of iron that had been heated all day and was burning and glowing with heat and were to weigh it later on in a balance when it was cool and quenched."\(^{51}\) The arrow-makers in the Dhammapada commentary are said to have heated reeds and sticks over the fire and straightened them.\(^{82}\) The Mahā Janaka Jātaka describes the process by which the workers made an arrow.

"The arrow-maker had heated an arrow in a pan and had witted it with some sour rice-gruel and made the arrow straight."\(^{53}\) The Vinaya Pitaka indicates three different operations in the bow and arrow industry and mentions a large number of mechanics who engaged themselves in bow-making, in arrow-making and some of the mechanics were known as dhanukara and jākara. Therefore it is clear that specialisation was developed to a considerable extent. The blacksmith manufactured plough-shares, axes, goads and razors.\(^{85}\) There is a reference to a smith who carried his furnace.\(^{86}\) In the Chaddanta Jātaka an elaborate list of handiwork is furnished. From steel the blacksmiths manufactured various tools and weapons, knives, needles and nail-cutters.\(^{88}\)
"Goldsmiths were very skilled and specialised in manufacturing gold and silver ornaments. According to Kuša Jātaka the goldsmiths had attained a high proficiency in their art. The Majjhima Nikāya throws some more light on the craft of the jeweller. "The rare Veluriya gem of finest water that has been cut with eight facets and marvellously wrought when laid on a yellow cloth, diffuses its sparkling radiance around."

The textile industry also did not lag behind. Textile workers were said to be so proficient in their industry that could transform a coarse woven cloth into a fine one through a particular process. It is mentioned in the Dhammapada commentary that a maiden taking a coarse cloth, cut it with a sharp knife into strips, pounded the strips of cloth in a mortar, whipped and cleaned the shoddy, spun yarn and had it woven into a robe. The Dīgha Nikāya furnishes a long list of various kinds of cloth and blankets. A similar list referring to numerous varieties of cotton and fur articles, is furnished by the Ācharāṇga Sutta. References to the spinning and weaving industries show a further division of labour with the growth of the industry. Specialisation must have created new classes of textile workers like the embroiderers, ornamental workers and workers in rugs and furs who specialised in their distinct crafts.

The ivory workers manufactured bangles and various kinds of ivory ornaments and precious ornaments for the rich.
busy life is depicted in the following words:

"Tightly swathed in one garment their heads covered with another, their limbs be sprinkled with ivory dust, they made various forms out of ivory."96

Some professional ivory dealers of Benaras supplied the industry with ivory.97 The costly items like gold, silver and ivory were normally used by the well-to-do people who normally lived in towns. The goldsmith, silversmith, jewellers and ivory workers and weavers of costly garments are often found to have resided in towns and catered to the demand and taste of well-to-do people. Obviously the towns favoured the concentration of costly items.

Of course it is true that the costly items could not satisfy the demands of the whole community. There are some products which are used both by the rich and the poor. Out of the commonly used products one is pottery. Potters are frequently mentioned in the Pāli texts. Potters moulded all kinds of earthen jars, dishes and bowls as a wheel turned around by the hand.98 The Northern Black Polished Ware (NBPW) was the most distinctive pottery of the early historical period.99 The demand of the public for clay works was so high that the potters after meeting the demand of the local people took the donkey-loads of wares to distant cities for sale.100 More light is thrown on the process involved in pottery by other accounts. Potters prepared all kinds of earthen jars, dishes and bowls
for domestic purposes. There is a reference to a very rich potter of Palaspura named Saddalputta who engaged hundred of servants to run his five hundred shops outside the city. Pāṇini has mentioned the names of various kinds of industrial labourers, village artisans are referred to by him as grāma-gilpins. Patanjali also refers to the following industrial workers:

