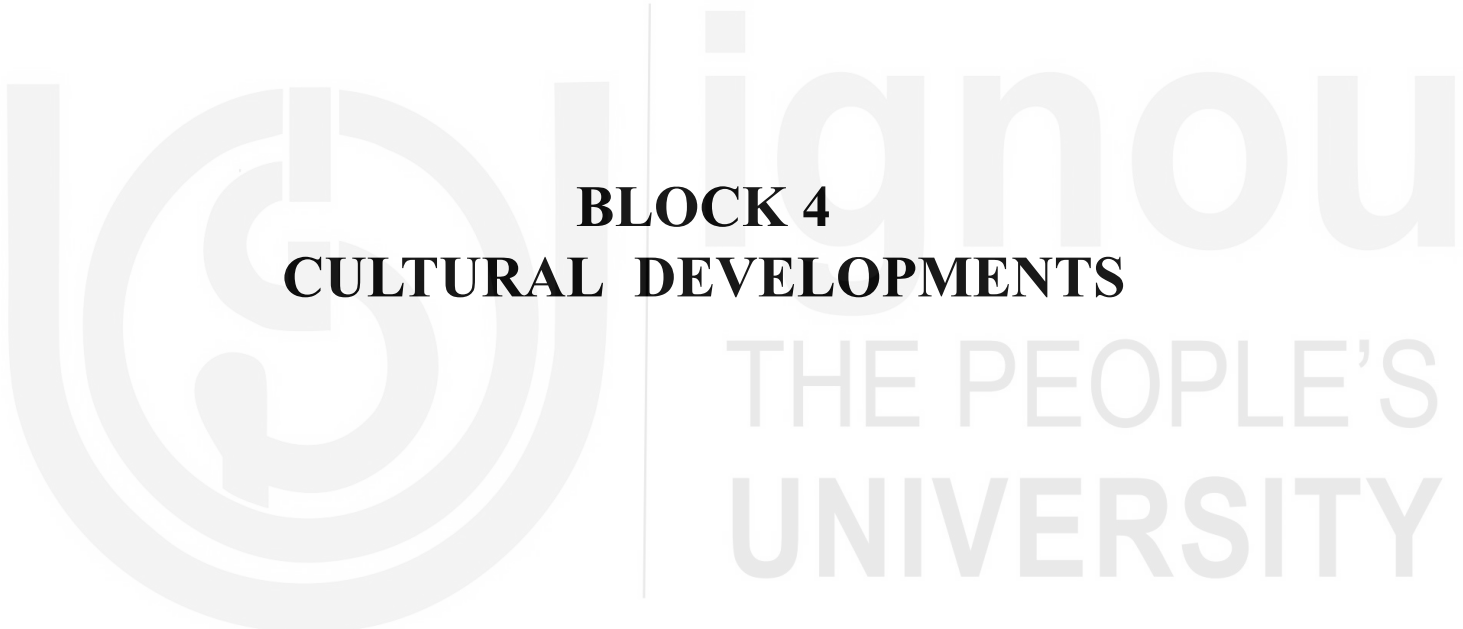


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BLOCK 4

CULTURAL DEVELOPMENTS



UNIT 14 LANGUAGES AND LITERATURE*

Structure

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14.0 OBJECTIVES

After reading this Unit, you will be able to learn about:

- the meaning of language and literature;
- the significance of oral and written in early India;
- the various languages current in early India; and
- the kinds of literature that were written down in early India.

14.1 INTRODUCTION

Language is commonly considered as a means of communication. But, it is also a reflection of the society it has evolved in. There are various factors that contribute to the evolution of a language. These factors, in turn, help us in understanding ideals, norms, practices and ways of thinking of the society. In this Unit, we will be focusing on various languages that evolved in the ancient period — ‘elite’ and ‘popular’ languages — their importance, nature and various factors that

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influenced their rise. Literature of the ancient Indian historical period is vast. An attempt has also been made to include as many texts as possible that will help in understanding the literature of this phase and its contributions.

14.2 THE ORAL AND WRITTEN IN ANCIENT INDIA¹

Oral tradition or oral culture refers to those traditions or cultures where human knowledge is handed down and practiced by the words of mouth, from one generation to the next. The written culture on the other hand is a literary tradition based on language that has script. Which of these traditions was dominant in India? Scholars believe that one cannot talk of rigid divisions between literary and oral traditions. They were not mutually exclusive categories. Let us take the example of the *Vedas* which are regarded as one of the earliest specimens of Indian written literature. One term that was used to describe these sacred texts was *sruti* which means ‘hearing’ or ‘listening’. The reason is that the texts of the *Vedas* were circulated in oral traditions, recounted in oral-aural interactions, before they were written on manuscripts. In such contexts one needs to “distinguish between mode of origin (or composition) and the mode of transmission. For instance, many texts of medieval Indian *Bhakti* saints (such as Basavanna), were most probably composed orally, written down later by disciples and then disseminated orally again. Obviously there was also a transmission through writing. Thus the written form is only a part of the history of the texts, one phase in the cycle of transmission” (Blackburn and Ramanujan 1986: 4). Thus, the demarcation between oral and written tradition in the real cultural manifestations is highly fragile which makes it complicated to label a particular phenomenon as oral or written in absolute terms. Instead of a rigid line of segregation, there exists a continuum between both the traditions. The oral-written continuum is very much a part of Indian culture. In fact, the continued interaction between oral and written lore and the striking cultural productions thereof, is a distinctive feature of Indian culture. The well - known anthologies of stories, such as *Brihatkatha*, *Pancatantra*, *Vetalpanchavimsati*, and the great Epics like the *Ramayana* and *Mahabharata* etc. demonstrate how the narratives in oral circulation later became written texts. The remarkable diffusion of these stories within and outside the Indian territory was in fact the result of the many phased transmissions from oral to written and written to oral discourses that took place at different points of time.

14.3 LANGUAGES

India has a rich heritage of languages and literature. Through the centuries many languages were born. Some of them might not be spoken today but have left a rich literature and a lasting influence over almost all languages of India. Many of the religious texts of the Hindus, the Buddhists and the Jainas are available in these languages which include Sanskrit and Pali.

The languages of India are divided broadly into two families i.e. Indo-Aryan and Dravidian. Most of the languages spoken in northern India belong to the former and the languages of southern India to the latter.

¹ This section has been taken from MFC-003, Block I, Unit 2

One should remember that these languages did not grow in isolation. Both families have influenced each other. Sanskrit was the language of the Indo-Aryans. It was gradually standardized and given a highly scientific grammar by Panini in the 4th century BCE. It was a language of the upper classes and castes. It was the court language for centuries and was used extensively for literary purposes. The common people used not only Sanskrit but also different dialects. They were called Prakrits. Buddhist literature is in Pali, one of the Prakrits. In the course of time many spoken forms called “*apabhramsas*” developed in different part of the country. These *apabhramsas* developed into regional languages. Among the Dravidian languages Tamil is the oldest. Other languages developed during the first millennium of the Common Era.

14.3.1 Sanskrit

The oral sources in India were preserved meticulously; they were so carefully memorized that the text almost came to be frozen, as was the case with Vedic ritual compositions. The language of the *Vedas* was a more archaic form of Sanskrit that is now called Old Indo-Aryan. This differentiated it from the later forms of Sanskrit referred to as Classical Sanskrit. The Indo-Aryan is of the Indo-European family of languages.

Old Sanskrit is known to us, strangely enough, from somewhat later documents. The original composition of the oldest part of the Vedic collections of hymns, our oldest texts, is placed conservatively at 1200 BCE. These hymns form the basic part of the scriptures of the Brahmanical religion. A second, slightly divergent type of Old Sanskrit is known to us from the *Brahmanas*, the prose texts of the Brahmanical religion, and from the grammar of Panini and its ancillary works. Sanskrit, was spoken round the fourth century BCE by the upper class somewhere in north-western India. As a standard dialect and later as a literary and scholastic language, it gradually came into official use all over Brahmanical India; in the inscriptions it appears first round 150 BCE and a few centuries later entirely supersedes the dialects of the Prakrit type; from that time to the present, written according to the rules of Panini’s grammar, it has served as the medium of an enormous body of artistic and scholarly literature.

Through a process of acculturation many ‘non-Aryan’ words entered the Sanskrit language. These texts were related to rituals and thus, wrong pronunciation would have been catastrophic. This was considered impure and sinful. In order to maintain the purity of language, there was a need to develop grammar and science of phonetics. The oldest Indian linguistic text, Yaska’s *Nirukta*, explaining obsolete Vedic words, dates from the 5th century BCE and Panini’s grammar, the *Ashtadhyayi* (“Eight Chapters”), was probably composed towards the end of the 4th century BCE. According to many scholars, Panini’s work helped the language to gain a ‘classic’ status except in its vocabulary. The great grammar of Panini, which effectively stabilized the Sanskrit language, incorporated the work of many earlier grammarians.

Panini’s grammar consists of over 4,000 grammatical rules. Later Indian grammars are mostly commentaries on Panini, the chief being the “Great Commentary” (*Mahabhasya*) of Patanjali (2nd century BCE) and the “Banaras Commentary” (*Kasika Vrtti*) of Jayaditya and Vamana (7th century CE).

Panini's grammar was widely accepted. With Panini the language was fixed, and could only develop within the framework of his rules. It was from the time of Panini onwards that the language began to be called *Sanskrita*, "perfected" or "refined", as opposed to the *Prakrtas* ("natural"), the popular dialects which had developed naturally. Panini's work was most probably based on the language as it was spoken in the north-west.

Sheldon Pollock in his book *The Language of the Gods in the World of Men: Sanskrit, Culture, and Power in Pre-modern India* has divided the transformations in culture and power in pre-modern India into two phases. The first occurred around the beginning of the Common Era, when Sanskrit, a sacred language, was restricted to religious practice, was reinvented for literary and political expression. This development according to him marked the beginning of an 'amazing career' which made Sanskrit literary culture to spread across most of southern Asia from Afghanistan to Java. The second phase occurred around the beginning of the second millennium, when local speech forms were recognized as literary languages and began to challenge Sanskrit for both poetry and polity, and in the end replaced it.

While Sanskrit was the language of the upper class, the masses used Prakrit or Pali. Popular languages which were recognized as 'literary' languages are mentioned below:

- 1) The most important was the ecclesiastical language of the Buddhists of Ceylon, Burma and Siam, the language in which the oldest preserved collection of sacred writings of Buddhism was written.
- 2) Buddhist Sanskrit literature.
- 3) The Jainas did not use Sanskrit for their sacred writings; Middle Indian dialects were divided into two different Prakrits :
 - a) The Jaina Prakrit (also called Ardhamagadhi or Arsa), the language of the older works of the Jaina Canon.
 - b) The Jaina-Maharastri, the language in which the commentaries of the Jaina Canon and the non-religious poetical works of the Jainas are written. This was closely related to Prakrit, which has been used most frequently as a literary language for secular writing.
- 4) The Maharastri, the language of Maharashtra, the land of the Marathas.
- 5) The Sauraseni. Its foundation is the dialect of Surasena, the capital of which is Mathura.
- 6) People of the lower classes spoke Magadhi in the dramas, the dialect of Magadha.
- 7) Paisaci was spoken in the drama by the members of the lowest sections of society. The word probably originally designated the dialect of a branch of Pisacas, although the Indians declared it to be the language of the demons called Pisacas. A famous book of narrative literature, Gunadhya's *Brhatkatha* was also composed in Paisaci dialect.
- 8) Lastly, the Apabhramsa which is used in popular poetry, in Jaina romances and occasionally in drama, stands midway between the Prakrit and the

modern Indian vernaculars: for “Apabhramsha” is a general term for literary idioms which, though based on the Prakrit, were more closely adapted to certain popular dialects.

14.3.2 Prakrits and Pali

By the time of the Buddha the masses were speaking languages which were much simpler than Sanskrit. These were the Prakrits.

Prakrit

Prakrit was the *lingua franca* of the masses. It was used in the production of various literary texts across the subcontinent from about the second or third century. It has been used in various inscriptions of ruling dynasties across South Asia over the first four or five centuries.

Prakrit reflects regional subtypes. The scholarly developments in Sanskrit had put Prakrit under pressure and grammars, dictionaries and various treatises came to be written in Prakrit. Both Sanskrit and Prakrit coexisted, but they occupied diverse spaces. Inscriptions of pre-Gupta times especially the Ashokan edicts are in Prakrit. Various secular literatures were composed in Prakrit. Prakrits were much simpler than Sanskrit both in sound and grammar.

One very important early popular dialect was Pali, which became the language of the Sthaviravadin Buddhists. The Buddha probably taught in Magadhi, but with time his doctrines were adapted to local dialects. The language chosen by the Sthaviravadins was a Western one, probably spoken in the region of Sanchi and Ujjayini.

Pali

This language contains within itself local variants and subscribing it to a particular region is difficult. Jainas, like the Buddhists rejected Sanskrit and adopted Ardhamagadhi for their texts. However, around the second century, Buddhist treatises in north India and in much of South Asia excluding the peninsula were written in Sanskrit. But it is not clear as to what made the Buddhists adopt Sanskrit after half a millennium. Some scholars believe that the Buddhists realized that they will not be able to influence the brahmanas unless they opted for a language that the brahmanas favoured. It has also been argued that adoption of Sanskrit language was the result of penetration of Buddhism westwards into Mathura and the core region of Aryavarta which was the main region of *vaidika* culture.

Other important Prakrits were Saurasena, spoken originally in the western part of modern Uttar Pradesh; and Maharastri, spoken in the north-western Deccan. Saurasena was particularly used in drama, by women and respectable people of the lower orders. Maharastri was a literary language, especially popular for lyric songs. There were several other Prakrits of lesser importance. By the time of the Guptas, the Prakrits were standardized and had lost their local character.

Apabhramsha

We also find literary productions in Apabhramsha. Dandin defines Apabhramsha as, “What is called ‘*Apabhramsha*’ is the language of the Abhiras and others when used in literary works; whereas in scholarly discourse anything that deviates from correct Sanskrit is so named.” The word, ‘*Apabhramsha*’ implies deviation

from standard Sanskrit. By the middle of the second millennium, Apabhramsha and to a lesser degree Prakrit had come to be used almost exclusively by the Jainas, whereas brahmanas monopolized Sanskrit. Literary texts in Apabhramsha were produced increasingly according to Dandin in its birthplace i.e. in western India.

Sinhalese

The development of Sinhalese can be traced in inscriptions and literature from the 2nd century BCE down to the present day. It was influenced by the local variants, and also by Tamil; Sinhalese developed rapidly and independently. By the beginning of the Common Era, Sinhalese was no longer a Prakrit, but a distinct language.

Bhutabhasha

Dandin refers to another language which was used for literature, Bhutabhasha, elsewhere known as Paishachi (the speech of the Bhutas/Pisacas).

The question that arises here is that what made the above languages (Apabhramsha, Sinhalese and Bhutabhasha/Paishachi) a tool for literary expression? The one distinctive feature shared by them was their availability across region, ethnicity, sect, and time. They were not rooted to any particular place, people, creed, or era and social limitations. Some regions did continue, historically, to show preference for one or the other language.

Neither language ever enjoyed the vast diffusion that Sanskrit received. Second, neither Prakrit after the fourth century nor Apabhramsha at any time was used for articulating political discourse of any kind.

14.3.3 Dravidian Languages

Dravidian is virtually an independent group of languages with a distinctive character. Earlier Tamil literature had adopted Sanskrit words. This was mainly due to the growing influence of 'Aryan' culture. Telegu and Canarese, which were spoken further north, were naturally even more strongly influenced by Sanskrit. Canarese first appears in inscriptions at the end of the 6th century, and its earliest surviving literature goes back to the 9th century. Telegu did not become a literary language until the 12th century and only became really important under the Vijayanagara empire, and was the court language. Malayalam though closely related to Tamil, was a separate language by the 11th century.

Check Your Progress Exercise 1

- 1) What is the significance of oral and written traditions in Early India?

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- 2) Discuss the main features of the of any two languages of ancient India.

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14.4 LITERATURE

One of the noteworthy features of Indian literature is its vastness. It has embraced within itself various cultural, socio-political traits and changes. According to many, ancient Indian literature lacked historicity. This is not true. If one goes through this vast ocean of knowledge, one can have a good understanding of various transformations that took place in ancient Indian history. To understand history, it is very important to be cognizant of the thinking of the period, which the texts of the period reflect clearly.

14.4.1 Significance of Indian Literature

Maurice Winternitz rightly points out, “Indian literature embraces everything which the word ‘literature’ comprises in its widest sense: religious and secular, epic, lyric, dramatic and didactic poetry, as well as narrative and scientific prose. The Indian collections of fairy-tales, fables and prose narratives have played no insignificant part in the history of world literature.” Literature was instrumental in the development of a culture.

In ancient India we not only find narrative and canonical literature, dramas, prose and poetry, but in addition to that there was a strong inclination for scientific subjects as well. Therefore we find in India not only an abundant literature on politics, economics, medicine, astrology and astronomy, arithmetic and geometry; but also music, singing, dancing and dramatic art, magic and divination; even erotic are arranged in scientific systems and treated in special manuals of instruction.

The literature of the period is not only unique for its vastness, but also how it portrays the process of transculturation and acculturation thus making it important for the study of society and civilization for historians. The literature in the ancient Indian period had its own distinct features based on its content and structure. In the section below we will be discussing various literatures of the period based on content and structure.

14.4.2 Vedic Literature

The *Rigveda* covers a long period and has been composed following a strict metrical pattern and convention. The collection is divided into ten “circles” (*mandalas*) or books. The hymns contain many repetitions. Vedic literature consists of three different classes of literary works; and to each of these three classes belong a greater or a smaller number of separate works some of which have been preserved, but also many have been lost. They are:

- i) ***Samhitas***, i.e. “Collections,” namely collections of hymns, prayers, incantations, benedictions, sacrificial formulas and litanies.
- ii) ***Brahmanas*** – voluminous prose texts, which contain theological matter, especially observations on sacrifice and the practical or mystical significance of the separate sacrificial rites and ceremonies.
- iii) ***Aranyakas*** (“forest texts”) and ***Upanishads*** (“secret doctrines”) – which are partly included in the *Brahmanas* themselves, or attached to them, but partly are also counted as an independent work. They contain the meditations of forest hermits and ascetics on God, the world, and mankind, and there is contained in them a good deal of the oldest Indian philosophy.

14.4.3 The Epics and the *Puranas*

There existed one or several collections of *Itihasas* and *Puranas*, made up of myths and legends, legends of gods and tales of demons, snake deities, old sages (*Rsis*) and kings of ancient times. They might not have existed in the form of written literature from the beginning. There are references to story-tellers in various literary works of the period. The authors, reciters and preservers of this heroic poetry were the bards, usually called the *Sutas*, who lived at the courts of kings and recited or sang their songs at great feasts glorifying the princes. They also went to battlefields which would enable them to sing praises of the warriors. Apart from them, there were also travelling singers, called *Kusilavas*, who memorized the songs and publicly sang them.

Puranas

The *Puranas* were recited in popular gatherings and were generally considered as the scripture of the masses. What is really intriguing is the fact that they represent how brahmanas were compelled to give up their elitist style and take cognizance of the lower stratum of the society. One of the major problems regarding the *Puranas* is that they were not necessarily composed by a single author or at any particular point of time. Dating the *Puranas* is a problematic task. According to many scholars the *Puranas* received their final form during the Gupta period. Ludo Rocher implies the same. R.C.Hazra’s work on *Puranas* provides a close understanding of the *Puranas*. He traces the effect of changes and developments on the *Puranas*. The various factors that influenced the literary production were early religious movements, foreign invasions and emergence of new occupations. There were eighteen major *Puranas*: the *Markandeya*, *Vayu*, *Brahmanda*, *Vishnu*, *Matsya*, *Bhagvata*, *Kurma*, *Vamana*, *Linga*, *Varaha*, *Padma*, *Narada*, *Agni*, *Garuda*, *Brahma*, *Skanda*, *Brahmavaivarta* and the *Bhavisya Purana*.