1. Taksā (Carpenter)
2. Tantuva (Weaver)
3. Karmāra (Blacksmith)
4. Suvarnakāra (Goldsmith)
5. Leather worker.

The remarkable growth in crafts and industries during the pre-Maurya phase was mainly due to individual private enterprise. The political authority seldom interfered into artisans' functions. But in Maurya times we witness a remarkable expansion of the economic activities of the state. The industrial policy of the Maurya age may be described as that of a state controlled economy. Private enterprises were not banned nor were the private industrialists shut out; on the other hand they were allowed to carry on their business with their traditional experience and professional efficiency but strictly within the bounds of state regulations. The Mauryas not only invigilated over private enterprises but also launched productive
and commercial units, parallel to similar private enterprise.
The state has no intention to work for a programme of more
extended socialisation of its type to be achieved by preferential
treatment of its own interests as against those of the individual
competitors in prescribing regulations for the conduct of rela-
tions between employers and employees. The state appreciates
the fact that the private sector is a source of strength to its
economy. Even when it is placed in a privileged position
as a monopolist, it invites private co-operation for a proper
utilisation of its reserves (Krta-bhända-vyavahāraḥ-samukham •••
sthāpayet). The state firmly held the ruins of economy which
was no longer allowed to drift under Laisser Faire principles.
Megasthene's account and Kautilya's Arthaśāstra refer to the
variety of flourishing industries of the time. We notice the
development of the mining and metal industries. Expert
officers were put in charge of each of them. Industrial workers
were put to work to remove their impurities by treating them with
organic ingredients when the metals (Iron, Silver, Gold, etc.)
were thoroughly purified, the officer-in-charge employed several
workers to manufacture different implements and instruments,
various kinds of weapons, armour, machines and innumerable
articles of every-day use. Megasthene informed us that ship-
building was the monopoly of the government. He also referred
to a class of ship-builders among other artisans who could only
work for the king and consequently were paid from the royal exchequer. Kautilya has furnished the following list of industries which were under state control: (1) Mines, (2) Textiles, (3) Weights and measures, (4) Forests and (5) Armoury. The Arthashastra does not furnish any detail about the manufacturing process followed by blacksmiths but the allusion to some war machines such as the Jāmadaŋgava (a large machine to shoot arrows), Parjanyaka (a water machine to put out fire) and Audhghatma (an instrument to pull down towers), requiring a high degree of skill in metal work, suggests that the iron industry must have been highly advanced. A superintendent employed skilled goldsmiths who purified the varieties of gold by various processes. If they found the gold brittle, owing to its contamination with lead, they heated it with dry cow-dung (Suskapatala) when it split into pieces because of its hardness, it was dipped (after heating) into oil mixed with cow-dung (Tailgōmaya). A similar description is given about the quality and purification of silver. The discovery of very fine jewellery from the Šīr mound, the oldest part of the Taxila site justifies the goldsmith's craft. Specialisation in this craft is also referred to by Megasthenes. Weaving industry was carried on under the supervision of the superintendent of weaving. Weaving was not left only in the hands of professional weavers but was done on a very large scale. The Officer-in-charge
not only employed qualified persons in the industry but also made
arrangements for the employment of orphans. Skilled workers
were rewarded by the state for their skillfulness.

The continuity of the industrial growth and development
after the fall of the Maurya empire in 187 B.C. was not hampered
even due to the repeated foreign aggressions. This development
of industries and specialisation in different arts and crafts
is evidenced in epigraphic, archaeological and literary resources,
of course which are scanty. It is true that the pattern of
management of industries which we have seen in the Maurya empire,
took a new shape in this period. This will be clear in our
subsequent discussions. A large number of inscriptions recording
donation of gifts to religious institutions, contain names
of donors and their occupations. These give us a fairly reliable
picture of the growth and diversification of crafts.

Mining, however, seems to have remained under govern-
mental monopoly and supervision. The Junagadh Rock Inscription
of Rudradāman was overflowing with various kinds of gems and
precious metals and mineral objects viz., gold, diamond, silver
which were collected by him through lawful taxes (Yathā avaprāptaiḥ
bali sūlka bhāgaḥ). It is interesting that the area called
Cosa lying to the east of river Harmada as mentioned in Ptolemy's
geography (150 A.D.) yielded diamond. Cosa appears to have
been located somewhere in eastern part of Malwa. According to Junagadh Rock Inscription one of the territories conquered by Rudradaman is Akara, adjacent to Avanti, western part of Malwa. Akara may therefore be logically placed in the western part of Malwa. The toponym Akara literally means mine or an area having mines. One may remember here that Cosā of Ptolemy yielding diamond can be placed in Eastern Malwa. Thus Cosā and Akara may refer to the same area situated in Eastern Malwa which had diamond mines.

Rudradaman is said to have levied just taxes including bhāga (share) which enriched his treasury through the collection of precious mineral objects including diamond. The term bhāga in Kautilya's Arthasastra means a particular type of tax which the king could levy on mine and mineral objects procured through private enterprise. Judged in this light diamond mine in Cosā or Akara in Eastern Malwa appears to have enriched Rudradaman's treasury. Prior to 150 A.D. Rudradaman and his family probably ruled in this area as subordinates under the imperial Kushānas. Therefore some control of the Kushānas in Malwa (including Eastern Malwa) is not unlikely. Two Kuṣāṇ inscriptions dated 22 and 24 in the Kaniṣṭha era (≈100 and 102 A.D.) are found from Sāñchi. These unmistakably point to the inclusion of Eastern Malwa within the Kuṣāṇ territory as early as Kaniṣṭha I's reign (78-101 A.D.). The account of Lama Taranātha although
belonging to much later period tells us that Eastern Malwa was conquered by Kanishka who worked out many diamond mines in that area. All these data reasonably suggest that Eastern Malwa had diamond mines which began to be worked out since the time of Kanishka. Early Indian treaties lay down that mines and minerals were royal monopolies. The king was entitled to the stipulated share of products from mines when these were worked out by private enterprise. Rudradāman seems to have similarly levied bhāga or share from diamond mines at Ākara.

The Kondāpur discoveries include ornaments of precious gold, copper, ivory shells and hoard of lead coins of the Sātavāhana princes. These articles expressly indicate that the jeweller's art had also become highly developed. It is suggested that many a decorative motif noticeable in the early architecture and sculpture was borrowed from jewellery patterns and designs. We find many beautiful descriptions of gold ornaments worn by the heroes and heroines of dramas of Aśvaghoṣa, Bhāsa and other literature of the period. In the relief of Bharut, Sāhchi and other monuments of the early Indian school people of ordinary rank are portrayed with pieces of jewellery on their toras. Traces of gold workings are numerous in the Cuddapah and Kurnul Districts as well as in the Palnad subdivisions of the Guntur District. In Sirkap silver jewellery has also been found. The technique and designs are similar to
these of the gold jewellery. Some pieces of silver ware have also been found. Some of the silver objects according to Marshall are local products judging from their workmanship and the Kharosthi character inscribed on them. The specimens unearthed from the relic of a stupa show that the three allied crafts of gold, silver and brass reached a high water-mark. Besides lead, tin and copper were in use during this period. Mining of copper was also conducted extensively in South India. Ancient mines of copper exist in the Kurnool and Nellore Districts in India. Innumerable deposits of iron are of varying quantities are widely distributed in the Deccan. According to Schoff rich deposits of iron was found in Hyderabad, a short distance north of Golconda. The chisels that drilled the granite of the Egyptian obelisks are said to have been of Indian steel. A class of artisans specialised themselves in the art of ivory-carving. The excavations at Kondapur yielded an interesting piece of ivory plaque which shows an elephant with a man and woman seated on it. Two figures — one in ivory and the other of bronze found at Ter are of great interest. These specimens are placed by Motichandra to a date not later than the middle of the 2nd century A.D.