Various narratives found in the *Puranas* are found in the Epics as well. The Epics are an encyclopedia of historic accounts that makes them an undeniably major primary source for historians.

Mahabharata

Truly, the *Mahabharata* is in itself a ‘whole literature’ which contains legends of gods, mythological narratives of brahmanical origin, and to a great extent even didactic sections for the propagation of brahmanical philosophy and doctrines ‘for the strengthening and consolidation of their influence.’ The *Mahabharata* had a huge influence on South Asian culture. The *Mahabharata* embraced within

itself numerous local myths in ‘true *Purana* style’, Visnu and Siva myths, and *Purana*-like cosmologies, geographical lists and genealogies. The *Mahabharata* also incorporated ‘ascetic poetry’ which implies the attempt of the Brahmanic priestly class to influence the masses. This included the ascetics, forest hermits and mendicants, the founders of sects and monastic orders. Thus, the *Mahabharata* apart from being an epic, is also a work of poetic art (*kavya*), a manual (*Sastra*) of morality, law and philosophy with reference to the oldest tradition (*smṛti*) for the purpose of legitimation.

Ramayana

The *Ramayana* is not as lengthy as the *Mahabharata* and is more uniform in nature. The authorship is attributed to a sage named Valmiki. The original *Ramayana* was most probably composed in the third century BCE by Valmiki on the basis of ancient ballads. The *Ramayana* is said to be the ‘first ornate poetry’ of India. Till now the story of Rama, the protagonist of the text and Sita, his wife (the ideal woman) and Hanuman, Rama’s most trusted ally, is still celebrated in India. Like the *Mahabharata*, the *Ramayana* also suffers from interpolations. Rama was later made an incarnation of Vishnu.

There has been a Tamil translation of the text dated to about 11th century. The famous ‘*Ramcaritmanas*’ was based on *Ramayana* which was composed around 1571 CE by Tulsi Das. Popular scenes from the *Ramayana* are still performed in northern India. This shows the great popularity of this Epic in the sub-continent.

14.4.4 The Tantra Literature (*Samhitas*, *Agamas*, *Tantras*)

Tantric influences have been noticed in several later *Puranas*, with respect to the cult of Shakti, the female deities etc. The “*Samhitas*” are the sacred books of the Vaishnavas, the “*Agamas*” those of the Saivas and the “*Tantras*” those of the Shaktas. Though *tantra* literature was not against what the Vedas propounded, they were of the view that what was mentioned in the Vedas was too difficult to follow and for that reason it was necessary to introduce an easier cult and doctrine. These texts were not only accessible to the people of higher caste, but also to women and the lower stratum of the society. A complete *Tantra* (*Samhita*, *Agama*) should consist of four parts:

- i) *Jnana*, “knowledge”;
- ii) *Yoga*, i.e. “meditation, concentration,” with a view to acquiring magic powers, hence also “magic” (*mayayoga*);
- iii) *Kriya*, “action,” i.e. instructions for the making of idols and the construction and consecration of temples;
- iv) *Carya*, “conduct,” i.e. rules regarding rites and festivals, and social duties.

According to Winternitz, “the Tantras and the curious excrescences and degenerations of religion described in them, are not drawn from popular belief or from popular traditions either of the aboriginal inhabitants or of the Aryan immigrants, but they are the pseudo-scientific productions of theologians, in which the practice and theory of Yoga and doctrines of the monist (*advaita*) philosophy are seen mingled with the most extravagant symbolism and occultism.”

14.4.5 Classical Sanskrit Poetry

The earliest surviving Sanskrit poetry is that of the Buddhist writer Ashvaghosa, who is believed to have lived around the end of the 1st century CE, and who composed *Buddhacarita* in simple classical style. The Girnar Inscription of Rudradaman, dated CE 150, is the earliest surviving example of courtly Sanskrit prose.

The poetry in Sanskrit was written mainly for recitation or performance at court, or for small circles of intellectuals.

The subjects covered by the Indian poets were love, nature, panegyric, moralizing and storytelling. Though religious subjects were also included with regard to the legends of gods but profound religious thoughts were comparatively rare in courtly literature.

14.4.6 Narrative Poetry

There are various collections, popular stories, the *Brhatkatha* ("Great Story"). The most famous one being Somadeva's "Ocean of Story" (*Katha-sarit-asagara*), written in the 11th century in 'easy' and 'polished' verse. The stories are narrated with simplicity including humour and tragedy. Other works include Kalhana's great chronicle of Kashmir "The River of Kings", "The Deeds of Harsha", by Bana, written in ornate poetic prose; "The Deeds of Vikramanka" (*Vikramankadevacarita*) of Bilhana, dealing with the life and adventures of the great Chalukya emperor Vikramaditya VI (c. 1075-1125); *Ramacarita*, and the work of a Jaina monk, Nayacandra Suri, the *Hammira-mahakavya*, which is among the latest important works of Sanskrit literature.

14.4.7 The Drama

The origin of Indian theatre is still not clear. But dramatics was not new to ancient India. There are references to dramatic performances during the Vedic period. We find instances which point to the enactment at festivals. Some writers have found elements in common between the Indian and the classical Greek theatre.

Sanskrit dramas are numerous. They range from one-act plays to very long plays in ten acts. Dramas might have been performed privately or semi-privately in palaces or the homes of the rich, or were given public showing in temple courts on days of festival.

Kalidasa's plays are celebrated even now. The three plays of Kalidasa which has survived are:

- i) *Malavikagnimitram*: that narrates the love of king Agnimitra for Malavika. The play was set in the Sunga period;
- ii) *Vikramorvasiyam*: the play tells the story of the love of Pururavas and Urvasi;
- iii) *Abhijnanasakuntalam*: this is considered to be the 'masterpiece' of Kalidasa.

The earliest known dramas to have survived are fragments of plays by Ashvaghosa. The oldest complete plays are attributed to Bhasa, which seem to be earlier than those of Kalidasa. Bhasa's thirteen surviving plays include several works, notably "The Dream of Vasavadatta" (*Svapnavasavadatta*) and

“Yaugandharayana’s Vows” (*Pratijnayavgandharayana*). Bhasa also wrote a number of short dramas based on epic stories.

There were many other dramatists of whom we can only mention a few. They are:

- i) Sudraka’s “The Little Clay Cart” (*Mrcchakatika*) – This narrates the love of a poor brahmana Carudatta for the virtuous courtesan Vasantasena. It is said to be rich in humour and pathos and action.
- ii) Visakhadatta (6th century) who was a political dramatist. He has only one complete surviving play, “The Minister’s Signet Ring” (*Mudraraksasa*), which deals with the schemes of Chanakya.
- iii) Bhavabhuti who lived at Kanyakubja in the early 8th century has three surviving plays — “*Malati and Madhava*”, “The Deeds of the Great Hero” (*Mahaviracarita*), and “The Later Deeds of Rama” (*Uttarardmacarita*).

After Bhavabhuti the quality of Sanskrit drama declined. Playwrights of some merit, such as Bhattanarayana (? 8th century), Murari (early 9th century), Rajasekhara (9th-10th centuries), and Krsnamisra (11th century), continued to write dramas but their works were mostly composed more for reading rather than for performance.

14.4.8 Sanskrit Prose Literature

The earliest surviving prose stories are a few references in the *Brahmanas*, followed by the Pali *Jatakas*. Dandin’s “Tales of the Ten Princes” (*Dasakumaracarita*) is a collection of narrations, simple in style.

Subandhu, one of the great prose writers, is known only from one work, called after its heroine Vasavadatta, which tells of her love for the prince Kandarpaketu. Subandhu’s “merits lie in his ornate descriptions and his mastery of language, and his work consists of a series of descriptive tableaux, linked by a thin thread of narrative, each long description told in a single sentence which covers two or more pages of type.”

Bana’s style is said to be similar to that of Subandhu. His works “Deeds of Harsha” (*Harshacharita*) and *Kadambari* hold more importance. In the former work there is a piece of autobiography that is considered ‘unparalleled’ in Sanskrit literature. Bana is considered to be an unconventional man. His opinions and his attack on the theory of royal divinity made him unpopular with his royal patron. What made him an exclusive personality in ancient India was his empathy for the ‘poor and humble’ and he is considered to be ‘the master of exact observation’.

Prose romances and stories in mixed prose and verse (*campu*) were often written after Bana, but none of them were of much literary importance.

Another celebrated literary work of the period is the *Pancatantra* (“Five Treatises”) which is a book of instruction in *niti*, or the conduct of one’s affairs intended for kings and statesmen. The stories are in the form of narrative and exist in several versions with varying length and merit, mostly in prose, but containing many verses of a gnomic type.

14.4.9 Pali Literature

The Pali language was mostly the speech of the ordinary man as compared to Sanskrit and its style was prosaic.

One of the noted works under Pali has been the *Tripitaka* which is a part of the Buddhist Canonical literature. The oldest literature of the Buddhists consists of collections — of speeches or conversations, sayings, songs, narratives and rules of the order. The *Tripitaka* is nothing but a great compendium of such collections. The *Tripitaka* — the word means “three baskets” — consists of three so-called *pitakas* or “baskets”. They are:

- i) *Vinayapitaka*, “basket of the discipline of the order” — This section contains all that refers to the monastic community (*sangha*), the rules of the discipline of the order, precepts for the daily life of monks and nuns and so on.
- ii) *Suttapitaka*, “basket of the *Suttas*” – The Pali word ‘*sutta*’ corresponds to the Sanskrit *sutra*, but for the Buddhists it means “discourse,” or “sermon.” Every long or short explanation, frequently in the form of a dialogue, on one or more points of religion (*dhamma*) is called a *sutta* and often also *suttanta* (Sanskrit *sutranta*). The *Suttapitaka* consists of five nikayas, i. e. great collections of these *suttas* or *suttantas*.
- iii) *Abhidhammapitaka*, “basket of the higher subtleties of the doctrine” — The texts contained in this section deal with religion but more in the form of instructions and enumerations.

The *Jatakas* have been one of the illustrious literary productions under Pali literature. They were originally in a form different from that of the Pali Canon. The stories were written down in the present form around fifth century CE. The *Jatakas* or Buddhist stories are a collection of folklore that were composed for the propagation of Buddhist ideas amongst the masses. The *Jatakas* are considered to be as one of the ‘classified’ texts of Buddhism. The *Jatakas* had both a rural and urban background. Regarding the authorship of the *Jatakas*, it is not the work of a single author.

In Pali poetry we get a few verses from the “Songs of the Elder Monks and Nuns” (*Theragatha* and *Therigatha*); a collection of poems ascribed to the great disciples of the Buddha in the early days of the Order. The style of these poems is simpler than that of courtly Sanskrit literature and suggests the impact of ‘popular’ songs. The first is attributed to Ambapali, the beautiful courtesan of Vaishali who became a Buddhist nun.

In case of Pali descriptive poetry we have passages from the Ceylon chronicle, the *Mahavamsa*, describing the capture of Vijayanagara, the capital of the Tamil invader Elara, by the Sinhalese national hero, King Dutthagamani (161-137 BCE).

14.4.10 Prakrit Literature

Prakrit was a language that the Jainas opted for propagating their ideals, like the Buddhist chose Pali. The Jainas kept in mind the fact that their propaganda should reach out to the laymen, hence the canonical writings and the earliest commentaries are written in Prakrit dialects (Magadhi and Maharastri). It was in a later period that the Jainas — the Svetambaras from the 8th century, and the

Digambaras somewhat earlier — used Sanskrit for commentaries and learned works as well as for poetry. The term given to the sacred books of Janism, both by Svetambaras and Digambaras is *Siddhanta* or *Agama*. They are unanimously called the twelve *Angas* or limbs. There exists detailed knowledge of the *Siddhanta* of the Svetambaras. The authority of the sacred texts does not go beyond fifth century CE. The Jaina canon in Prakrit has similar ‘archaic’ features as the Pali canon in Buddhism.

The language of this Canon is a Prakrit which is known as Arsa (i.e. “the language of the *Rsis*”) or Ardha-Magadhi. Mahavira is said to have preached in this language. But there is a difference between the language of prose and that of verses.

There have been lengthy descriptions of the *Tirthankaras*, of pious monks, mighty kings, wealthy merchants, prosperous cities etc. over and over again. The style is more ornate than that of the Pali scriptures, and closer to courtly Sanskrit. The poetry of the Jainas is better than their prose.

The most important literary work in Prakrit is the *Gathasattasai* compiled by Hala. It is a collection of short poems. According to Jan Gonda they are examples of ‘exceedingly sophisticated verbal art; they follow set patterns, obey strict literary rules which are product of a long period of development, and show a sure sense of taste.’ They were meant for an audience who were not the masses but educated urban and aristocratic public. Assigning an exact date for the text is difficult. Hala was a king of the south Indian Satavahana dynasty whose reign can be placed around first century CE. This date is considered to be too early for the text. It was most probably compiled between third and seventh century CE.

14.4.11 Tamil Literature

Tamil tradition tells of three literary schools (*sangam*) which met at Madurai. The first of these was attended by gods and legendary sages, but all its works have perished. Of the second, there survives only the early Tamil grammar, *Tolkappiyam*. The poets of the third *Sangam*, on the other hand, wrote the “Eight Anthologies” (*Ettutogai*), which are the greatest testament of ancient Tamil literature. But again dating them is problematic as it is almost certain that the grammar *Tolkappiyam*, attributed to the second *Sangam*, is later than many of the poems of the Third. The poetry of the “Eight Anthologies” is little known outside the land of its origin.

Poetry in Tamil literature was divided into two main groups: “internal” (*agam*), that dealt with love, and “external” (*puram*), which dealt with the praise of kings.

Traditionally there were five regions (*tinai*): the hills (*kurinji*), the dry lands (*palai*), the jungle and woodland (*mullai*), the cultivated plains (*marudam*), and the coast (*neytal*). Each was concomitant with some aspect of love or war; the hills were the scene of poems on pre-nuptial love and on cattle-raiding; the dry lands, of those on the long separation of lovers and on the laying waste of the countryside; the jungle, on the brief parting of lovers and on raiding expeditions; the valleys, on post-nuptial love or the deceits of courtesans and on siege; and the sea coast, on the parting of fishermen’s wives from their partners and on battle. Every poem of the “Eight Anthologies” was classified in one of the five sections, but much of the poetry did not follow this formal classification.

“The Eighteen Minor Works” (*Padinenkilkanakku*) are largely aphorisms and moralizing in character, the two most famous being *Tirukkural*, and *Naladiyar*. The latter is formal and literary in nature, and contains verses of merit and high ethical content.

The indigenous style of poetry was getting modified under the influence of Sanskrit, and Tamil poets took to writing long poems which they called by the Sanskrit name *kavya*. The earliest and greatest of these is “The Jewelled Anklet” (*Silappadikaram*), which is very different from Sanskrit poetry. Though written for an educated audience it is near to the life of the people which also makes it realistic in nature. The traditional author of the poem was Ilangovalar, the grandson of the great Chola king Karikalan, who lived around 1st or 2nd century CE but the poem belongs to several centuries later. It throws light on political ideas as well. The author though was a great poet, is not considered a great storyteller who is said to have drawn together the themes of earlier Tamil poets. But his work contains interesting descriptions which make this literary text and Kamban’s *Ramayanam* ‘national epics’ of the Tamil people.

A little later than “The Jewelled Anklet”, its sequel *Manimegalai* was composed. It is attributed to the poet Sattan of Madurai. “The Jewelled Anklet”, though containing many religious and moral lessons was primarily written to tell a story, while in *Manimegalai* the story is a mere framework for philosophical analysis. The heroine, Manimegalai, is the daughter of Kovalan, the hero of “The Jewelled Anklet”, who became a Buddhist nun on hearing of her former lover’s death. The story tells of the love of prince Udayakumaran for Manimegalai, and the miraculous preservation of her chastity. In the end she becomes a Buddhist nun like her mother. The interesting section is where she holds discussions with members of various sects, both Hindu and heterodox, and her successful refutation of their doctrines. Thus this text is important for critically analyzing various religious traditions and the position of women.

A third Tamil “epic” is the *Sivaga-Sindamani* which enumerates the exploits of the hero Sivaga or Jivaka, who excelled in every art from archery to the curing of snake-bite, and who wins a new bride only to become a Jaina monk after his many victories. The author was a Jaina named Tiruttakkadevar. His work is ‘fantastic’ and lacks any contact with real life and is said to be influenced by courtly Sanskrit.

14.4.12 Folk Poetry

One that can be mentioned here is that section of the Buddhist canon called *Samyutta Nikaya* which was first translated into Chinese about CE 440, from a manuscript acquired in Ceylon by Fa-hsien in 411. Probably the verses here quoted were sung in India between the time of the codification of the Pali canon in the 1st century BCE and the beginning of the 5th century CE.

Check Your Progress Exercise 2

- 1) Discuss the significance of Ancient Indian literature.

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- 2) Discuss any two types of literature of ancient India.

14.5 SUMMARY

Indian civilization is unique and distinct in nature. This uniqueness is reflected in every facet of Indian history. Language and literature is one of them. Language and literature is a form of expression. It is a way of expressing an idea with a purpose which might be transmitted from generation to generation. The study of literature, language and expressions helps in forming perception and understanding. Till present times, historians used to critically analyze the expressions of literature of a particular period and put forward their perceptions supported by various arguments. These perceptions help to form an in-depth understanding of history. Indian literature has covered subjects including social, economic and scientific advancements as well. Thus the critical study of language and literature not only helps in forming an idea of the cultural history, but also social, political and economic aspects as well.

14.6 KEY WORDS

Astadhyayi: means literally eight chapters. A text by Panini (end of the 4th century BCE).

Sanskrita: perfected or refined.

Prakrtas: natural; dialect which developed naturally.

Samhita: collection. There are four *Samhitas* apart from *samhitas* which are part of *Tantra* Literature: *Rig, Sam, Yajur and Atharva Veda*.

14.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) See Section 14.2
- 2) See Section 14.3 and its relevant Sub-sections

Check Your Progress Exercise 2

- 1) See Sub-section 14.4.1
- 2) See Section 14.4 and its relevant Sub-sections

14.8 SUGGESTED READINGS

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UNIT 15 SCULPTURE AND ARCHITECTURE*

Structure

- 15.0 Objectives
- 15.1 Introduction
- 15.2 Post-Mauryan Phase (c.200 BCE-200 CE)
 - 15.2.1 Architecture
 - 15.2.2 Sculpture
- 15.3 Gupta Phase (c. 300-600 CE)
 - 15.3.1 Architecture
 - 15.3.2 Sculpture
- 15.4 Post-Gupta Phase
 - 15.4.1 Pallava Architecture
 - 15.4.2 Pallava Relief Sculpture
 - 15.4.3 Architecture under the Chalukyas
- 15.5 Summary
- 15.6 Key Words
- 15.7 Answers to Check Your Progress Exercises
- 15.8 Suggested Readings

15.0 OBJECTIVES

After reading this Unit, you will be able to learn about:

- *stupa* architecture in post-Mauryan period;
- evolution of Buddhist rock-cut architecture;
- temple architecture of the period under study in the context of both cave temples and free-standing temples; and
- various sculptural schools and their chief features.

15.1 INTRODUCTION

This Unit is a survey of art and architecture between the period c.200 BCE-c. 750 CE. It is a vast period that can be divided into three phases: post-Mauryan, Gupta and post-Gupta. Each period was marked by significant contributions to art and architecture. We shall start with the post-Mauryan period: a time of great prosperity. It was marked by refinement of Mauryan architecture whether it is the *stupa* or cave-buildings. Accompanying this was the emergence of three schools of sculpture: Gandhara, Mathura and Amravati. Gupta epoch set new standards in rock cut architecture and sculpture. There was also the first emergence of Hindu cave and structural temples. In post-Gupta era major contributions were made by Pallava and Chalukya dynasties to temple architecture.

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15.2 POST-MAURYAN PHASE (c. 200 BCE-200 CE)

The Mauryan period witnessed production of splendid specimens of art by the state. With the emergence of social groups who could extend substantial patronage for production of specimens of art, new trends in art activities came about. In the post-Mauryan period, patronage by different social groups was the main reason behind the fact that art activities became so widespread all over India and beyond; it was no longer high art exclusively patronized by the state. There was also, from the Mauryan period onwards, a shift toward using non-perishable material i.e. stone as a medium of creative expression. There was also constant interaction in this period with those art forms that flourished beyond the frontiers of the Indian sub-continent. There emerged various schools of art. Let us discuss the main features of post-Mauryan art.

15.2.1 Architecture

Architecture of the post-Mauryan period is mainly in the form of religious buildings. We can divide them into four categories:

- 1) *Stupas*
- 2) Cave architecture for monks of different religions
- 3) Royal Shrines of Kushanas
- 4) Free-standing Sunga pillars.

Stupa

The word *stupa* is derived from the root *stu* which means to worship and praise. In Buddhism it denotes a mound where the relics of the Buddha, his disciples and famous monks are encased.

The Mauryan emperor Ashoka redistributed the Buddha's relics and built several *stupas* enshrining them. Initially, their building plan was very simple. It consisted of a hemispherical mound made of bricks enshrining the relics. Its top had a *chhatra* within a small railing known as *harmika*. The *stupa* was surrounded by a railing known as *vedica*. The space enclosed by it was meant for circumambulation.



The Great *Stupa* at Sanchi, Frontal View of South *Torana*. Credit: Photo Dharma. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:001_Front_View_of_South_Gate_\(32969983444\).jpg](https://commons.wikimedia.org/wiki/File:001_Front_View_of_South_Gate_(32969983444).jpg)).

During this period several *stupas* were also enlarged and modified under the patronage of different royal dynasties, traders and artisans. The hemi-spherical dome was enlarged. On this dome an additional terrace *medhi* was built for an additional round of circumambulation. It was provided with a lintel gateway (*torana/toranadvara*) that was beautifully decorated with reliefs of Buddhist motifs and iconography placed at cardinal positions of the *vedica*. The best preserved examples are located at Bharhut, Bodhgaya, Sanchi and Amravati.



LEFT: *Stupa no. 2, Sanchi*. Credit: Kevin Standage. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Sanchi_Stupa_No2.jpg).



RIGHT: *Sanchi Stupa no. 3, Front View*. Credit: Photo Dharma. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:003_Front_View_\(33709016166\).jpg](https://commons.wikimedia.org/wiki/File:003_Front_View_(33709016166).jpg)).

Rock Cut Architecture

It involved converting a cave into a building. Artisans were often inspired by contemporary buildings which meant adding elements like pillars (not required in a cave). The oldest cave buildings were excavated under the Mauryas at Barabar and Nagarjuni hills, mainly for the *Ajivika* mendicants. In this period, many caves were excavated in the Western and Eastern Ghats for religious mendicants. Those in the Western Deccan are mainly located in Maharashtra. These were built for Buddhist monks and consisted of two kinds of buildings –

- *caityas* (prayer halls), and
- *viharas* (living quarters).

The *caitya* was generally designed as a large apse-shaped pillared hall. At its centre, a *stupa* (in case of *Hinayana* sect) or an image of the Buddha (in case of *Mahayana* sect) was placed. Its entrance was designed as pillared veranda/porch. The general design of a *vihara* is quite simple. It consisted of a main hall surrounded by small rooms/cells for monks. Its entrance may or may not have a veranda.

The important cave buildings are at Bhaja, Kondane, Pitalhora, Ajanta caves 9 and 10, Bedsa, Nasik, Karli and Kanheri. Some of these contain inscriptions which can be paleographically dated. Others can be dated on the similarity of the architectural styles. Susan Huntington divides these caves into following three sub-phases:

- c. 100-70 BCE – Bhaja, Kondane, Pitalkhora and Ajanta cave no. 10
- c. 100-200 CE – Bedsa
- c. 200-300 CE – Karli and Kanheri

Royal Shrines of Kushanas

The Kushanas adopted certain peculiar customs to consolidate their rule. One such custom was the cult involving the worship of dead rulers; the implication being that any dissent and revolt against the emperor would mean revolt against god. For this purpose special shrines were set up. Two of these have been discovered in Mathura and Surukh Kotal in Afghanistan. The surviving figure in the former is seated and wearing clothes associated with Scythians, high boots and tunic. The throne has lions supporting it, possibly derived from the Mauryan idea of royalty. Its inscription tells us that it was the statue of Vima Kadphises. Another statue discovered is that of Kanishka. This figure is standing. It wears a tunic and boots. He is carrying a sword in right hand and a mace in left. The idea is to give the viewer an impression of his military prowess. Unfortunately, the head of both the statues has not survived.



Headless Statue of Kanishka, Mathura Musuem. Credit: Biswarup Ganguly. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Kanishka_enhanced.jpg).

Sunga Pillars

Best specimen of a Sunga pillar is the Heliodorus pillar at Besnagar near Vidisha, Madhya Pradesh. It was commissioned by Heliodorus, Greek ambassador to the Sungas, around 113 BCE. He is one of the earliest recorded Greek converts to Hinduism. The 7-line Brahmi inscription identifies the pillar as *Garuda-dhvaja* installed to showcase his devotion to *Bhagavata* cult. This cult is considered a predecessor of Vishnu cult. The inscription is the first known inscription in India related to Vaishnavism.

In many ways the pillar is different from Mauryan lion-capitals. It is half their size. The shaft does not have a smooth appearance and there is slight decoration in the form of garland and geese motifs. The capital consists of a reverse lotus with its leaves visible. Atop was perhaps a *garuda* sculpture as the name *Garuda-dhvaja* suggests. The pillar was located near a Vasudeva shrine.



Heliodorus Pillar. Credit: Public. Resource.Org. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Heliodorus_pillar_inscription.jpg).

A banyan tree-shaped capital has also been found. This indicates that many more pillars may have been erected in and around the region of Vidisha but they have not survived.

15.2.2 Sculpture

Sculptural art in this period developed on a large scale. It was largely associated with the decoration of religious buildings. Initial samples belong to the Sungas and their contemporaries. Later on, under the patronage of foreign and Indian rulers there was emergence of three distinct schools:

- 1) Gandhara,
- 2) Mathura, and
- 3) Amravati.

These schools for the first time produced images of the Buddha, Jaina *tirthankaras* and Brahmanical gods which, according to Ananda Coomarswamy, were inspired from *Yaksha* images of the Mauryan period.

Sculpture under the Sungas

The samples dated from 2nd century BCE to 1st century BCE are credited to the Sungas and their contemporaries. They consist of stone sculptures, small terracotta figurines and bas-relief sculptures. Stone sculptures have been recovered from Vidisha, Mathura, Ahichchhatra, Kausambi, Ayodhya, and Pataliputra. They

mainly depict *Yakshas* and *Yakshis*/Yakshinis. Most famous among them is Kubera *Yaksha* from Vidisha wearing a *dhoti*, belt, turban and heavy jewellery.

From the Sunga period onwards relief sculptures became an integral part of *stupa* decoration. Such images are recovered from Sanchi *stupa* 2, Bharhut, Amaravati, and Jaggayyapeta. At Sanchi *stupa* 2 they were carved on the *vedica*. These are mainly floral motifs, elephants, people riding horses etc. Northern entrance of the *stupa* has more significant elements like the Ashokan pillar, *pipal* tree garlanded by *vidyadharas* and *kalpavriksha*. On *vedica* of the Bharhut *stupa* we find carved the serpent king, *yaksha*, *yakshini*, lotus motif, dwarves, people riding horses and even a Greek warrior. Some roundels also have depiction of *Jatakas*. However, the Buddha during this time was never directly depicted. He was represented through symbols like sacred ladder, sacred tree or sacred altar. Amaravati also has reliefs depicting devotees worshiping the Bodhi tree. A relief at Jaggayyapeta in Andhra Pradesh depicts a *chakravartin* (ideal king).

Terracotta images have also been recovered from Chandraketugarh, Mathura, Kaushambi, Ahichchhatra and in Deccan from Kondapur, Nagarjunakonda, Yeleshwaram, Sannati, Ter, Paithan and Nevasa. They are mainly female figurines. There are also few animal figurines which could be toys for children.

Gandhara School of Art

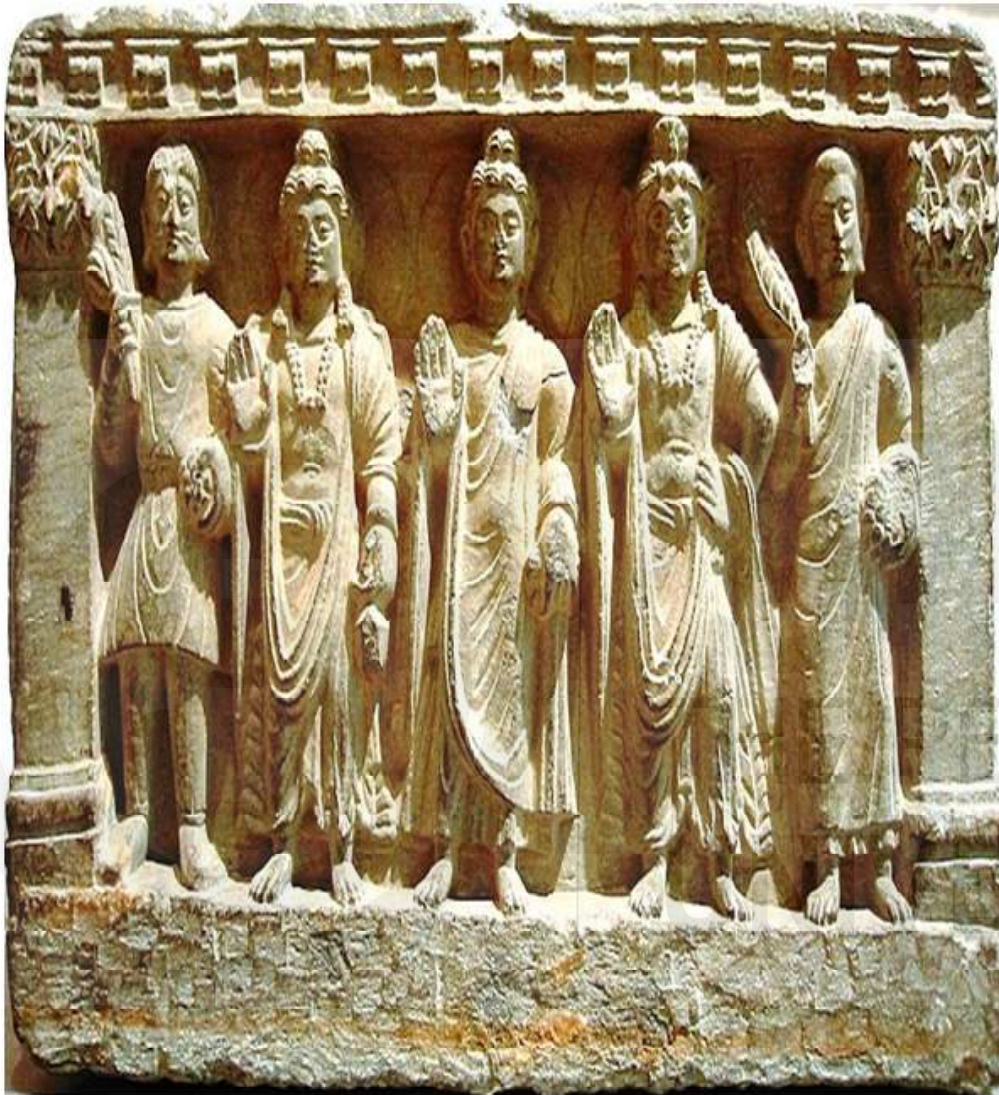
The Gandhara school of art developed in the north-west region of the subcontinent. Various trade routes connecting the subcontinent with the Mediterranean and China passed through this region. Also, in this period it came under the control of various foreign dynasties like Indo-Greeks, Scythians, Parthians and Kushanas. Thus, this school represents an amalgamation of Indian, Greek and West Asian idioms.

The main theme is Buddhism. Several sculptures of the Buddha and Bodhisattvas have been found. The Buddha is depicted in both standing and seated pose. His iconography has both Greek and Indian elements. In the standing pose he wears Greek drapery and



Representation of the Buddha in the Greco-Buddhist art of Gandhara, 1st-2nd Century CE. Piece Preserved in Tokyo National Museum, Japan. Credit: World Imaging, 2004. Source: Wikimedia Commons. ([https://en.wikipedia.org/wiki/File:Gandhara_Buddha_\(tnm\).jpeg](https://en.wikipedia.org/wiki/File:Gandhara_Buddha_(tnm).jpeg)).

stands barefoot. One leg is slightly bent, known as *contrapposto*. He has curly hair and facial features based on the Mediterranean model. Indian element is visible in the poses of hands (*mudras*) such as *abhayamudra*, *dana mudra* etc. He has *mahapurusha-lakshanas* (signs of a great man) like *ushnisha* (three-dimensional oval over the top of the Buddha's head), circular symbol on forehead and plain halo in the background. He does not wear any jewellery. He has elongated ears indicating royal life in previous birth. The sculpture often stands on a pedestal which at times is carved with a scene or auspicious symbol.



An Early Buddhist Triad. From Left to Right: a Kushana Devotee, *Bodhisattva* Maitreya, the Buddha, *Bodhisattva* Avalokiteshvara and a Buddhist Monk. 2nd-3rd Century, Gandhara. Credit: No machine-readable uploader provided. World Imaging assumed (based on copyright claims). Source: Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:BuddhistTriad.JPG>).

Bodhisattvas (future Buddhas) are also depicted in seated and standing variety. Most of them wear a *dhoti* with shawl covering shoulders. They have elaborate hairstyles and wear heavy jewellery. Different *bodhisattvas* are identified by their *mudra*, head gear or objects they carry. The school also produced several relief sculptures depicting the Buddha's life. This emphasis is in sharp contrast to other Indic schools in which there is emphasis on *Jatakas* (stories of previous birth of the Buddha). The emphasis on the life of the Buddha may be because of the fact that Buddhism here was a foreign religion.

Mathura School

This school developed around the city of Mathura: an important city on the *uttarapatha* as well as the second capital of the Kushanas. The images discovered here belong to all the three religions: Buddhism, Brahmanism and Jainism. Besides, there are also few royal sculptures from Mathura depicting Kushana rulers. These were created using red spotted sandstone, easily available in the nearby Aravalli region.

Jaina sculptures have been recovered from a ruined *stupa* at Kankali Tila. They depict *Jina* in seated or standing pose. They look quite similar to Buddhist sculptures with minor differences. They are generally nude. The standing *Jina* is straight with hands long enough to reach the knee. The seated *Jina* is in *padmasana* (lotus-position or cross-legged posture) with hands in *dhyana mudra*. Jainas venerate 24 *tirthankaras* who are distinguished by different emblems on their throne or chest: lion for Mahavira, bull for Rishabh etc. They also donated reliefs to the *stupa*, known as *ayagapatas*, in the form of square slabs depicting *Jina*, *stupa*, *swastika*, twin fish symbols, miscellaneous scenes etc.

Buddhist images, too, occur in both seated and standing variety. They are generally shown wearing a *dhoti* and shawl, with no jewellery and footwear. Facial features are inspired from *yaksha* images of the Mauryan era. Ears are elongated. Head is shaved. Body is stout and husky. The standing Buddha has no bend anywhere in the body. The seated Buddha is shown on a pedestal in *padmasana* with right hand in *abhaya* (benediction or boon-giving) *mudra* while left hand rests near left knee. Some additional features were added to the image: lightly decorated halo, *Bodhisattvas* or *Vidhyadharas* as attendants and a parasol above the Buddha.



Buddha Seated in Abhaya-Mudra, Kushana Period (c. 1st-3rd Century CE), Mathura Museum, Uttar Pradesh. Credit: Biswarup Ganguly. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Inscribed_Seated_Buddha_Image_in_Abhaya_Mudra_-_Kushan_Period_-_Katra_Keshav_Dev_-_ACCN_A-1_-_Government_Museum_-_Mathura_2013-02-24_5972.JPG).

Among Saivite deities a sculpture of Karttikeya (son of Siva) was discovered at Kankali Tila. His appearance is quite similar to the images of *Bodhisattvas*, the only distinction being the spear in his right hand. There is also a sculpture of Surya shown in a crouching position as if seated on a chariot. Two horses are depicted near his feet, possibly pulling the invisible chariot. There is also a relief of Vishnu and Balarama but very few representations of Krishna have been discovered belonging to this time.

Amravati School of Art

This school developed under the patronage of dynasties like the Satavahanas and Ikshavakus. Both bas-reliefs and free-standing sculptures were produced. Satavahana reliefs have been found at Amaravati where they were used for decorating the *stupa*. They show the *stupa*, *Jataka* tales, scenes from the life of the Buddha and Buddhist symbols like *chakra*. Compared to the Sunga specimens there was great improvement in technique. The figures are deeply carved and have a natural appearance. According to Huntington, this may be because of the influence of Roman art. The reliefs created under the Ikshavakus show even further improvement. These have been recovered from their capital Nagarjuna-konda. They were, again, used for decorating *stupas*. Great advancement is seen in the usage of space. The figures are well-placed. They have a slim appearance and look very lively.

Free-standing sculptures emerged towards the end of Satavahanas' reign of mainly the Buddha and *Bodhisattvas*. They have been discovered from Goli, Amaravati and Nagarjunakonda. The material used is marble or limestone. Although the school is deeply influenced by Mathura, it has certain distinctive features. The Buddha is shown wearing *sanghati* which resembles a toga-like garment. It only covers the left shoulder. In origin, it could be a modification of Gandhara drapery or could be an indigenous conception. His face is closely modelled on the Buddha found on the reliefs. There is, however, a difference in the delineation of the body. Instead of slimmer physique in the reliefs, he has a massive body. His hair is in form of short ring-like curls. In iconography the right hand is in *abhaya mudra* but the left hand holds the hem of the garment. He stands barefoot on a plain pedestal. This image too has the *mahapurusha-lakshanas*. Images of *bodhisattvas*, unlike in the Mathura and Gandhara school, are much rarer in the Amravati school.

Check Your Progress Exercise 1

- 1) Explain the etymology and components of a *stupa*.

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- 2) Compare and contrast the Gandhara and Mathura school of art.

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15.3 GUPTA PHASE (c. 300-600 CE)

Art and architecture produced between c.300-600 CE has been celebrated by nationalist historians and art-historians as the Golden Age or Classical period. According to Coomaraswamy this period was marked by political stability and prosperity that enabled the emergence of exquisite art forms that were largely indigenous with no foreign influence from Greece and West Asia. The art of this time, in his words, “is self-possessed, urbane, at once exuberant and formal”. This new expression influenced the entire country and all the religions: Hinduism, Buddhism, and Jainism.