Glass industry played a vital role in the economic progress of the period. Glass beads occur in the Satavahana structure at Kondapur in Maharashtra. Glass vessels of...
fragments of them nearly all of the 1st century A.D. unearthed at Sirkap bear a close similarity to a glass ware belonging to different parts of the Roman empire of the contemporary period. Samples of various kinds of glass wares have been grouped as (I) lace glass, (II) ribbed glass, (III) marbled glass, (IV) blue and white canco glass, (V) mosaic glass, (VI) colourless translucent glass, (VII) millefiori glass.126

The art of potter can be gleaned from the articles excavated at Paithana, Maksi and Kondâpur. The finds at Kondâpur include some terracotta figurines which reveal realistic features. According to Yazdani the potter's craft which is considered insignificant in these days, occupied almost the same position as sculpture and painting.127 The terracotta representing animal figures reveal neat workmanship, a definite effort by potters at realism.128 For the service to the community the potter supplied the normal earthen pots used for water, rituals, cooking but charged extra for special large vessels.129 The pots and potsherds found at various sites of the Deccan suggest the richness and variety of the production of the Sàtavâhana period.130

Stone carving offered a source of living to many specimens of the well-developed art of the stone-cutter.
depicting his sense of plastic beauty, his high intellectual qualities and his skilful technique are found at Kōṇḍāne, Bhāja, Deoṣā and Karle situated in the western parts of the Andhra kingdom and at Amarāvatī in the eastern territory.  

One of the traditional crafts, namely that of carpentry continued in this period. Most of the wooden material has been destroyed by nature but the broken pieces found are sufficient testimony to the wood-worker’s art.

Inscriptions mention various types of industrial workers. These inscriptions giving the following list of the workers, are found mostly from Sāñchi, Mathurā and Western Deccan (2nd century B.C. to 3rd century A.D.):

( I) Kolikas (weavers)
( II) Tilapishakas (oil pressers)
(III) Odyantrikas (fabricators of hydraulic engines)
( IV) Kāsakaras (brassiers)
( V) Tesakaras (polishers)
( VI) Kamāras (iron-workers)
(VII) Lohavaniyas (iron smelter)
(VIII) Avesīs (artisans)
( IX) Chammakāras (leather workers)
(X) Gadhikas (perfumers)
(XI) Suvaṇakāras (goldsmith)
(XII) Manikāras (jewellers)
(XIII) Mithikas (stone polishers)
(XIV) Selavaddhakis (stone masons)
(XV) Vaddhakis (carpenters)
(XVI) Konācika (reed maker)
(XVII) Vasakāra (bamboo worker).

We also hear of the Guda-Yāntrikas or the persons operating the machines for extracting juice from sugarcane and preparing sugar therefrom. In the Periplus Pandya kingdom is considered as centre of pearl-fishing. Ptolemy points out pearl-fishery in the Kolkhis gulf, i.e., in the gulf of Manar in South Tinnevelly. In the South pearl fishing seems to have been a state-monopoly. The Periplus says that pearl fisheries at Colchi were worked out by condemned criminals.

Among various mineral products salt was of special importance. Salt being an item of daily necessity was always in regular demand. There were rocks yielding salt. Ormenus, Salt Range in Pakistan was cut out like blocks from a quarry, whence a greater revenue occurs to the sovereign of the country than they derive from gold and pearls. Thus it is evident that the state had indirect control over this industry.

The mineral resources were the monopoly of the state. This is evidenced in the Poona and the Riddhapur plages of
Prabhāvatī Gupta. These records prove that the political authority exercised some control on salt manufacturing. The existence of mines is also referred to in the Amarkosā and Kalidāsa's Rādhavaṇīa III, 18. The Chotanagpur areas are the main source of metallic ores in Northern India. The blacksmith was the indispensable workers in the rural areas. Kalidāsa points out how the blacksmith used to manufacture the different articles by heating and beating with the help of hammer. The discovery of so many iron objects, viz., hammer, different kinds of chisels, axes, a padlock, a plate of iron with holes, a door ring, a spoon and a small iron-pot indicate the development of the blacksmith trade in this period. These were used for domestic purposes. Besides this the excellent craftsmanship of iron is exhibited in the construction of the Meharauli Iron Pillar of Chandra who is usually identified with Chandra Gupta II. Without the construction of a very big iron foundry and without highly skilled iron workers such a monolithic pillar could hardly have been made. The mention of various weapons in the Allahabad Stone Pillar Inscription of Samudragupta indicates the indispensability of iron workers in the Gupta period. The goldsmiths were mostly confined to the cities and mainly met the needs of the rich. We come across names of so many ornaments, viz. Chudāmarī, Muktāguṇa, Kīrīṭa, Kārnābhīṣaṇa, Muktāvalī, Tārāhāra and Āṅgada. These show that the
ornaments were manufactured on a large scale with a great skill. Owing to the paucity of data we can hardly know the detailed processes adopted by the goldsmith in their art but it is understood that the workers used scales for weighing the quantity of stones and touchstones for testing the quality of gold and other metals. 149