15.3.1 Architecture

Temples

Temples of the Gupta period can be divided into:

- i) Early Gupta style
- ii) Late Gupta style

The early Gupta style is dated from 3rd century to 5th century CE. There are both cave and free-standing temples made under this style. One such Cave complex was discovered at Udayagiri in Madhya Pradesh. Around 20 caves were excavated in the low-lying sandstone hills. Three of them bear Gupta period inscriptions: two issued during Chandragupta II's reign and one during Kumaragupta's reign. In architectural plan all the temples here are single-roomed structures having a pillared porch for entrance. Interiors are mainly plain. However, rich decoration is visible on the doorways. The porch was not excavated but built separately from stones. The pillars in it had a square base, an octagonal shaft and a vase-shaped capital.



Temple no. 17 at Sanchi. Credit: Biswarup Ganguly. Source: Wikimedia Commons. (https://en.wikipedia.org/wiki/File:Temple_17_-_Buddhist_Monument_-_Sanchi_Hill_2013-02-21_4494.JPG).

Free-standing structures had a similar architectural plan. The best example is the Vishnu temple at Tigawa. It has two parts – a small square chamber and a pillared porch. The porch stands on four octagonal pillars with square base and four lion capitals. The whole structure has a flat roof. Walls are mostly plain. The only decoration visible is near the doorway in the form of reliefs of river-goddesses Ganga and Yamuna identified by their respective *vahanas* — crocodile and tortoise (according to John Guy this is because the Ganges has a rich crocodile population and Yamuna has a rich tortoise population). Another temple with a similar plan is temple no. 17 at Sanchi.

The later Gupta style, dated between 5th and 6th century CE, is characterized by an increase in the complexity of plan. The temples now were built on a plinth or platform provided with staircase. The flat roof was replaced by a tower that could be either pyramidal or curvilinear in shape. They were built with stone set together with dowels or with bricks glued with mud mortar. Further, the doorways and external walls were more elaborately decorated on which we find depiction of gods and goddesses of the growing Hindu pantheon, floral patterns etc. Best examples of this style are:

- 1) Vishnu temple at Deogarh and Bhitargaon
- 2) Parvati temple at Nachna-Kuthara
- 3) Shiva temple at Bhumara

Buddhist Cave Buildings

Buddhist cave buildings continued to be built in the Western Ghats under the patronage of Guptas and Vakatakas. They have been found at Ajanta and Bagh, of which Ajanta caves are best preserved. They consist of 30 caves of which cave nos. 19 and 26 are *caitya* halls and the rest are *viharas*. About six of these were excavated during the post-Mauryan period for the Hinayana sect. In the Gupta age *Mahayana* monks largely occupied these caves. Since this sect believes in image worship of the Buddha we see rich sculptural representations of the Buddha and *bodhisattvas* decorating the caves.

The building plans of *caityas* of this period are not very different from the plans found in the post-Mauryan period. Out of the two *caitya* halls, cave 19 is an older building. It has an inscription of Harishena, a Vakataka ruler, inscribed in the early part of his reign. The entrance is still designed as a pillared portico. It contains a doorway, above which is an ogee-curved arch within which there is a sun-window. What is innovative is the decoration. There are several sculptural representations of the Buddha, each enclosed within pilasters. Style of the figures is very similar to the Sarnath school. The interior of the cave is planned slightly differently. The first thing greeting the visitor is a covered courtyard surrounded with four cells. The purpose of the cells is not understood. After this we have an apsidal hall divided into a nave and side aisle by a colonnade of pillars. The pillars are thicker and are decorated with fluted patterns and a cushion capital. At the centre of the hall is the object of worship, a *stupa* with *harmika* and several *chhatris*. On its dome a standing Buddha has been carved. The *harmika* has a carving of the seated Buddha. The roof is barrel vaulted in shape and covered with beams. The spaces between these beams are covered with miniature paintings of the seated Buddha. The side aisle has nothing significant and has plain walls.

15.3.2 Sculpture

Udayagiri and Eran Sculptures

The Udayagiri cave temples are not just the oldest Hindu cave temples in India but also have the best preserved sculptural representations of Hindu deities. A study of these indicates that the iconographic formula of Hindu deities had fully matured in this period.

Siva is preserved in cave 4 in the *ekamukhalingam* (lingam with one face) form. Unlike the Gudimallam specimen he has a fuller face, almond shaped eyes with heavy lids and fleshy lips. Huntington says that this was inspired from the late-Kushana Mathura art. Cave 3 has a sculpture of standing Karttikeya whose facial features are similar to the above. His standing pose with feet apart and knees slightly bent is very similar to the Mathura images. Outside this shrine two *dvarapalas* (doorkeepers) are depicted. Ganesha (god of good luck) does not have any separate shrine dedicated to him; he is carved on the left wall outside cave 6.

Among the Vaishnavite deities the most impressive representation is in cave 5. There is a colossal relief of Varaha (boar *avatara* of Vishnu) rescuing earth from drowning in the ocean. The earth is represented as a maiden. Varaha stands with his left leg resting on a rock and right leg straight. The body is husky, giving an impression of a strong figure. Near the left leg *nagas* are shown paying respect. In the upper portion *rishis* and celestial beings are praising the Varaha. This



Varaaha Panel at Udayagiri (Madhya Pradesh). Credit: Jean-Pierre Dalbéra. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:375-415_CE,_Udayagiri_Hindu_Caves,_Varaha_rescuing_goddess_earth_legend,_Les_grottes_d%27Udayagiri_\(Inde\).jpg](https://commons.wikimedia.org/wiki/File:375-415_CE,_Udayagiri_Hindu_Caves,_Varaha_rescuing_goddess_earth_legend,_Les_grottes_d%27Udayagiri_(Inde).jpg)).

scene spreads on to adjacent walls. The right wall has reliefs of Ganga, Yamuna and the ocean. The two river-goddesses are identified through their *vahanas*: Ganga on *makara* (crocodile) and Yamuna on tortoise. Vishnu is also presented in his *anantashayana* (literally meaning “sleeping on the serpent Ananta”) form in cave 13. His head is not well preserved.

At another historical site, Eran in Madhya Pradesh also, there have been recovered outstanding sculptures of Vaishnava deities in the form of Narasimha, two Varahas and one free-standing pillar depicting Vishnu's *vahana* Garuda. The first Varaha was made during the time of Samudragupta. It is made of sandstone. The style is quite similar to that of Udayagiri cave relief. A sash is tied around his waist. The earth goddess hangs from his tusk. The Narasimha sculpture is another outstanding piece. Like Varaha he has a strong physique with four arms, wide shoulders and flat head. He too wears a sash. The second Varaha is executed and decorated very differently. It belongs to the time of Huna invader Toramana. The boar stands on his four feet with Prithivi hanging from his tusk. We have small panels of *rishis* (saints) seeking shelter in him.



Varaha at Eran in zoological form. Credit: Arnold Betten. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:Eran,_Varaha_und_Garuda-S%C3%A4ule_\(1999\).jpg](https://commons.wikimedia.org/wiki/File:Eran,_Varaha_und_Garuda-S%C3%A4ule_(1999).jpg)).

A free-standing pillar has also been found. The inscription on it tells us that it was commissioned in 485 CE by a local ruler. It has a square shaft, bell-shaped capital, surmounted by a square abacus with a pair of lions on each side. At the top we have a wheel and on either side we have two male figures. They represent Garuda, identified by their holding a serpent. It perhaps stood opposite the Vishnu temple.

Sarnath School of Art

The earliest samples discovered at Sarnath were mainly of the Mathura school. However, in the last quarter of 5th century the site developed its own unique sculptural art. This is reflected in the standing Buddha image donated by a Buddhist monk Abhayamitra in 473 CE. Three years later he donated two more standing Buddha idols.

The statues made under the Sarnath school during the Gupta era have very different characteristics from previous schools in the following respects:

- 1) First distinguishing trait is the execution of facial features. Eyes are cast downwards, nose is sharp and lips are curved in a gentle smile. The *mahapurusha-lakshanas* are not present: elongated ears, *ushnisha* and circle on the forehead. The overall effect is of a delicate face that has achieved great tranquillity and enlightenment.
- 2) The second distinguishing trait is the posture of the body. It stands in *abhanga* pose in which the body is either tilted left or right. It is covered in drapery but unlike the Gandhara ones, it does not have any folds. The drapery, in fact, looks transparent and could be even missed by the viewer if not for the crease near the waist and slight projection on right and left. Huntington believes that these sculptures were originally painted. The hands are in pose similar to the earlier schools: right in *abhaya mudra* and left in *dana mudra*.
- 3) The third unique characteristic of this school is its execution of halo. It was executed in two forms:
 - Circular halo, covering back of the head and shoulders, or
 - Elongated halo that covers the entire body.

At times these are plain but in many examples they are covered with intricate floral designs. In some pieces we also see the depiction of *vidhyadharas* on the top left and right and attendants near the feet of the Buddha.

The school also produced images of the seated Buddha. They share several features with their standing variants: serene face, *mahapurusha-lakshanas* and halos. The difference is in posture. He is mainly seated in *padmasana*. In the earlier schools the hands may be shown in *abhaya mudra*, variants of



Preaching Buddha in *Dharmachakra Mudra*, Gupta Period. Source: EHI-02, Block-4, Unit-17.

dhyana mudra or *dharmachakra mudra* (gesture of teaching). In this school there is a greater preference for *dharmachakra mudra*.

Gandhara and Mathura School of Art

Images of the Buddha continued to be produced during the Gupta epoch under Gandhara and Mathura schools. Gandharan sculptures have been mainly recovered from Hadda in Afghanistan. They were now increasingly made of stucco (lime plaster) instead of blue schist or green phyllite. In style there is continuity of the post-Mauryan period reflected in robe and hair style but the facial features have a softness possibly inspired from the Sarnath school.

The Mathura school of art also saw the influence of Gupta sensibility. The best specimen is a standing Buddha dated to 434 CE. It is made of red sandstone but execution is completely different from the post-Mauryan Mathura art. The body is slimmer and more graceful. Pose is more relaxed and we see a slight bent in the right leg. It is wearing a drapery with folds, somewhat similar to the Gandhara school. There is a round halo behind the head which is amply decorated.

15.4 POST-GUPTA PHASE

In the post-Gupta period significant contribution to the development of art and architecture was made by two southern dynasties: Pallavas and their neighbours, the Chalukyas of Badami. They mostly patronized Hindu temples. The Pallavas, who emerged around 600 CE, controlled large parts of Tamil Nadu. At times their empire even included parts of Deccan and Odisha. But, most of the architectural marvels of this dynasty have been found at Tamil Nadu. Their temples are mostly dedicated to Brahmanic deities, possibly under the influence of *Bhakti* saints *Alvars* and *Nayanars*. A new artistic idiom developed under the patronage of Pallavas. They were the first to encourage the usage of stone in buildings in south India. Both cave-temples and free-standing structures were constructed. This led to development of the Dravida architectural style.

They were frequently locked in conflict with the Chalukyas of Badami who rose to power in 543 CE under Pulakesin I. While they initially controlled Karnataka, under capable rulers like Kritivarman I and Pulakesin II they expanded their rule over Maharashtra and Andhra. The Andhra region was handed over to Pulakesin II's brother Vishnuvardhana who founded the collateral branch of the Chalukyas of Vengi, in 624 CE. Both the branches built significant architectural structures which occupy a unique position in the evolution of Hindu temple architecture. Like the Pallavas, they built caves as well as the free-standing temples. These are both in *nagara* as well as *dravida* style. It was perhaps this that led to an amalgamation of the two styles, leading to the development of a new *vesara* style. Therefore, in Badami we find temples made in all these three styles.

15.4.1 Pallava Architecture

Cave Temples

Pallava cave-temples were mainly built under two monarchs Mahendravarman I (590-630 CE) and his successor Narasimhavarman I (630-668 CE). In design these are very simple consisting of a huge *mandapam* (hall/pavilion/porch) and a cubical *garbha-griha* (*sanctum sanctorum* or innermost sanctuary wherein the image of principal deity is housed). The *mandapam* also doubled up as an entrance made of either pillars or pilasters.

Two cave temples were constructed under Mahendravarman I:

- 1) Lakshitayatana at Mandagappattu
- 2) Lalitankura at Tiruchrapalli

An inscription informs us that Lakshitayatana temple was dedicated to the Hindu Trinity but the dedication of Lalitankura is not known. Compared to the later temples, these are distinguished by having a very simple decoration scheme. On the entrance there are two reliefs of *dvarapalas*. The pillars or pilasters are also lightly decorated with motifs like medallions.

The cave temples built under Narasimhavarma I are located in the new city founded by him – Mamallapuram (today's Mahabalipuram). The Varaha cave temple is outstanding and lavishly decorated. It consists of a rectangular *mandapam* hall and a cubical shrine. The shrine is empty, making it difficult to identify its dedication, but the hall has beautiful reliefs of Varaha, Trivikrama (giant form of the Vamana *avatara* of Vishnu), Gaja-Lakshmi (Lakshmi seated on lotus and flanked with an elephant on both sides) and Durga. The entrance consists of two pillars and pilasters. Instead of plain pillars each pillar has a seated lion as base, a round shaft and a cushion-shaped abacus. Outside, near the entrance, we see for the first time a water-tank which became an essential feature of the Dravida style.



Varaha lifting Bhudevi (earth-goddess), Varaha Cave Temple, Mamallapuram. Credit: mountainmoeba. Source: Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:Varaha-mahabalipuram.jpg>).



Facade of Varaha Cave-Temple. We can see lion motif at the base of the pillars. Credit: Vsundar. Source: Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:Vsvarahacave.jpg>).

Another cave temple – Trimurti cave – is less spectacular. It only has three cubical shrines built next to one another with no *mandapam*. The central shrine is dedicated to Siva, left one to Vishnu and right one to Brahma. The doors of each shrine has a relief of two *dvarapalas*. In addition, the wall next to the Brahma shrine also has a relief of Durga.

A unique cave associated with his reign is the Yali (lion) cave. It is located about 5 km. from Mamallapuram in Saluvakuppam village. The cave is shaped as a seated lion with face further decorated with mini-lions. In its entrance, too, there is a pillared porch with base of the pillars shaped as seated lions. The purpose of its creation is not understood.

Structural Temples

Free-standing temples built with stone blocks or bricks first emerged under Narasimhavarman II (700-728 CE). Best examples are:

- Shore temple at Mamallapuram
- Kailashanatha temple at Kanchipuram.

These temples added a new element to the architectural plan. They were built within a walled complex: a typical feature of the *Dravida* style.

The Shore temple at Mamallapuram derives its name from the fact that it overlooked an ancient port. Today, only the western portion of the structure is visible as the rest is buried under sand. The temple has three different shrines:

two dedicated to Siva and one to Vishnu. The Vishnu shrine is considered to be the oldest and at the front and back of it there is the Siva shrine. The roof of the Vishnu shrine is flat whereas the two Siva shrines have pyramidal roofs. Each shrine is provided with a circumambulatory passage. From ruins in the vicinity it is possible to argue that there existed other minor shrines, halls and a tank for ritual ablution. The entire complex is surrounded by a huge rectangular enclosure with a *gopuram* (gateway) on the west.



Frontal View of Shore Temple, Mamallapuram. Credit: mckaysavage. Source: Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:Mamallapuram.jpg>).



Shore Temple, Side View

Credit: Bernard Gagnon. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Shore_Temple_01.jpg).

The Rajasimheshavara or Kailashanatha temple is located at Kanchipuram. Like the Shore temple it is located within a rectangular enclosure. The main shrine is square in shape and houses a *siva-linga*. It has a circumambulatory passage. The roof is pyramidal in shape topped with a *stupika* (top most part of a Hindu temple). It is decorated with barrel-vaulted structures. The main shrine is surrounded by nine small shrines. For the congregation of devotees a separate *mandapam* was built on its east. In later period the two buildings were joined with help of another pillared hall known as *antarala*.



One Side View of Kailashanatha Temple, Kanchipuram. Credit: Bikash Das. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:7th_century_Sri_Kailashnathar_Temple_Kanchipuram_Tamil_Nadu_India_01_\(5\).jpg](https://commons.wikimedia.org/wiki/File:7th_century_Sri_Kailashnathar_Temple_Kanchipuram_Tamil_Nadu_India_01_(5).jpg)).

15.4.2 Pallava Relief Sculpture

The sculptural art that developed under the Pallavas is mainly in the form of reliefs. Many of these reliefs were used in the decoration of temples depicting deities and mythological stories associated with them. Supplementing them are the representations of *dvarapalas*, seated lions and dwarves. Pallava style is characterized by slenderness of the figures and their highly animated look. Huntington traces this as influence of the post-Mauryan Amravati school of art. The figures are deeply carved and adequately spaced, creating an impression of a three dimensional image. What is innovative is the scale of these images. In most of the Indian schools, in order to emphasize centrality of the main figure, different scales were used for the characters. Thus, in the sculptures depicting the Buddha, the figure of the Buddha was huge and other figures like dwarves, attendants etc. were smaller. In Pallava reliefs, however, all figures have the

same scale. The main figure was emphasized by being placed centrally and being on a throne or pedestal.

Other than the temple reliefs an open-air relief was also discovered at Mamallapuram. A natural fissure in the rock divides it into left and right portions. The right portion on the lower side shows an elephant flock with two elephants depicted larger than the rest, walking towards the fissure. Near the fissure there is one figure with his left hand up as if he is lifting something. It is identified as Krishna lifting Govardhana. In the middle, on the fissure, there is depiction of *nagas*. The figures near the fissure are significant. In the lower half there is a figure shown in two different poses: one doing penance and other bowing to the *naga* deity. Above him there is a scene of *rishis* sitting on either sides of a mini shrine. Above this is the most significant representation. There is a figure doing a penance by standing on one leg and Siva in front of him bestowing a boon. This scene is construed as Arjuna's penance or Bhagiratha's which led to the descent of the Ganga. The latter interpretation has more weightage, given the fact that this relief was built over a tank which is now lost. It is believed that the rainwater flowed into the tank through the fissure. This relief, according to scholars, has an allegory. The Bhagiratha penance scene may imply ending of the drought and Krishna's scene can mean ending of the flood. The two scenes could be seen as glorifying the building of tanks, thus ending these extreme conditions. In other words, it underlines irrigation works undertaken by the Pallavas.

15.4.3 Architecture under the Chalukyas

Cave Temples

The cave temples built under Western Chalukyas are located at Badami and Aihole. At Badami there are three cave temples: two dedicated to Vishnu and one to Siva. They have similar plan. Unlike the Gupta and Pallava cave temples, the entrance here is in the form of an open courtyard which leads to a closed veranda after which there is *mandapa* which contains a cubical *garbha-griha*. The temples are beautifully decorated. Pillars of the veranda are square-shaped and decorated with medallions and garlands. The *mandapa*, however, has different set of pillars. They are round in shape with cushion capitals. Several relief sculptures decorate the walls and often depict stories related to the chief deity. Near the entrance there are reliefs of *dvarapalas* and dwarves.

Structural Temples

The dynasty built beautiful structural temples. Clusters of temples have been discovered at Pattadakal, Mahakuteshwar and Aihole. They were built with large stone blocks, set together without the help of mortar. Both *nagara* and *dravida* style temples were constructed. There are also specimens which are quite unique and cannot be classified either as *nagara* or *dravida*. The Chalukyas introduced new elements like open porch, use of balcony slabs and carving of auspicious motifs and figures on pillars. These later became a regular feature of temple architecture.

Aihole has some of their oldest temples like Gaudara Gudi, Chiki and Ladhkhan temples. These temples have a unique plan. A square *garbha-griha* is located within a pillared *mandapa*. The *mandapa* may be open as in Gaudara Gudi or closed as in Chiki and Ladhkhan temples. The temples are built on a platform

provided with a staircase. The roof of the temples might be slightly slanted. The Ladhkhan temple also has a small shrine on its roof accessed by a staircase below. It is believed that these temples were originally assembly halls and were later converted into temples.



Gaudara Gudi Temple, Aihole, Karnataka. Credit: Jean-Pierre Dalbéra. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:Le_temple_Gaudara_Gudi_\(Aihole,_Inde\)_14383019304.jpg](https://commons.wikimedia.org/wiki/File:Le_temple_Gaudara_Gudi_(Aihole,_Inde)_14383019304.jpg)).

The *nagara* style temples have been discovered at Aihole, Pattadakal, Alampur and Mahakuteshwar. The temples at Alampur were built by their collateral branch, the Chalukyas of Vengi. In terms of architecture, some of the temples show further evolution of the *nagara* style. There is the beginning of the cruciform ground plan. The oldest temple in which this is visible is Huchchappayya temple at Aihole. In this the three components – *garbha-griha*, *mandapa* and *ardhamandapa* (entrance porch forming a transitional area between the outside and *mandapa* of the temple) – are built one after another forming a cruciform ground plan. The *garbha-griha* has the typical *nagara-shikhara* (curvilinear roof). Its *ardhamandapa* is designed as an open-porch. Other *nagara* temples built by this dynasty closely follow this plan. A slight variation is visible at Jambulinga temple at Pattadakal which has a closed *ardha-mandapa*.

Check Your Progress Exercise 2

- 1) Write a note on Udayagiri and Eran sculptures.

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2) Discuss temple architecture under the Pallavas.

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15.5 SUMMARY

This Unit has been an attempt at surveying and analysing significant developments in art and architecture between the period *c.* 200 BCE- *c.* 750 CE. Being a very broad chronological span, it is divided into post-Mauryan, Gupta and post-Gupta periods, each characterized by novel contributions. We have thrown light on these contributions. You also learnt about the elements of a *stupa* in post-Mauryan age, emergence of Buddhist rock-cut architecture, temple architecture in terms of both cave temples and free-standing temples and different sculptural schools and their chief characteristics.

Changes in art styles and the emergence of architectural idioms is, no doubt, an important subject of study. *Stupas* and *viharas* received extended patronage by various groups in the society. The Gupta era is marked by the formative stage of temple construction and post-Gupta age saw the flowering of different styles of temple architecture: *Nagara*, *Dravida* and *Vesara*.

15.6 KEYWORDS

Abacus: Slab forming top of the capital of a column.

Bas Relief: A form of sculpture where instead of converting entire stone into an image only a part of the stone is utilized to make an image. The resultant sculpture looks embedded into the stone.

Bodhisattva: Any person who is on the path towards the Buddhahood (the condition or rank of the Buddha/enlightenment/supreme state of life). It also means the “awakened one”. In *Mahayana* Buddhism it means a sentient person who is able to reach *nirvana* but delays it due to his compassionate heart for his fellow suffering beings.

Capital: Top portion of the pillar.

Iconography: Study of rules for making an image. For instance, a Vishnu image will have four hands, each carrying a *kaumodaki/gada* (mace), *chakra*, conch and lotus.

Kalpavriksha: Mythical tree that can grant any wish.

Pilaster: Pillar carved onto a wall.

Porch: Covered entrance of a building.

Shaft: Middle portion of a pillar.

Vidyadharas: Bearers of knowledge.

Yaksha and Yakshi/Yakshini: Forest spirits known from the time of *Rigveda*. They are seen as the cult of common folk. They could be good and evil. They were generally invoked for attaining wealth, prosperity and beauty.

15.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) See Sub-section 15.2.1
- 2) See Sub-section 15.2.2

Check Your Progress Exercise 2

- 1) See Sub-section 15.3.2
- 2) See Sub-section 15.4.1

15.8 SUGGESTED READINGS

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UNIT 16 SCIENCE AND TECHNOLOGY*

Structure

- 16.0 Objectives
- 16.1 Introduction
- 16.2 Hydraulic Engineering
- 16.3 Astronomy
- 16.4 Architecture
- 16.5 Metallurgy
- 16.6 Scientists of Ancient India
- 16.7 Summary
- 16.8 Key Words
- 16.9 Answers to Check Your Progress Exercises
- 16.10 Suggested Readings

16.0 OBJECTIVES

After reading this Unit, you will be able to learn about:

- the contribution of ancient Indian scientists to the fields of metallurgy, architectural engineering, hydraulic engineering, astronomy, mathematics etc.;
- the life, times and achievements of ancient Indian scientists; and
- how the western and the Arab world learnt a great deal from Indian achievements in science and technology.

16.1 INTRODUCTION

Formal education was available in brahmana *ashramas*, hermitages and in Buddhist and Jaina monasteries. Apart from Vedic and Dharmasastric teaching, subjects like grammar, rhetoric, prose and verse compositions, logic, mathematics, astronomy, medicine and astrology were taught to the students. Actual professionals handled distinctive forms of education. The writing of a manual in Sanskrit on a particular subject was an indicator of its importance. In this Unit, we will be studying various achievements of ancient India in the fields of metallurgy, architectural engineering, hydraulic engineering, astronomy, mathematics, astrology, medicine etc. in the period between 200 BCE-1200 CE. We will also be studying the life and contributions of various ancient Indian scientists who made a mark in the field of science through their acumen and genius.

16.2 HYDRAULIC ENGINEERING

Kalhana's *Rajatarangini* gives details of some of the finest examples of hydraulic engineering. This is a 12th century text which tells us about the most well-conceived irrigation networks. These functioned through various canals, irrigation

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channels, embankments, aqueducts, circular dykes, barrages, wells and waterwheels. An example of a vast embankment is *Guddasetu*, built by king Damodara II and the construction of a series of *Arghat* or waterwheels, by the 8th century CE king Lalitaditya Muktapida of the Karkota dynasty. The text also mentions the hydraulic feats of an irrigation engineer called Suyya. He is credited with *draining the waters of the Vitasta river and controlling it by constructing a stone dam, and clearing its bed*. Suyya also *displaced the confluence of the rivers Sindhu and Vitasta*, and constructed stone embankments for seven yojans along the Vitasta in order to dam the vast Mahapadma lake (now famous as the Wular lake). In fact, Suyya is credited with having made, "...the streams of Indus and Jhelum flow according to his will, like a snake-charmer his snakes". The system of irrigation established by Suyya was designed in such a way that everyone was supplied with a fair share of water (Pandey, 2016).

The prominent dynasties of the South and the Deccan such as the Pallavas, Cholas, Chalukyas, Kakatiyas, Pandya, Chera and the Vakatakas constructed many irrigation devices and water bodies. The famous Kaveri Anicut was built by the Pallavas. In the subsequent period, the Cholas innovated with an irrigation device called the chain-tank. In this method the tanks were constructed along the slopes and were connected with water channels. Apart from these other devices like the wells, depressions excavated in sheet rock, cisterns, ponds, tanks were also built. In dry regions like Gujarat, tanks, *kunds*, step-wells or *baolis*, wells, ponds etc. were built. This led to systems like *johadhs*, anicuts, check-dams, *khadins*, *tankas*, *adlaz*, *jhalara*, *modhera*, *vapi*, *medhbandhi* (earthen structure on fields to prevent water from flowing out).

Tanks, reservoirs, ponds and step wells also had deep ritual significance. Most temples in the Deccan and south India were constructed in the vicinity of seep springs which were dammed up in the form of a step tank or some other water body. Gujarat and Rajasthan are known for Step wells. They were made into beautiful architectural structures. Most were fed by deep aquifers. Water was drawn by a rope from balconies and corridors, to lower levels, and subterranean chambers, to keep it cool. An elaborate network of copper pipes was constructed within the palaces of rulers for cooling terrace pavilions; channels flowed through royal chambers, fountains and water-gardens, and even filled under-ground tanks.

16.3 ASTRONOMY

The early expositions of Indian astronomy were designed to organize large sacrifices. These were recorded in the *Jyotishavedanga*. With the coming of the Hellenistic Greeks, a variety of new systems were introduced. Some of these were incorporated in Indian astronomy. There was shift from astronomy based on the lunar mansions and constellations to astronomy that placed greater emphasis on the planets (Thapar, 2002). The new astronomy was a departure that gave direction to the new theories influencing astronomy and mathematics in the Eurasian world. Ujjain, which was on the Indian prime meridian, became a centre for studies in astronomy.

Aryabhata I (476 CE) was the first astronomer who tackled the problems of new astronomy. He invented a system of expressing numbers with the help of consonants and vowels, based again on the decimal place value principle. The system was used by Bhaskara I (574 CE) and Aryabhata II (950 CE), and applied

in the astronomical *Jaimini-sutras* of unknown date. Aryabhata I of Kusumapura (Pataliputra or Patna) laid the foundations of scientific Indian astronomy in 499 CE. He taught astronomy to his pupils who included Pandurangasvamin, Latadeva, and Nihsanka. One of his successors, Bhaskara I was the author of the *Laghubhaskariya* and the *Mahabhaskariya* which follow Aryabhata's system of astronomy. He also wrote a commentary on the *Aryabhatiya*.

Aryabhata I was the author of two distinct systems of astronomy, the *audayika* and the *ardharatrika*. In the first, the astronomical day begins at the mean sunrise at Lanka, and in the other, it begins at the mean midnight. Aryabhata I was the first Indian astronomer who referred to the rotation of the earth to explain the apparent diurnal motions of the fixed stars.

Varahamihira's redaction of the old *surya-siddhanta* heavily borrows from the *ardharatrika* system of astronomy of Aryabhata I. But, his work is valuable from the viewpoint of the history of Indian astronomy. Brahmagupta (b. 598 CE) wrote his *Brahmasphuta-siddhanta* in c. 628 CE and his *Khandakhadyaka* in 665 CE. The second work gives easier methods of computation of the longitude of planets according to Aryabhata's *ardharatrika* system of astronomy. In his first work he has corrected all the erroneous methods of Aryabhata I and has in more than one place corrected the longitude of the nodes, apogees, and other astronomical elements of planets. Indeed, after Aryabhata I, the next name of significance is undoubtedly Brahmagupta.

There was an increasing exchange of ideas between the Indian and Arab astronomers and mathematicians. Earlier there was a similar interaction between Hellenistic and Indian astronomers. Indian works on mathematics, astronomy and medicine were very much prized in the scholarly centres that arose under the Caliphate at Baghdad. The Indian methods were of the most elementary character, while those of Ptolemy were much advanced and more elegant. Yet the Indian astronomers could solve some problems where Ptolemy failed. For instance, they could find the time of day by altitude from the sun's azimuth. Thus, although scientific Indian astronomy is dated much later than the time of Ptolemy, barring the mere idea of an Epi-cyclic theory coming from outside India, its constants and methods were all original.

16.4 ARCHITECTURE

All forms of civil engineering from drainage system to huge temples, both rock cut and structural were conceived and built by ancient India; all those still extant shows the engineering skill of our ancestors. During the Gupta period, structural principles of constructing small and large temples were put to work. The art of building temples was so developed that separate temple idioms came into existence such as *Nagara*, *Dravida* and *Vesara*. Treatises such as *Silpratnakosa*, *Silpapradipa*, *Silpasastra*, *Bhubanapradipa*, *Mayamatam*, *Visnudharmottara Purana*, *Silpasarani* etc. were codified by Silpin; these treatises throw ample light on the ancient Indian architecture and archaeometry.

In the construction of religious edifices like *Stupas* and *Caitya-grhas* the Buddhists showed their engineering skill. Construction of *stupas* and *caityas* was an important aspect of Buddhist religious life. The word *stupa* is derived from the root *stup*, meaning 'to heap', and suggests the mound-like shape and method of

construction of these edifices, while the word *caitya* is derived from *citi* (altar). Constructing stupas was an ancient practice. The earliest stupas were simply mound of earth piled up in the form of a mound. Gradually with time, they became elaborate and acquired more height. Ashokan stupas are the earliest which were made of bricks and mud mortar. In the Sunga period some stupas were made even more elaborate with the encasing of the mound within a veneer of dressed stone slabs. The stupa was provided with a railing, *harmika*, *chhatra* and gateways. The gateways were embellished with sculptures mostly from *Jataka* stories. Gradually the advantage of filling the core with rubble or other material was recognized. And the outward thrust of the fill material on the facing wall was minimized by dividing the inner space into compartments in the form of boxes or radiating spokes like those of the wheel of a cart (Satpathy, n.d.).

With the growth of the *Sangha*, monasteries and *caitya grhas* were also built. They were constructed to meet the needs of the monks who lived in abodes far from habitation. The early Buddhist cave monasteries were quadrangular in shape, a typical example of which has been found at Nasik. The basic pattern for such *viharas* must have been evolved by the second century BCE as seen from some of the specimens at Ajanta. The *vihara* had later a covered *mandapa* (courtyard) in the centre and with the installation of the Buddha's image inside the cell in the back wall, it became a *chaitya-cum vihara*, serving the purpose of a shrine as well. At Nagarjunakonda separate *chaitya* halls were provided in the *vihara* enclosures. Later specimens of stupas became ornate with base-terraces, umbrellas being multiplied as at Nalanda (Bihar), Ratnagiri (Odisha), and other places. Initially, the *stupa* was the object of worship. Later, an image of the Buddha was either placed on it as at Ajanta and Ellora, or worshipped singly as at Nagarjunakonda. The *chaitya-grha* usually had an apsidal ground plan with the *stupa* in the apsidal end and a central nave separated from the side aisles by a row of pillars. Unfortunately no structural *chaitya-grha* survives, but the rock-cut examples depict them with gabled wooden roofs, initially simple in form, and with wooden pillars arranged with an inward rake to counter the outward thrust of the gabled roof

Temple Architecture

The Gupta period (300-600 CE) saw the beginnings of systematic construction on the basis of structural principles in temple architecture. The basic elements are a square sanctum (*garbhagrha*) for the image, a small pillared portico (*mukhamandapa*), and sometimes a covered circumambulatory passage (*pradakshinapatha*) around the sanctum. There was a tendency during this period in stone construction to use stones larger than what the size of the building warranted. This was because the relationship between the strength and stability of construction and the economy of materials was yet to be understood (Satpathy, n.d.). The stone was usually prepared at the site of the quarry. Fragments of carvings found at some quarries suggest that the sculpturing of the stones was also usually done at the quarry site, although sometimes this was done after the stone had been set in its place on the temple itself. All of this entailed accurate measurements.

Models to scale were perhaps sometimes employed. From about the fifth century CE brick-built religious structures, both Buddhist and Brahmanical, gradually became common in the alluvial plains. These included Buddhist *caitya* halls, monasteries, and *stupas* as well as Brahmanical temples. Bricks were easy to

procure in the plains, whereas stone was not always readily available. And bricks also afforded the advantage of convenient handling and flexibility in construction technique because of their small size. One difficulty encountered in the use of bricks was the bridging of spaces as in the case of doorways, windows, and other openings. The craftsmen attempted to overcome this problem by using exceptionally large bricks, some early examples being more than 50 cm. long. But even this was not always sufficient to surmount the difficulty, and so lintels of wood were resorted to. Stone lintels were subsequently found to be preferable to wooden ones (Satpathy, n.d.). At one period brick structures with stone dressings became a rather common type of construction.

The post-Gupta period witnessed brisk building activity with experiments in various temple forms. Interesting results of such experimentations are seen at the principal centres at Aihole, Badami, Mahakuteswar, Pattadakal, and Alampur. The south Indian temples of the *vimana* (lit. well-proportioned) type with a pyramidal *sikhara* made their earliest appearance at Badami in the simple form of the temple known as Maleguti-Sivalaya (garlandmaker's temple). Later variants and developed forms of *vimana* with *karna-kutas* (miniature square shrine at the corner of the roof), and *nasikas* (arched opening above the superstructure wall), projecting from the façade became common. Equally interesting are the Hoysala (twelfth-thirteenth century) temples at Halebid and Belur, famous for their intricately carved sculptured decorations, a kind of which is also seen in some of the Vijayanagara (fourteenth century) temples noted for large-sized *mandapas*.

Though essentially linear in elevation, the north Indian *Sikharas* have some variations. While at Bhubaneswar itself the typical Odishan form is represented by the Muktesvara temples (tenth century), the Rajarani temple (eleventh century) shows an interesting experiment with miniature *sikharas* clustered around the *jangha* (bottom portion of the spire) as in the temples of western and central India including those at Khajuraho. The Lingaraja temple (eleventh century) shows the culmination and grandeur of this type of temple, but the Surya temple (thirteenth century) at Konarak (Puri district) in its original form with bold and lively sculptural decorations must have been a magnificent work. At Khajuraho, again, a beginning was made with a plain *sikhara* without any embellishment of the miniature spires (*uru-srngas*) which became the characteristics of the later examples. The temple components were *ardha-mandapa* (entrance porch), *mandapa* (hall), *antarala* (vestibule), and *garbhagrha* (sanctum), the entire structure being placed on a high platform and the walls decorated with beautiful carvings. The result of these experiments was the emergence of two broad temple architectural styles, one predominating in the north called *nagara* and the other common in the south called *dravida* or *vimana*.

The main structural component during the post-Gupta period continued to be stone. One wonders how the big slabs of stone used in the temple structures were transported and set up in position to make the temples. From reliefs carved on temples and from a manuscript describing the building operations of the temple at Konark one gets an idea of the methods employed in transporting large stones to the construction site and hoisting them into place. They were transported on barges along rivers and streams or pulled by elephants over wooden rollers. They were lifted into place by means of rope pulleys on scaffolding. Ramps of timber or sand were built on which to haul up exceptionally large stone slabs.

The rock-cut temples, both cut in and out of the rock, mostly followed the contemporary architectural styles. The Kailasa temple at Ellora (800 CE) stands unparalleled as a monument to the artistry and craftsmanship of Indian rock-cut architecture. The temple of Kailasa was executed by cutting away more than fifty million tonnes of rock from the sloping hill by means of hammer and chisel, a process which took some 100 years. The first step was to cut three trenches at right angles into the hill, thereby isolating a massive block of stone over 60 m. long, 30 m. wide, and 30 m. high. Next, this block was carved from the top downwards and hollowed out into the form of the temple with its intricate carvings. In order to highlight the shape of the temple against the grey stone of the mountain surrounding it, the entire edifice was coated with a white gesso, imparting to it a brilliant sheen (Satpathy, n.d.). The Jainas too carved out retreats in the hills of Udayagiri and Khandagiri near Bhubaneswar in the first century BCE and shrines later at Ellora, Badami, and elsewhere.

Check Your Progress Exercise 1

- 1) Discuss the skill of ancient Indians in hydraulic engineering.

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- 2) Describe how various types of architecture in ancient India exhibit the genius of Indian engineering skill.

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16.5 METALLURGY

Ancient Indians excelled in metallurgical sciences. A type of iron manufactured in the ancient period in India was the one that was used to manufacture the famous Iron Pillar at Delhi. It is a 1600 year old pillar with a height of 7.67 m and weighs six tons. It was initially erected by Chandra as a standard of Vishnu at Vishnupadagiri, according to a six- line Sanskrit inscription on its surface. Vishnupadagiri has been identified with modern Udayagiri near Sanchi in Madhya Pradesh, and Chandra with the Gupta emperor, Chandragupta II Vikramaditya (375- 414 CE). In 1233, the pillar was brought to its current location in the New Delhi's Qutub complex. It is rust resistant due to the addition of phosphorus. This element together with the oxygen from air contributes to the formation of a protective veneer on the surface which forms again if damaged by scratching. The pillar is still a wonder and millions come to see it. There are a few more such

pillars in India, for instance at Dhar (Madhya Pradesh) and Kodachadri hill (coastal Karnataka). Besides, the same technology was used to manufacture huge iron beams used in some temples of Odisha, such as Jagannath of Puri (12th century). The iron beams at Konarak's famous Sun temple are of even larger dimensions. Chemical analysis of one of the beams confirmed that it was wrought iron of a phosphoric nature.