The textile industry was in highly developed condition in the Gupta age. Some words connected with the textile industry i.e. weaver, the weaver's loom, the threads and the processes involved in weaving suggest the development of textile industry. 150 It is interesting to note that cloth was manufactured on the basis of the status of man in the society. Fine cloth was manufactured for the rich, 151 and coarse cloth was manufactured for the poor. 152 Besides manufacturing cloth from cotton and silk, the textile workers made garments from wool as well as from fur. After necessary carding and cleaning of these two materials the weavers manufactured warm cloths like blankets for winter. 153 The manufacture of silk seems to have been very common in the Gupta period. The Amarakosa furnished some account about the manufacturing of silk. 155 After weaving the cloth was bleached, probably with chemicals. This bleached silk was sold at a high rate. 155

There is a very interesting account of the silk.
weavers as a separate community in the Hanadasar Stone inscription of Kumāra Gupta and Bandhuvarmā. These people were very famous for their skill in silk-weaving.\(^{156}\)

The excavations at Abhibhabtra, Hastināpur and Kausāmbi reveal that the potters of the Gupta period attained a high state of skill in moulding, colouring and baking the earthenware. Observing the different types of earthen pots at Abhibhabtra, Panigrahi concludes "wheel-made pots are predominant but mould-made pots form a fair percentage. Some specimens show a polished red ground and easily distinguishable from the rest by this peculiarity."\(^{157}\) The pottery discovered at Kausāmbi is also of high quality. Besides clay-vessels, the findings of terracotta figurines from Abhibhabtra and Kausāmbi throw a light on the high developed pottery industry. Talented potters with the help of clay produced wonderful terracotta figurines which were appreciated by the poor people.\(^{159}\) All these evidences show how the pottery industry played an important role in the Gupta age.

The stone-cutting industry also attained high standard in this period. Some of this stone-remains exhibit high techniques and talents of the workers.\(^{160}\) The Buddha images are amongst the most notable creations of the period.\(^{161}\)

Some evidences prove that the leather industry was
the monopoly of the state. The *Amarakosā* refers to the leather-worker who produced leather articles such as shoes, leather fans, thongs, ships, bellows and leather-bottles. Leather was used for bedding purposes only.

The ivory industry was a highly developed in the Gupta period. The manufacture of ornaments from ivory is also mentioned in *Kāmasūtra*. Of course it is true that ornaments made of ivory were normally consumed by the rich section of the society. An ivory seal discovered from the excavations at Bhīṣa speaks throws further light on the ivory industry. *Kalidāsa* also mentions seats made of ivory.

Wood-carving seems to have been a very important industry of this period. There were two kinds of carpenters, i.e., those hired by the villagers and those who carried on their industry independently. In a workshop there was a head-carpenter under whose supervision many other carpenters worked. *Amarakosā* also refers to chisel, saw and a work-bench. The bamboo and cane industry ca not be ignored. Cane-chairs (*vetrāsana*) were offered to guest to sit on. *Amarakosā* refers to baskets made of cane. According to *Paśupatī* bamboo was commonly used for constructing cars.

Ship-building was an important industry in the 6th century Bengal. Faridpur Copper plate of Dharmāditya, gives
us an interesting information in this respect. Kseni, as Dr. Hornle suggests, must be nau (or náva)+ ata+ kseni. Kseni is evidently a modification of Ksavena (a harbour). Ata or āta means the frame of a door and here in conjunction with nau must mean a ship's frame." Apart from any controversy regarding the interpretation, it can be presumed that ship-building was an important industry.

The term "aurasthānīka" found in the Mallasarul Copper Plate of Gopachandra indicates the presence of people engaged in wool-producing industry.