16.6 SCIENTISTS OF ANCIENT INDIA

In ancient India not only great accomplishments were achieved in the field of art and architecture, literature, philosophy etc., many natural and pure sciences also flourished and registered remarkable growth and development. In the realm of astronomy, mathematics, biological and medical science ancient Indians made various breakthroughs. Among the intellectual and scholastic luminaries Baudhayana, Aryabhata, Brahmagupta, Bhaskaracharya, Varahamihira and Nagarjuna deserve special mention. One of the best analyses of the lives and careers of ancient Indian scientists has been undertaken by B.B. Satpathy. Presented below are the details about them, based on his book *Science and Technology in Ancient India* (n.d.).

- 1) **Baudhayana (c.500 CE):** His *Baudhayana sutras* is a work on a wide range of subjects including philosophical discussions on *dharma* (righteous conduct), rituals etc. as well as scientific discussions on mathematics etc. He adhered to the *Yajurveda* school. He is credited with the writing of the earliest *Sulba² sutras* (appendices to the *Vedas* performing the role of manuals enunciating rules for the construction of Vedic altars, preparation of the site where Vedic sacrifices were to be carried out etc.) known as the *Baudhayana Sulbasutra*. It specifically deals with the dimensions of Vedic brick fire-altars. The rules of construction are noteworthy from the viewpoint of mathematics. They throw light on various significant mathematical formulae, including the value of π to a considerable degree of precision and giving a version of the Pythagoras Theorem. The sequences associated with primitive Pythagorean triples were named Baudhayana sequences.

Baudhayana's *dharmasutra*, like that of Apastamba, also constitutes a portion of the larger *Kalpasutra* (a compendium of the Jaina tradition that contains the biographies of Jain *tirthankaras*, particularly Parshvanatha and Mahavira). It is composed in the form of *prashnas* which literally means questions or books. These *prashnas* comprise the *Shrautasutra* and other ritual texts, the *Shulvasutras*, which elucidate Vedic geometry and the *Grihyasutras* which throw light on domestic rituals. Therein we find an explication of rectangles and squares which is deemed as the earliest recorded statement of the Pythagoras Theorem. The *sulbasutras* also suggest how to square a circle i.e. how to construct, using only a ruler and compass, a square the area of which is equal to that of a given circle. It is interesting to note that Indians learnt and knew of the Pythagorean Theorem before the Greeks.

- 2) **Aryabhata I (c.476-550 CE):** He was the first among eminent astronomer-mathematicians of ancient India. He composed the *Aryabhatiya/Aryabhatiyam* (in 499 CE at the age of 23) and the *Arya-siddhanta* (a lost literary piece on astronomical computations).

¹ *Sulba/Shulva* means measurement.

He received his education in Pataliputra (Kusumapura). It is stated that he was the head of an institution (*kulapa*) at Kusumapura and because the Nalanda University was in Pataliputra and was equipped with an astronomical observatory at that time it is conjectured that he might have been the head of the University of Nalanda too. He is also known to have established an observatory at the Sun temple, Taregana/Taregna (near Patna in present-day Bihar). He authored several works on astronomy and mathematics, some of which could not be recovered and are considered lost. His major composition *Aryabhatiya* – a book on mathematics and astronomy – was extensively consulted and quoted in the subsequent mathematical literature across India and has survived to present times. The sections on mathematics encompass algebra, arithmetic, plane and spherical trigonometry. They also explain complex mathematical formulae on continued and quadratic equations, sums-of-power series etc. and provide a useful table of sines. We get glimpses of the *Arya-siddhanta* in the writings of his contemporary Varahamihira and later mathematicians and commentators like Brahmagupta and Bhaskara I. This text, it seems, was based on the older *Surya Siddhanta* and used the midnight-day reckoning, in contrast to the sunrise in the *Aryabhatiya*. It also described numerous astronomical instruments:

- 1) the gnomon (*shanku-yantra*),
- 2) a shadow instrument (*chhaya-yantra*),
- 3) both semicircular and circular angle-measuring devices (*dhanur-yantra/ chakra-yantra*),
- 4) a cylindrical stick called the *yastiyatra*,
- 5) an umbrella-shaped device (*chhatra-yantra*),
- 6) bow-shaped as well as cylindrical water-clocks.

A third text to his credit that has survived in its Arabic translation is *Al-nanf*. It states that it is adopted from the Sanskrit work by him but the Sanskrit name of the original composition is not known. It is referred to by the Persian scholar Abu Rayhan al-Biruni in his chronicles.

Aryabhata had huge influence on Indian astronomical tradition and our neighbouring cultures which translated his writings. The Arabic translation during the Islamic Golden Age (c. 820 CE) was particularly significant. Some of his explanations are cited by Al-Khwarizmi and in 10th century CE AlBiruni mentioned that Aryabhata's followers believed that the Earth rotated on its axis. His definitions of sine (*jya*), cosine (*kojya*), versine (*utkrama-jya*) and inverse sine (*otkram jya*) influenced the birth of trigonometry. As a matter of fact, the modern terms "sine" and "cosine" are adaptations of the words *jya* and *kojya* introduced by Aryabhata. As just stated, they were translated as *jiba* and *kojiba* in Arabic and then misunderstood by Gerard of Cremona while translating an Arabic monograph on geometry to Latin. He assumed that *jiba* was the Arabic word *jaib* which means "fold in a garment", L. sinus (c. 1150).

Aryabhata's astronomical calculation methods had same weight. Along with the trigonometric tables they came to be widely used in Islamic adaptations to figure out several Arabic astronomical tables (*zijas*). In particular, the

astronomical tables formulated by Al-Zarqali (11th century) – the instrument-maker and most important astronomer/astrologer in western part of the Islamic world – on the basis of Aryabhata's legacy were translated into Latin as the *Tables of Toledo* (12th century) and remained the most accurate ephemeris used for centuries in Europe. The calendrical calculations introduced by Aryabhata and his followers have been in continuous use in India for the practical purposes of preparing the *Panchangam* (Hindu calendar). In Islamic cultures they formed the basis of *Jalali* calendar devised in 1073 CE by a group of astronomers such as Omar Khayyam. The modified versions of *Jalali* are the national calendars used in Afghanistan and Iran today. Dates of the *Jalali* calendar are based on actual solar transit, just like in *Aryabhata* and earlier *Siddhanta* calendars. This kind of calendar needs an ephemeris for calculating dates. Although the dates were difficult to decipher, seasonal errors were much lesser in *Jalali* calendar than in the Gregorian calendar.

India's first satellite *Aryabhata* and the lunar crater *Aryabhata* were named to honour this great Indian scientist. Further, the Aryabhata Research Institute of Observational Sciences (ARIES) as a centre for research and training in astrophysics, astronomy and atmospheric sciences was set up near Nainital (Uttarakhand) in his name. The inter-school Aryabhata Maths Competition is also named after him, so is *Bacillus aryabhatai*, a bacterial species discovered in 2009 by the ISRO scientists.

- 3) **Brahmagupta:** His contribution holds a unique position in the history of Indian mathematics. His pioneering interpretations on Geometry and Number Theory make today's mathematicians marvel at their originality. His theorems that resulted in the calculation of circum-radius of a triangle and lengths of the diagonals of a cyclic quadrilateral, construction of a rational cyclic quadrilateral and integer solutions to a single second degree equation were ground breaking. After the Greeks ascended to supremacy in mathematics (especially geometry) during the time from 7th century BCE to 2nd century CE there was a sudden dip in mathematical and scientific enquiries and investigations during the next millennium till the age of Renaissance in Europe. But, mathematics and astronomy continued to flourish in Asia, specifically in India and the Arab world. A continued exchange of information was visible between the two cultures and later between Europe and the Arabs who had gained a lot from Indian scientific temper. An unparalleled contribution of Indian intellect was the decimal representation of positive integers along with zero that eventually travelled to the Western world despite the fact that there was some initial resistance and reluctance to accept it.

Brahmagupta is said to have spent his early days as court-astronomer to emperor Vyaghramukha. He is best remembered for his seminal composition: the *Bahmasphutasiddhanta* (theory of “the opening of the universe”) or simply the *Siddhanta*. He is credited with another work by the name *Khandakhadyaka* which he wrote later. The *Siddhanta* comprises of 1008 *shlokas* (verses) constituting 25 chapters that contain theorizations and inferences on algebra, arithmetic, geometry and number theory. He was the first to introduce zero as a digit. The *Siddhanta* was translated into Arabic and titled *Sind hind*. The *Khandakhadyaka* contains 194 verses arranged in 9 chapters that throw light on astronomical calculations. He was definitely

a prominent mathematician of his times who also had the audacity of critiquing his predecessors for their faults and omissions and rectifying them as much as he could. He authored a sequel to the *Khandakhadyaka* with some rectifications to some concepts elucidated in the *Khandakhadyaka*. He was the head of Ujjain observatory. He passed away in 668 CE.

- 4) **Bhaskaracharya:** The time-span between c.500 and 1200 CE was the best for Indian astronomy mainly because of genius astronomers such as Aryabhata, Lallacharya, Varahamihira, Brahmagupta, Bhaskaracharya and others. The *Siddhanta Shiromani* written by Bhaskaracharya is regarded as the prime-point of all astronomical treatises composed in those 700 years or so. It contains the essence of ancient Indian astronomy and mathematics. He resided in Vijjadveed (surrounded by Sahyadri hills; it was an important centre of learning during his time). His father Maheshwar taught him mathematics and astronomy. Unfortunately, today we have no clue as to where was Vijjadveed located. Bhaskaracharya composed the *Siddhanta Shiromani* in 1150 CE at the age of 36. It is a mammoth text of close to 1450 verses and is divided into four parts:

- 1) *Lilawati*,
- 2) *Beejaganit*,
- 3) *Ganitadhyaya*, and
- 4) *Goladhyaya*.

As a matter of fact, each of these sections can be deemed as separate books. One of the most important features of *Siddhanta Shiromani* is that it contains simple methods of arithmetic and astronomical calculations. A basic and crucial knowledge of ancient Indian astronomy can be had by only perusing this compendium. As such, it surpasses all the ancient Indian treatises on astronomy. Its segment *Lilawati* is an excellent example of how a difficult subject like mathematics can be laid bare in poetic language. *Lilawati* has been translated into several languages across the world.

Bhaskaracharya's inferences include the following:

- Earth is not flat, doesn't have any support and has a power of attraction.
- North and South poles of the earth experience six months of day and six months of night.
- Both one day and one night of Moon are equivalent to 15 earth-days.
- Earth's atmosphere extends to 96 kms. and is composed of seven sections.
- Beyond the earth's atmosphere there is a vacuum.
- He was aware of the precession of equinoxes.

He accurately calculated apparent orbital periods of the Sun and orbital periods of Mercury, Venus and Mars. There is a slight difference between the orbital periods he calculated for Jupiter and Saturn and the corresponding modern values. The methods and concepts developed by him are relevant to this day.

- 5) **Varahamihira (505–587 CE):** He was among the band of Indian scientists such as Aryabhata, Dhanvantari, Sushruta, Charaka and Bhaskaracharya

whose areas of expertise varied from mathematics, surgery, medicine, to meteorology. He had acquired astonishing knowledge of a whole range of technical subjects like hydrology, meteorology, astrology, astronomy and seismology. His magnum opus – the *Brihat Samhita* – throws light on all of these. The Arab scholar Alberuni translated into Arabic his another composition: the *Brihat Jataka*. He also lavished praise on Varahamihira for the richness in detail in the *Brihat Samhita*.

Varahamihira was a resident of Ujjayini. He respected learning wherever it was found and was thoroughly familiar with astrological works of the Greeks and he refers to these in his texts. His other compositions include *Pancha Siddhantika*, *Vivahapatala*, *Laghujataka*, *Yatra*. They were possibly written in that order stated. He was born in Avanti (roughly corresponding to modern-day Malwa) to Adityadasa who was himself an astronomer. It is mentioned in one of his own works that he was educated at Kapitthaka. He was one of the nine jewels (*Navaratnas*) of the court of legendary king Yashodharman Vikramaditya of Malwa who belonged to the Aulikara dynasty and held sway over much of the Indian subcontinent between c. 530-540 CE as mentioned in the Mandsaur pillar inscription.

Varahamihira was the first to state in his chief composition the *Panchasiddhantika* dated c. 575 CE that the *ayanamsa/ayanabhaga* (precession of the equinoxes) lasted for 50.32 seconds. It is a book on mathematical astronomy. It delineates the five astronomical canons prevalent around that time and provides useful information on older Indian texts on the topic which are now lost. It presents a summary of five earlier astronomical texts, namely:

- 1) *Surya Siddhanta*,
- 2) *Romaka Siddhanta*,
- 3) *Paulisa Siddhanta*,
- 4) *Vasishtha Siddhanta*, and
- 5) *Paitamaha Siddhanta*.

It is a significant work on *Vedanga Jyotisha* as well as Hellenistic astronomy that includes Greek, Roman and Egyptian elements. Alberuni explicated the five astronomical traditions on the basis of Varahmihira's theory.

Varahamihira's another influential contribution is the encyclopaedic *Brihat-Samhita* that encapsulates a vast array of topics of interest like astronomy and astrology; planetary movements, eclipses and their effects; other natural phenomena; geography and botany; clouds, rainfall and growth of crops; manufacture of perfume and cosmetics; domestic relations and matrimony; architecture and iconography; gems and pearls; characteristics of *Khadga* (sword), *Angavidya* (knowledge of the limbs); auspicious and inauspicious characteristics of people and animals, good and bad omens and the science of precious stones (gemmology).

It elucidates gemstone evaluation criterion expounded in the *Garuda Purana* and provides information on the sacred Nine Pearls borrowed from the same treatise. It has 106 chapters binding nearly 4000 *shlokas* and is eulogized as the "great compilation". Chapters XXI-XXXIX are geophysical in nature and primarily deal with meteorology that includes appropriate planetary

conjunctions, cloud formation, rainfall and its volume, signs of immediate rain, hurricanes etc.

He was an astrologer as well. He wrote about all three chief aspects of *Jyotisha* (astrology) like horoscopy. His *Brihat Jataka* is revered as among the five main compositions on Hindu astrology. It is said that the two texts of the West – the *Romaka Siddhanta* (“Doctrine of the Romans”) and the *Paulisa Siddhanta* (“Doctrine of Paul”) – influenced his mind and intellect. However, this view is debatable and contestable because we have much evidence to show that it was the indigenous Vedic thought that first motivated and impacted deductions of the astrologers of Western origin that subsequently returned to Indian land after being reformulated.

- 6) **Nagarjuna:** He was a chemist and an alchemist. The growth and development of the scientific discipline of Chemistry in India, particularly alchemy, entered an exciting phase during the age of *tantrism*. Initially centred on the worship of Siva and Parvati, it was an amalgamation of alchemical processes, on the one hand, and grotesque rites, on the other. There was also a class of *Tantras* which was a mixture of Buddhist and Saiva cults. Nagarjuna’s *Rasaratnakara* – a momentous literary piece on alchemy composed around 7th-8th century CE – belongs to this category. It deals with the preparation of *rasa* (liquids, mainly mercury). As per a *tantric* sect a person ought to preserve his body by means of mercury and medicaments. As per the *tantrics* mercury was produced through the creative conjunction of Siva and Parvati and mica was produced from Parvati. The combination of mercury and mica was believed to be symbolic of death and poverty. The *Rasaratnakara* describes alchemical processes and preparations of mercurial compounds. It also gives noteworthy information on the extraction of zinc, mercury and copper. He explains the preparation of crystalline red sulphide of mercury (*swarnasindura* or *makaradhwaja*) which was effectively and efficiently used as medicine for many diseases and disorders. He was an eminent scientist who, for the first time, not only enunciated cementation processes but also propounded zinc production by a distillation technique. In the *Rasaratnakara* he also provides a list of the apparatus used by earlier alchemists. The process of distillation, liquefaction, sublimation and roasting are also enunciated.

Alberuni states that Nagarjuna was a native of Daihak fort near Somnath who lived about a century before his time and he has eulogized Nagarjuna as being adept in *Rasayana*. Nagarjuna’s efforts were focussed on transforming base metals into gold. We are told that due to his commendable chemist activities he had acquired such a reputation that the people believed that he was in communion with gods and goddesses who had blessed him with the power of converting base metals into gold and extracting the “elixir of life”. The *Rasaratnakara* is in the form of a dialogue between him and gods.

He has discussed various combinations of liquids in this treatise. It also surveys the status of alchemy and metallurgy in India during those times. Methods for the extraction of metals like gold, silver, copper and tin from their ores and their purification are also being elaborated upon. To prepare the “elixir of life” from mercury, apart from minerals and alkalis he also

used vegetable and animal products. He highlighted the usage of vegetable acids like sour gruel and juices of fruits and bark for the dissolution of diamonds, pearls and metals. Historians look up to him as an alchemist, metallurgist, chemist and medicineman. His texts include:

- *Rasaratnakara*,
- *Rashrudaya*,
- *Rasendramangal*,
- *Arogyamanjari*,
- *Kakshaputatantra*,
- *Yogasara*,
- *Yogasataka*,and
- *Uttaratantra*.

Mahmud of Ghazni attacked India and is said to have destroyed some of these manuscripts and taken some with him. Arabs learnt the transmutation of base-metals to gold from Nagarjuna. They termed it *Al Kimia*. Medieval Europeans learnt it from them and called it Alchemy. Although Nagarjuna could not produce gold through the transmutation of base-metals, these methods did result in metals with gold like yellow lustre and yellowish brilliance. These techniques are deployed to manufacture imitation jewellery to this day.

During the latter part of his career he seems to have shifted towards organic chemistry and medicine. He wrote *Uttaratantra* which is considered to be a supplement to an earlier compendium on surgery and medicine – the *Shusruta Samahita* by Sushruta who lived long before him. The *Uttaratantra* throws light mainly on the preparation of medicinal drugs. The writing of four Ayurvedic compositions – *Arogyamanjari*, *Kakshaputatantra*, *Yogasara* and *Yogasatak* – are also ascribed to him. Many of his ideas on medicine were incorporated into the *Yunani* system of medicine of the Arabs. His contribution could not have escaped their attention. The methodology of alchemy was also, quite possibly, borrowed by them from India because their homeland was not rich in metals; thus alchemy and the knowledge of smelting of metals could not have been indigenous to them. Apart from India there is no reference to alchemy in the ancient world. There is first mention of it in medieval Europe.

They seem to have borrowed from India the technique of transmuting base-metals into gold-like metals. The Arabs called the technique *Al Kimia* which according to the Oxford Dictionary literally means the ‘transformation of metals’. *Al* means ‘The’ and *Khimia* which is derived from the Greek term *Khemia* means ‘to transmute metals’. But westerners were unaware of the technique of alchemy. This is borne out by the fact that the term Alchemy which the westerners use for describing this technique was borrowed from the Arabs. The word Alchemy is obviously a corruption of the term *Al Kimia* which the Arabs gave to the technique of converting base metals into gold like substances which they culled out from Indian texts on the subject

- 1) Discuss the achievements in metallurgy in ancient India.

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- 2) Discuss any two scientists of ancient India.

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16.7 SUMMARY

Science and Mathematics were highly developed during the ancient period in India. Ancient Indians contributed immensely to the knowledge in Mathematics as well as various branches of science. Scientists flourished in India and cultivated astronomy and mathematics and took both the subjects to their height. Baudhayana was the first one ever to arrive at several concepts in Mathematics, which were later rediscovered by the western world. The value of π was first calculated by him. What is known as Pythagoras theorem today is already found in Baudhayan's *Sulva Sutra*, which was written several years before the age of Pythagoras. Aryabhatta was a fifth century mathematician, astronomer, astrologer and physicist. He was a pioneer in the field of mathematics. Aryabhatta showed that zero was not only a numeral but also a symbol and a concept. Discovery of zero enabled Aryabhatta to find out the exact distance between the earth and the moon. He also gave a scientific explanation for solar and lunar eclipse clarifying that the eclipse were not because of Rahu and/or Ketu. In 7th century, Brahmagupta took mathematics to heights far beyond others. In his methods of multiplication, he used place value in almost the same way as it is used today.

Bhaskaracharya was the leading light of 12th Century. He is famous for his book *Siddhanta Shiromani*. Bhaskara introduced *Chakrawal* method or the Cyclic method to solve algebraic equations. Varahamihira was another well-known scientist of the ancient period in India. He lived in the Gupta period. Varahamihira made great contributions in the fields of hydrology, geology and ecology. Nagarjuna was an eighth century alchemist. In his treatise *Rasaratnakara*, he has discussed methods for the extraction of metals like gold, silver, tin and copper.

16.8 KEY WORDS

Stupa: a mound of earth; a tumuli. Originally meant to enshrine the relics of the Buddha.

Caitya: a stupa-cum-sanctuary

Vihara: monastery; living quarters of monks

Shikhara: curvilinear spire of a north Indian temple

Vimana: structure over the *garbhagrha* of a temple

Nagara: north Indian temple style

Dravida: south Indian temple style

Vesara: Mixed variety, combining *nagara* and *dravida* features in a temple.

16.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) See Section 16.2
- 2) See Section 16.4

Check Your Progress Exercise 2

- 1) See Section 16.5
- 2) See Section 16.6

16.10 SUGGESTED READINGS

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UNIT 17 ECONOMY AND TRADE*

Structure

- 17.0 Objectives
- 17.1 Introduction
- 17.2 Post-Mauryan Period
 - 17.2.1 Trade
 - 17.2.2 Coinage
 - 17.2.3 Crafts and Craft Production
 - 17.2.4 Agriculture
 - 17.2.5 Urbanization
- 17.3 Gupta and Post-Gupta Period
 - 17.3.1 Land Grants
 - 17.3.2 Trade
 - 17.3.3 Coinage
 - 17.3.4 Urban Processes
 - 17.3.5 Craft Production
- 17.4 Summary
- 17.5 Key Words
- 17.6 Answers to Check Your Progress Exercises
- 17.7 Suggested Readings

17.0 OBJECTIVES

In this Unit we shall study economic trends in the period between c.200 BCE to 750 CE. After reading this Unit, you will be able to learn about:

- changing patterns of agricultural ownership;
- the process of urbanization;
- nature of external and internal trade;
- coinage system; and
- the debates on economic processes.

17.1 INTRODUCTION

The period between c.200 BCE to 750 CE can be divided into two parts from the viewpoint of economic processes and trade activities:

- 1) Post-Mauryan
- 2) Gupta & post-Gupta

In terms of economic trends the post-Mauryan phase was completely different from the Gupta and post-Gupta era. It was characterized by a high degree of urbanization achieved through intensification of various economic processes like

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trade, crafts, monetization and agriculture. The Gupta and post-Gupta epoch, on the other hand, was distinguished by agrarian economy based on land-grants. However, according to the Feudalism school, accompanying this agrarian expansion was the decline of urban centres, trade and coinage. This led to the localization of economy characterized by self-sufficient units. These developments first started during the Gupta period and reached their zenith under post-Gupta time. However, the absence of urbanization, trade and coinage in this period has become extremely debatable. We will study the two periods and debates on them in greater detail below.

17.2 POST-MAURYAN PERIOD

In order to reconstruct the history of the post-Mauryan period between c.200 BCE to 200 CE a variety of sources are available, including both foreign as well as indigenous sources. Among the former, the most important is the *Periplus of the Erythraean Sea* which gives rich data on sea trade between India and Rome. Some aspects of this trade can be understood from works by Classical writers like Pliny and Tiberius. Among indigenous sources *Jataka* stories are considered to be a rich source on understanding the trade and lives of traders. Other than this, some important information can be gleaned from other Buddhist texts like *Milindapanho*, *Divyavadana*, *Mahavastu*, *Avandanashataka* and *Lalita vistara*. Texts like *Manusmriti* and *Mahabhasya* are also significant. But, donor inscriptions are the most noteworthy in this regard. They record donations made by the merchant and artisan class. Though most archaeological sites have been excavated vertically, some important information about the nature of urban settlements can still be gathered from them. Besides, rich hoards of coins of various dynasties have also been discovered that throw light on commercial activities during this period.

17.2.1 Trade

The most significant development of this period in the economic sphere was increase in the volume of international trade. India had trade links with the Western world as well as Southeast Asia. In the western world most of the trade was with the Roman empire. This is attested by both classical sources as well as archaeological data.

Trade was conducted through both land and sea routes. Sea route was possibly more important. Trade started from the ports in Egypt and ended on the ports located on the eastern coast of India. An account of this journey is preserved in the *Periplus of the Erythraean Sea*. It has been suggested that India was a major contributor to this trade and exported items like:

- pepper,
- sapphire,
- turquoise,
- lapis lazuli,
- diamond,
- onyx,
- textiles of cotton, muslin and silk acquired through China,
- ivory,

- pearls,
- tortoise shells etc.

Some of these goods like grains, oils, iron and steel, teak, ebony were also exported to ports in Iran, Arabia and Africa. Trade was also conducted on land, with north India participating in the famous Silk Route trade between China and Rome. In return, India acquired huge quantities of Roman gold (*aurei*) and silver (*denarius*) coins causing significant drain of wealth from Rome. This has been lamented by Classical writers like Pliny and Tiberius. The process of drain is further confirmed by the discovery of Roman coin hoards in south India.

India imported the following goods:

- tin,
- lead,
- copper,
- antimony,
- realgar (ruby sulphur or ruby of arsenic),
- orpiment,
- storax (also known as styrax),
- silverware,
- glassware,
- coral,
- linen,
- topaz,
- slaves, and
- wine.

Wine was carried in Roman amphorae ware, rouletted ware and *terra sigillata* recovered from several parts of India. Southern and eastern part of the Indian subcontinent also acted as an intermediary between Rome and Southeast Asia. The *Periplus* informs us of traders from Southeast Asia bringing goods like spices, ivory, tortoise shell, sandalwood, cinnamon and cassia which were further acquired by Romans.

In facilitating this trade an important role was played by Buddhism and its monasteries. D.D. Kosambi was the first to comment on this link. According to him, the monasteries were important consumers of items like cloth and materials required in rituals; hence they created demand for these goods. At times, if required, they could also provide merchants with the required capital or loans. It is important to note that the monasteries were located on important trade routes. Some archaeological finds even indicate the involvement of monks in trade. In one monastery at Devnimori in Gujarat, Roman amphorae sherds with traces of wine were discovered. A monastery located in Pushkalavati even had a room full of distillation apparatus. Scholars believe that it could have been a storehouse or even a workshop for liquor manufacture. H.P. Ray, in addition, argues that compared to Brahmanism, Buddhism was more liberal towards trade. It did not have strict dietary taboos and also did not ban inter-dining which was suited to the requirements of trade.

India also had a significant amount of internal trade. It was conducted along two routes:

- 1) the great northern route (*uttarapatha*)
- 2) the great southern route (*dakshinapatha*)

Uttarapatha started from Pushkalavati (modern Peshawar) in the north-west and ended up at Tamralipti (Tamluk in Bengal), connecting various important cities in the present-day Punjab, Rajasthan, Haryana, Uttar Pradesh and Bihar. One arterial route connected Kaushambi with Ujjaini in the Deccan. From Ujjaini another route went to the south called *dakshinapatha*. Several products were exchanged along these routes. A variety of textiles were traded. *Jatakas* praise the silk, muslin and cotton cloth produced at Varanasi, woolen textiles from Punjab and blankets from Gandhara. The *Arthashastra* speaks highly of the fine cloth of Madurai and Kanchi. War animals like horses and camels were acquired from north-western region, while elephants were acquired from eastern and southern India. The western portion of the subcontinent was also known for steel weapons. South India was known for gemstones like diamond and pearls and the presence of gold mines.

17.2.2 Coinage

An increase in trading activity also led to widespread usage of metallic currency. A wide range of coins of different dynasties have been recovered across the subcontinent. Some of these are of punch-marked variety issued by the *ganasanghas* in modern Rajasthan and Punjab and by kingdoms in the far south – Cholas, Cheras and Pandyas. But, a vast majority of them were created according to a new technique – “die-struck” – introduced by the Indo-Greeks ruling in the north-west. Die-struck coins were issued by the *nigamas* at Taxila, Varanasi, Kaushambi and Vidisha. In north, the Kushanas, for the first time in Indian history, issued a large number of gold coins. The weight of these coins was based on Roman gold coins. They also issued few copper coins. In Deccan the Satavahanas issued a variety of coins made of:

- silver,
- copper,
- lead, and
- potin.

Besides these, large hoards of Roman coins, as evidence of brisk trade, have also been found in south India. It is believed that these were mainly used as bullion in India.

17.2.3 Crafts and Craft Production

Another significant development in post-Mauryan period was an increase in the number of crafts. The contemporary Buddhist treatise *Milindapanho* mentions the presence of 75 different occupations, of which almost 60 were crafts. This is in sharp contrast to only 12 crafts mentioned in a 6th century BCE Buddhist compendium *Digha Nikaya*. The list in *Milindapanho* enumerates crafts like:

- potters,
- basket-makers,

- salt-gatherers,
- tanners,
- ivory-workers,
- rope-makers,
- comb-makers,
- cotton thread spinners,
- bow manufacturers,
- bow string makers,
- arrow fletchers,
- painters,
- dyers,
- dye-manufacturers,
- tailors,
- weavers,
- grass cutters,
- hewers of wood
- smiths of gold, silver, iron, lead, tin, copper, brass and ivory.

It also indicates that within a craft each task was specialized. This proliferation is also supported by donor inscriptions of this time recovered from Buddhist *stupas* and monasteries. In the treatise we find mention of craftsmen like:

- carpenters (*vaddhaki*),
- bamboo-workers (*vasakara*),
- reed-workers (*konacika*),
- perfumers (*gandhika*),
- cloth-makers (*pravarika*),
- oilmen (*tilapisaka*),
- garland-makers (*malakara*),
- jewelers (*manikara*),
- ivory-workers (*dantakara*),
- goldsmiths (*suvarnakara*), and
- blacksmiths (*lohikakaruka*).

One factor for such proliferation was the specialization of specific tasks within a craft, as mentioned earlier. For example, in textile sector there were separate people performing the task of spinning, weaving and dying.

These crafts were organized into guilds, identified in the inscriptions as:

- *shreni*,
- *nigama*, and
- *goshthi*.

Their presence is also known from the *Jatakas*. Compared to the Mauryan period they now played a far greater role in economy. In the Mauryan period the state

regulated guilds through special officers who ensured quality of goods and also determined their prices. In this period, these tasks were now performed by *guilds*. In addition, we also find that guilds acted as banks. Inscriptions in Nasik record money deposited with a weavers' guild, the interest of which was paid for the upkeep of a nearby monastery.

However, one sphere where the state still maintained its monopoly was the mines. This is known from Classical accounts like *Periplus*, from which we know that pearl fisheries under the Pandyas were worked upon by prisoners. Similarly, Ptolemy informs us that diamond mines were under the control of Kushanas. Besides the mining of precious stones we also know that the state controlled the mining of salt. However, Ranabir Chakravarti also points out the instances of salt tax. This meant that along with the state there was also some private initiative involved in its production. Further, from the *Jatakas* we also come to know that the state still fixed prices for the goods important to it, like horses and jewels.

17.2.4 Agriculture

Supporting this massive expansion in craft and trade activity was agriculture. This sector, too, saw rise of private initiative. In Mauryan period we know that the state encouraged expansion of agricultural land through policies like *janapadanivesha*. It provided tax relief, tools and seeds for cultivation. In this period we hardly hear of *janapadanivesha*. Instead, we know from *Manusmriti* that land belonged to those who cleared it. *Milindapanho*, too, refers to individuals clearing the forest and making the land cultivable. Under the Satavahanas there are inscriptions recording individuals donating land to the *sangha*. The rise in private ownership did not mean decline in royal ownership. There are references to *raja-khettam* (crown land). And we also have instances of rulers donating land to religious establishments.

17.2.5 Urbanization

From the above discussion you can understand and discern that this period was marked by the rise of private initiative in agriculture and craft production. Also, there was an increase in the quantity of craft production as well as the volume of external and internal trade. The intensification of these economic processes led to massive urbanization throughout the subcontinent. For the first time in the archaeological data we notice the development of cities outside the Gangetic plain. These new cities were:

- Chandraketugarh, Tamralipti or Tamralipta and Mangalkot in Bengal,
- Sisulpalgarh in Odisha,
- Satanikota, Nagarjunakonda in Andhra Pradesh,
- Kaveripattinam, Kanchipuram, Madurai in Tamil Nadu etc.

Some scholars like R. S. Sharma and B. D. Chattopadhyaya have credited Mauryan expansion with the increase in urbanization. Sharma argues that Mauryans introduced urban infrastructure like fire-baked bricks and ring wells (for supplying water as well acting as soakage pits) in new regions which facilitated new settlements. Chattopadhyaya has used the concept of secondary urbanization to explain this process in Bengal. This means urbanization that occurs in the periphery through regular interaction with an already developed urban

centre, which in this case was the Gangetic valley. The development of urbanization in this period is often seen as acme of the second urbanization which dates to 6th century BCE.

Check Your Progress Exercise 1

- 1) Discuss India's internal and external trade in the post-Mauryan period and what role did Buddhism play in it?

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- 2) Analyze *Milindapanho* as an important source of information on crafts and craft-specialization during the post-Mauryan times.

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17.3 GUPTA AND POST-GUPTA PERIOD

For information about the economy during this period we have Sanskrit sources:

- i) law-books (*smritis*) of Narada, Vishnu, Brihaspati and Katyayana
- ii) technical works like *Amarakosha*/*Namalinganushasanam* (a dictionary-cum-thesaurus), *Krishi Parashara* (a literary composition on agriculture)
- iii) *kavya* literature such as *Abhijnana Shankuntalam*, *Devichandraguptam* and others.

Since this period saw the final composition of the *Mahabharata*, *Ramayana* and Puranic literature we can use these, too, to understand this period. It also witnessed composition of Tamil epics like *Silappadikaram* and *Manimekalai*. Along with them we also have travelogues of several foreign visitors; most significant being Chinese Buddhist monks like Fa-hsien who visited during the Gupta period and Huien Tsang who visited India during Harsha's reign. From 9-10th century CE there were several Arab travellers like Sulaiman, Al-Masudi, and Al-Biruni who have left important accounts.

In addition, historians are also aided by ample epigraphic data recording grants of land to religious establishments and officials. Majority of these are in form of copper plates. We also have some excellent numismatic data.

17.3.1 Land Grants

The Gupta and post-Gupta phases are marked by expansion of agriculture and changes in its organization. The chief factor for this was the large number of

land-grants given to religious establishments and officials. This practice was first recorded under the Satavahanas who gave a few grants to the Buddhists. In this period it became more widespread. Under the Guptas land-grants first became popular in peripheral areas like Madhya Pradesh and Bengal. The grants in Bengal were mainly given by individuals with the approval of central authority. Interestingly, the recipients were granted exemption from royal taxation. The grants made in Madhya Pradesh were by Vakatakas, the feudatories of Guptas. Compared to the Guptas the conditions of these grants were even more generous. Along with taxes the state also gave up the rights to mines, pastures on land along with the right to govern the inhabitants. Under the post-Gupta polities land-grants were also given to officials. The law-book of Brihaspati recommends grant of land to capable, brave officials. Huien Tsang informs us that under Harsha high officials had land assigned to them. We also have epigraphic data regarding land-grants to officials under the Gurjara-Pratiharas and their successors. Such inscriptions were also issued under the Palas and Rashtrakutas.

The impact of land-grants has generally been thought to be beneficial to agriculture. The epigraphs inform us that lands like *khila*, *aprahata*, *bhumicchidranyaya* and *avanirandhranyaya* were granted. These terms mean uncultivated land and this implies extension of land under cultivation. Further, these grants also mention names of several non-Sanskritic villages which indicates that these villages were on the periphery. The grants to brahmanas proved to be advantageous in many ways: they helped in integration of tribes into the society as peasants. Primarily of north Indian background, they brought advanced agricultural practices of the Gangetic plains to new areas. From texts like *Krishni Parashara*, *Brihat Samhita* of Varahamira, *Agni Purana*, *Vishnudharmottara Purana* we know of the usage of better quality seeds, fertilizers and ploughs. We also know of the undertaking of irrigational activities like building of dams, tanks, ponds, embankments and step wells. There was also an increase in the number of crops cultivated. From *Amarakosha* we come to know of a variety of lentils, rice, wheat, fruits and vegetables that were cultivated. So, the result of all this was agrarian expansion on a massive scale.

17.3.2 Trade

This time-span was marked by important changes in the pattern of external and internal trade. The flourishing Indo-Roman trade declined due to the decline of the Roman empire. From 6th century CE trade links were established with its eastern successor – the Byzantine empire. Coins of this empire have been recovered from Coimbatore. This trade, instead of Red sea, was now carried along the Persian Gulf. This also led to the involvement of Sassanid empire in this trade. From Christian topography we come to know of important ports on western coastline like:

- Kalliena (Kalyan in Mumbai), and
- Sibor (Chaul in Mumbai).

India during this period mainly exported silk and spices. On the east coast it continued to have flourishing trade links with Southeast Asia. The two ports – Kaveripattinam in Tamil Nadu and Tamralipti in Bengal – played a major role. The flourishing trade is testified by contemporary Tamil epics *Silappadikaram* and *Manimekalai* which mention large number of craftsmen and foreign merchants living in Kaveripattinam.

The brief revival of trade with Byzantine, according to the feudal school of thought, declined due to these factors:

- 1) Firstly, in 6th century CE Byzantine empire learnt the art of rearing silk worms from China which reduced its dependence on foreign trade.
- 2) Secondly, the expansion of Arabs under Islamic banner to Egypt, Syria, Iraq and Iran further disrupted the trade. It revived only from 10th century CE onwards.

However, K.N. Chaudhari has noted the positive impact of Islamic expansion and subsequent uniting of regions in Egypt, north Africa, Syria, Iraq and Iran under Umayyads and Abbasids. He sees this entire region being united under Arabic language which facilitated exchange. Also, the expansion of Islam led to rapid urbanization in these areas. The new urban centres significantly increased the demand for luxury goods. On the other end, from 7th century CE onwards China, under dynasties like T'ang and Sung, also encouraged western trade through land and sea routes. The Arab world demanded:

- Chinese goods like porcelain, silk, jade, paper;
- Indian goods like pepper, teak, coconut coir, rice grain, iron, cotton textiles, muslin; and
- Southeast Asian goods like sandalwood, spices.

In return, the Arabs provided:

- incense,
- horses,
- tin,
- silver, and
- gold.

Indian ports, on the western and eastern coast, acted as intermediaries between the Arabs and Chinese and also facilitated exchange with Southeast Asia.

One important information comes from charters which were given to the traders by different dynasties in this period. On the basis of these charters the feudal school has argued for the feudalisation of trade. It was now oriented towards serving local economic units. It means that the trade largely catered to local needs, leading to the rise of self-sufficient units. Merchant charters dated from 6th century CE onwards in western India forbade them from competing with one another. This meant that a merchant guild monopolized trade in a particular area. They were also given privileges like exemption from dues, freedom to deal with labourers and control over artisans. The state, however, still determined the price of the merchandise bought by it. The 8th century charters from south India even appointed merchants as managers of town and villages. This meant decline in trade, as merchants were increasingly playing the role of landlords than traders.