Different industries referred to in the Charter of Visnuśena is enlisted below:

(1) Indigo Factory — Nila-kutya-adānana dūmpakāna.
Nīla-kuti may mean an indigo factory.

(2) Oil-mill or manufactory — Yantra-kutya-adānana rūpaka-
trayam rū. Yantra-kuti may indicate an oil-mill.

(3) Metal industries.

(4) Wood-based industry.

(5) Pottery.

The existence of industries is evidenced from Lohakara-
rathakāra-nāpita-kumbhakāra-prabhritinām vārikena vishtih karaniya.

Definite evidence of regular industrial economy can be traced from the Indus Valley sites of Harappa and MohenjoDaro,
which were urban centres. The early Vedic culture is said to be rural because the Ṛgveda has nothing to say about cities. The requirements of the agriculturists led to the growth of some agro-based craftsmen. A tendency towards diversification in the industry is found in the Vedic hymns. Specialisation had started as evidenced from the separation of the ṛathkāra from takaś. An important development in the later Vedic economy was the rise of diverse arts and crafts. Buddhist texts enumerate large number of industries. The remarkable growth in crafts and industries during the pre-Maurya phase was mainly due to individual private enterprise. The Government tried to encroach upon their autonomy by appointing officers like Bhandāgārika to supervise their activities.

In the Maurya age the private enterprises continued, but industrial policy of the Maurya age may be described as that of a state controlled economy. Three types of industries viz. (I) Private enterprise, (II) State Monopoly of industries (Mining) and (III) state-controlled industries (Textile, Forest, Weights and Measures, Armoury) are found in the Maurya age. The Government interference in industries was being continued up to the 6th century A.D. But interference of the state in industries as we had seen in the age of Kautilya was loosened in the Gupta period. But the Gupta
exhibits the excellent craftsmanship. In this context the
collection of the Mehrauli iron-pillar, belonging to the
period of Chandragupta II, is an outstanding example of
craftsmanship in iron work. Without the construction
of a very big iron foundry and without highly skilled iron-
workers, such a monolithic pillar could hardly have been
manufactured. In this connection V.A. Smith opines: "It is
not many years since the production of such a pillar would
have an impossibility in the largest foundries of the world
and even now there are comparatively few where a similar
mass of metal could be turned out".184
NOTES

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23. Ibid., IX. 112. 2.
25. Rgveda, VIII. 78. 10.
26. Ibid., IV. 57. 8.
27. Ibid., I. 162. 20.
23. Ibid., X. 79. 6.
29. Ibid., I. 27. 3; A.A. Macdonell & A.B. Keith, op. cit., 
30. Rgveda, V. 57. 2.
31. Ibid.
32. Ibid., VI. 47. 10.
33. Ibid., VI. 46. 11.
34. Ibid., V. 62. 9.
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49. Atharvaveda, I. 9, 2.
52. Šatapatha Brāhmaṇa, II. 1. 1. 5.
53. Rgveda, II. 33. 10.
54. Atharvaveda, VI. 133. 3.
55. Rgveda, VIII. 78. 3.
56. Rgveda, I. 35. 4-5.
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58. Ibid., III. 26. 4.
61. Chāndogya Upanishad, IV. 17. 7.
63. Ibid., X. 23. 6.
64. Ibid., X. 130. 2.
66. Atharvaveda, XI. 6. 15.
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69. Rgveda, IX. 38. 32.
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73. Erhat Saṁhitā, XI. 7; XI. II. 57.
75. Jātaka, II. 18.
77. Ibid., Vol. 29, Pt. 2, p. 186.
78. Jātaka, IV. 159; I. 201; IV. 323.
79. Jātaka, II. 405; IV. 344.

81. *Digambarāya Papyrus* Jinasuttam, XIX.


83. *Jātaka*, VI, 66.

84. *Vinaya Pitaka*, I, 238.


86. *Jātaka*, VI, 189.


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93. *Dīgha Nikāya*.


Rhys Davids, *Buddhist India*, p. 91.


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154. Ibid.
155. Ibid.
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