The theory of localization of trade has not got support from other scholars. According to Ranabir Chakravarti epigraphic data indicates emergence of *mandapikas* in northern and western India which were centres of internal exchange. These have been mentioned in epigraphic records recovered from Kangra, Gwailor, Bharatpur, Jabalpur, Nadol, Jalore, Kathiawad. Some of these

were associated with large urban centres at Siyadoni, Bilhari and Anhilwara. The most significant exchange consisted of essential commodities like oil, salt, liquor, fish, crops and luxurious items like horses, camel, elephants, spices, gems and textiles. Their commercial significance is highlighted by the collection of tolls and taxes in these areas. In the Deccan and far south such centres were known as *pentha* and *nagaram*.

17.3.3 Coinage

Linked with the decline of trade is the thesis of decline of coinage. Most of the coins discovered from the Gupta period are gold and silver coins. The quantity of gold in these coins was, in fact, higher than that of Kushana gold coins. It was raised to 144 grains from 124 grains. However, very few copper issues of the dynasty have been discovered. R. S. Sharma points out that gold coins are more likely to have been used for large transactions like buying land. For everyday transactions copper coins were more suitable. This implies that everyday exchange might have been carried out through barter or cowry-shells. But, by the post-Gupta period there is a complete decline in the use of coins. We hardly find any issues of Harsha, Palas, Gujara-Pratiharas and other post-Gupta dynasties.

The lack of currency has drawn attention of several other scholars. It has been argued by R. C. Wick that even after the decline of Gupta dynasty its coinage was still used in north, east and central India. Few 7th century coins issued by Harsha, Jayanaga, Shashanka have also been reported. In southern Bengal numismatist B. N. Mukherjee also discovered excellent silver coins used between the 7th to 13th centuries. Some of the coins of this period were introduced by Hunas which, in turn, were influenced by the Sassanids. Several Indo-Sassanid coins have been discovered. One such series – “*Gadhaiya* coins” – were circulated in north and western India. These were initially made of silver but in the later period we have debased silver, copper and billon (alloy of a precious metal – most commonly silver but sometimes also mercury – with a majority base metal content such as copper). They were issued by private merchants as well as the state. Another series were probably in use under Gurjara-Pratiharas. Some of their inscriptions mention coins like:

- *vigrahapala*,
- *dramma*, and
- *adivaraha dramma*.

According to numismatists these are billon coins with varied silver content. John S. Deyell has reported nearly 46 such hoards. In south India, however, we have not discovered any coins of Pallavas, Pandyas, Chalukyas of Badami and Cholas. We have discovered coins for Eastern Chalukyas from 7th century CE. Most of the finds of the other dynasties date between 10th-13th centuries. But, Chattopadhyaya has drawn attention to many southern inscriptions mentioning different denominations of coins.

It is very difficult, indeed, to decide on whether there was a decline of coinage in this period or there is lack of archaeological work. It may be possible that more coin hoards will be discovered in future. Meanwhile, we cannot deny the increasing usage of barter and cowry shells for the purpose of trade. These are testified by the accounts of Chinese and Arab travellers.

The nature of urban processes in this period is debatable. According to Sharma this period was characterized by decline of urban centres and de-urbanization. This occurred gradually in two phases. The first phase, between c.350-400 CE, coincides with the rise of Gupta empire. Archaeological study records the desertion of sites or decay in the standard of early historic settlements. Some sites like Bara, Hastinapura, Sohgauna, Kapilavastu, Kusinagara, Chirand, Sisupalgarh, Tamralipti, Brahmagiri and others were completely deserted. Some of these desertions were also noted by Huiyen Tsang. Other sites like Purana Qila, Mathura, Taxila, Varanasi, Sringerapur, Vaishali also show signs of decay. Sharma assesses this through various ways. Most common among them is assessing the decline in the quality of building material used. In Mathura, for instance, houses were now built with brick-bats and mud. At Purana Qila the inhabitants reused bricks from older structures.

Sharma has attributed this to two factors:

- 1) Decline of Indo-Roman trade
- 2) Kali Age crisis.

The decline of Indo-Roman trade lessened the inflow of bullion into the subcontinent. This naturally lessened the income of artisans, traders and the state. This may explain the decay and desertion of urban centres. It forced the state to tap into agriculture for extra income. This is supported in the epigraphic data where a large number of taxes like *bhaga*, *bhoga*, *kara*, *bali* and *halivakara* were collected. Further, the state also followed the policy of expansion of agriculture into the hinterland through land-grants. But, the rise of taxation led to revolts in the rural areas, as recorded in the historical sources as the Kali Age crisis. The lower castes refused to pay taxes. As a result, income of the state declined further and the state couldn't pay salaries to priests, soldiers, officials. This decreased the purchasing power which, again, negatively affected the income of artisans and traders.

The twin crisis fully matured in the post-Gupta period. By this time there was a complete decline of foreign trade. We do not have trade links with either Byzantine empire or Southeast Asia. Also, the Kali Age crisis had progressed significantly, leading to large-scale land-grants to monasteries, temples and brahmanas. So, as opposed to the post-Mauryan times when there were donations by traders and artisans maintaining religious establishments, now there were agricultural grants maintaining them. This shift also reflects the decline of crafts and trade and increasing importance of agriculture.

Sharma's theory of urban decline has attracted criticism of other scholars. Upinder Singh argues that for the Gupta age it is hard to imagine a picture of urban decline. The contemporary Sanskrit and Tamil literature is full of descriptions of urban life. In *Mrichchhakatika* (meaning the "Little Clay Cart", a Sanskrit drama attributed to Sudraka of 5th century CE that revolves around the story of rich courtesan Vasantsena and poor brahmana Charudatta) the heroine lives in a beautiful, lavish house in Ujjain. Tamil epics like *Silappadikaram* describe the markets in Puhar and Madurai. However, Singh points out to the paucity of archaeological evidence regarding the decay of cities.

There is another set of scholars who believe that the post-Gupta period was marked by the revival of urban centres (third urbanization). According to Chattopadhyaya the epigraphic data from Gurjara-Pratihara kingdom has brought to light urbanization in upper Ganga basin, Indo-Gangetic divide and the periphery of Malwa plateau. In Indo-Gangetic divide the inscriptions identify Prithudaka or modern Pehoa near Karnal as a site where a regular fair for trading horses was organized. It was probably a *nigama* (market town). In upper Ganga basin he identified Tattanandapura (modern-day Ahar) as an urban centre from the use of suffix *pura*. Inscriptions at the site are dated between c. 867-904 CE. They give us valuable information about the layout of the settlement which consisted of a number of big and small roads, some leading to market areas (*hattamargas*). Most prominent of the markets was the eastern market (*purvahattapradesha*) which implies the presence of other market areas. The records also describe various kinds of buildings like shops, residences and temples built of bricks. Excavations at the site have confirmed the usage of burnt bricks, along with iron and copper objects and early medieval coins.

A similar town identified in the records is Siyadoni in the Jhansi district, Uttar Pradesh. It was a commercial centre, bigger than Ahar, consisting of several *hattas* (market places) where there were shops owned by traders and different craftsmen. One area of the town was exclusive to the merchants identified as *vanijonijarathya*. Another important town was Gopagiri which was an important political as well as commercial centre. It was a fort town looked after by *Kottapalas* (superintendents of forts) and *Baladhikritas* (commanders of army). It was also a residence for merchants, some of whom were part of the local administrative council. In manufacture the town was known for oil-making. It had residential areas and two market places reserved for oil-millers.

Similarly, in south India there was revival of urban centres under the Cholas from 9th century CE. A majority of them were centered around temples built either by the Cholas or their subordinates to legitimize their power. These could be a single temple or a complex of multiple temples. Many of these received land-grants, monetary grants and gold for their maintenance. Some of this was reinvested in land and trade. The involvement in such activities led to the emergence of urban complexes in the premises of these temples. The temples became grand structures, incorporating within them smaller shrines, hospitals, buildings for educational and cultural purposes. Further, the demand made by these establishments for grain, luxury goods and local items led to the emergence of these as centres of trade and even encouraged settling down of craftsmen in their vicinity. Apart from temple towns, few towns also owed their origin to the revival of trade. Some of older towns like Korkai, Kaveripattinam retained their significance but there was also the rise of new port-towns like Nagapattinam and Mamallapuram developed by Cholas and Pallavas respectively. In addition to them, there were also centres facilitating internal trade that were known as *nagarams*. Few of these also evolved as cities like Kanchi. Some of them became areas of craft activity and craft specialization.

However, a critique of this theory has been given by D.N. Jha. He states that the urban centres such as Pehoa/Prthudaka, Tattanandapura (Ahar), Siyadoni (Jhansi), Gopagiri etc. as pointed out by Chattopadhyaya date to 9th and 10th centuries. So, this dating does not contradict the decline of towns during Gupta epoch. Sharma

postulates the collapse of urban centres between c. 400-1000 CE and argues for their revival from 10th century CE onwards.

17.3.5 Craft Production

The presence of several crafts in the Gupta and post-Gupta times can be discerned from archaeology, epigraphy as well as texts like *Amarakosha*. The most important craft was pottery as indicated by large number of finds from Rajghat, Ahichchhatra and Bhita. Another important craft was iron-smelting. The advancement in this metallurgy is visible from the fine specimen – the Mehrauli iron pillar in Delhi. *Amarakosha* also mentions others craftsmen like goldsmiths, garland-makers, potters, brick-layers, washermen, weavers, tailors, painters, shell-cutters, carpenters etc. In terms of organization there existed guilds as well as specialized settlements as names of places like Lohanagara indicate. In post-Gupta period we see the emergence of sugar-making and oil milling as important industries. Some of the sugar products like molasses and candy were even exported to West Asia and China. A record, dated 930 CE, preserved in Bangladesh tells us about expert craftsmen like leatherworkers, carpenter, washermen, florists and blacksmiths. Just like the previous period, iron-smelting and textiles continued to be significant industries.

In the opinion of the feudal school, the position of artisans declined in this period. The collapse of trade and subsequent urban decay encouraged their migration to rural areas. One often cited example is the migration of silk weavers from Gujarat to Malwa in search for better livelihood. This may have happened due to the decline of external trade. Another factor that worsened their condition was the restriction on their mobility. The land-grants to temples, priests, officials and merchants often transferred to the beneficiary the right to extract labour from artisans. In fact, the beginning of *jajmani* system could be traced back to this period.

Check Your Progress Exercise 2

- 1) What role did land-grants play in the expansion of agriculture during Gupta and post-Gupta era?
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- 2) How different are the Gupta and post-Gupta centuries from the post-Mauryan period in the context of economy and trade?
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17.4 SUMMARY

There is no doubt among scholars that the post-Mauryan period from c.200 BCE to c. 200 CE registered huge economic growth marked by flourishing external as well as internal trade. There was ample growth in craft production and specialization leading to massive urbanization throughout the subcontinent. However, economic processes of Gupta and post-Gupta times are still debatable. While there was expansion of agriculture through land-grants in this period, the decline of trade, coinage and urban centres is a matter of contestation and disagreement.

17.5 KEY WORDS

Billon: alloy of copper with either silver or gold.

Bullion: gold, silver or any other precious metal in bulk before coining or valued by weight.

Guild: an economic organization of people following the same craft. Such an association gives an artisan/trader greater bargaining power and security.

Potin: alloy of copper, tin and lead.

Topography: study of the shape and features of land surfaces; arrangement of physical features of a geographical zone.

17.6 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) See Sub-section 17.2.1
- 2) See Sub-section 17.2.3

Check Your Progress Exercise 2

- 1) See Sub-section 17.3.1
- 2) Consult Section 17.3 comprehensively.

17.7 SUGGESTED READINGS

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UNIT 18 ENVIRONMENT, FORESTS AND WATER RESOURCES*

Structure

- 18.0 Objectives
- 18.1 Introduction
- 18.2 Environment
- 18.3 Forests
- 18.4 Water Resources
- 18.5 Summary
- 18.6 Key Words
- 18.7 Answers to Check Your Progress Exercises
- 18.8 Suggested Readings

18.0 OBJECTIVES

After reading this Unit, you will know:

- the perspectives on environment through the study of a few historical sources pertaining to both north and south India;
- how forests have been envisioned and perceived in our ancient historical tradition;
- the significance of rivers and management of water resources through irrigational activities; and
- Indian model of eco-friendly living of people of the past.

18.1 INTRODUCTION

This Unit covers the time-frame between *c.* 200 BCE and *c.* 750 CE. The lives and activities of people of early India were greatly impacted by their environment. They were very close to nature and natural resources. It can be gleaned from textual sources like *Arthashastra*, *Manusmriti*, *Brihat Samhita*, the Epics *Ramayana* and *Mahabharata* and many others. These works highlight notions about environmental conservation, interaction with diverse biological entities, forest ecology, agricultural produce, water management etc. It is quite apparent that people strove towards developing effective measures to safeguard their ecosystems and engage in sustainable development. In this Unit, we will try to analyze how they had a sound understanding of ecology through a study of environment, forests and water resources.

18.2 ENVIRONMENT

Conceptualizing Environment:

It is relevant here to understand how societies, cultures and communities in ancient period visualized and identified their environment. What were the popular ideas

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concerning environment which helped them to deal with adverse situations? We can convincingly postulate that everything related to nature, such as ecology, landscape, water, winds, vegetation, bio-diversity etc., should be an object of study while studying environment. It is significant to remember that researches into the environmental history of ancient India have taken stock of environment and its multifarious aspects. These include close linkages between history and geography; impact of historical developments on natural environment and environmental practices and vice-versa; relationship of the process of state formation; state and societal interventions in natural environment and topography; settlement patterns; botanical and zoological knowledge; interaction between civilizations and natural resources; control over such resources and its nature and purpose; policies and regulations for resource use; demand for forest products and its impact on forest inhabitants and their livelihood; tribal relationships and notions of the ownership of forest and its resources; incorporation of forests into the state ambit for political, economic, administrative, military and strategic reasons; royal hunts in the forests; stable and dynamic facets of land use; agrarian production and extension of agriculture to virgin tracts of land; land reclamation; possible changes in the tribal habitat and “peasantization” of the tribes of peripheral zones; peasant economy; water-control; harvesting of water resources and irrigational works; their ownership, management of and association with increasing agrarian output; irrigation technology; importance of pastures or grasslands as a source of revenue; pastoralist culture, pastoralist specialization, pastoralist activity, pastoral nomadism and agro-pastoralism; influence of ecological settings on the distribution of land-grants; damage to environment in the form of deforestation; its causes, extent and pace; denudation of native tree cover; resource depletion; soil degradation; forest clearance for agriculture; environmental preservation in the form of conservation of depleting natural reserves, forests, flora and fauna etc. Even seemingly disparate historical processes like emergence and proliferation of castes, rise of religious and philosophical sects and evolution of regional art styles have been studied in the context of environment. Covering all these aspects in this Unit would be well nigh impossible. We will limit our analysis to the study of the perspectives the ancient Indians had towards environment as reflected in a few prominent historical sources of the period under study.

Arthashastra

The *Arthashastra* is a treatise written in the form of Sanskrit prose on statecraft, governance, economic policy and military strategy. Its authorship is attributed to Kautilya (Chanakya in common parlance) and it is believed to have been composed, compiled, redacted and codified between 2nd century BCE and 3rd century CE. It is used extensively to reconstruct Mauryan history. However, it may also be used to study the state of affairs in the post-Mauryan times, when it was given its final shape and form. There is a debate whether it describes the actual functioning of the state or an ideal state. However, even if it points to an ideal order, the vast mine of information on environment supplied by it indicates that people of those times must have inculcated and developed such knowledge.

Kautilya informs us that people were aware of rainfall patterns, soil types as well as appropriate irrigation techniques. He divides the landmass between the Himalayan range in the north and oceans in the south, south-west and south-east into the following geological regions:

- 1) Village areas (*grama/gramya*),
- 2) Mountains (*parvata*),
- 3) Forests (*aranya*),
- 4) Dry lands (*bhauma*),
- 5) Humid or wet lands (*audaka*),
- 6) Plains (*sama*), and
- 7) Uneven lands (*visawa*).

The text displays knowledge and concern about various living creatures – plants and vegetation, wild and domestic animals – and both punishments and penalties are prescribed for causing harm to them. It ordains appointing supervisors of cattle, elephants, horses and pastures to perform duties like protecting wildlife and preventing poaching of wild animals, ensuring adequate rationing to domestic animals and their proper care, compliance to norms regarding dealing with pet animals by their owners, regulating grazing by cattle etc. One of the responsibilities of the village-headman (*gramika*) was to prevent cruelty to animals.

It also advocates using non-agrarian lands as sanctuaries/animal parks where animals were to be given complete protection and their killing or capture was forbidden. It enlists a wide range of protected birds, animals and fish. It meticulously gives details of training, care and treatment of cows, elephants and horses¹. The king is advised to safeguard forests (particularly elephant forests), mines and irrigation works as well as to establish new ones.

Manusmriti

The *Manusmriti* (2nd century BCE-3rd century CE), also known as *Manava Dharmashastra*, is one of the numerous *dharmashastras*². It is believed to be a discourse by brahmana thinkers, ideologues and jurists like Manu and Bhrigu on laws, rights, duties, conduct, virtues and various other topics. Critiqued otherwise for its patriarchal tone and caste discrimination, the text has good deal of material on environment. It defines biodiversity as all living forms classified as *chara* (movable living organisms) and *achara* (immovable plant world). It highlights the importance and value of underground stems and tuberous roots, fragrant flowers, nourishing and tasteful fruits, leafy vegetables, trees yielding timber, various crops etc. Like the *Arthashastra*, it too lays down punishments of different kinds for causing harm to plants and trees. It mentions birds of various kinds:

- village habitat birds,
- diving birds that feed on fishes,
- web-footed birds,
- birds with striking beaks etc.

It also refers to a range of animals including solitary moving animals and one-hoofed animals. It states that killing of particularly horse (*ashva*), goat (*aja/ajaa*), buffalo (*maha*), elephant (*ibha*), deer (*mriga*), ass (*khara*) and camel

¹ Kangle, R. P. (1986). *The Kautilya Arthashastra: Part I and II*. Second Edition. University of Bombay.

² Ancient Indian compendiums of moral laws and principles for religious duty and righteous conduct to be followed by a Hindu.

(*ushtra*) is a crime. It, thus, pays adequate attention to the protection of flora and fauna. It attaches importance to biodiversity conservation in general, protection of both domestic and wild animals and vegetarian food habits.

Epics and Puranas

The two great Epics (c. 500 BCE-500 CE) – *Ramayana* and *Mahabharata* – are used by historians to cull significant information on polity, social structure, social practices and norms current at the time, philosophy, cultural characteristics like customs and traditions, religious sects, aspects of economic and environmental history etc. that cannot be dubbed and sidelined as “non-history”. They are believed to have been compiled and given their final form around 4th-5th centuries CE. Krishna in *Bhagvad Gita*³ compares the world to a Banyan tree with endless branches in which all demigods, humans and animals reside. It underlines the idea of community ecology. Vrindavana was known for its groves of *Amlaki* (Indian gooseberry), *Peepal*, *Kadamba*, *Tamal* and *Vata* (Banyan). He refers to the Banyan and *Pipal* trees as keystone resources.

He is said to have been an ardent appreciator of nature. He says, “The environment is your concern, it is your duty to be responsible for it.” His life and activities in Braj⁴ and Vrindavana demonstrate supreme level of compassion towards environment and environmental restoration. There seems to be a notion that environment could be polluted or harmed through human action and the same could be reversed. He is depicted as having defeated Kaliya *naga* and purified Yamuna of its poison, protected forest by swallowing destructive fires, restored air by crushing tornadoes etc. In the tale of child Krishna eating mud and foster-mother Yashoda seeing entire universe in his mouth, he remarks, “... I have to play in these grounds, I will make these grounds so pure that anybody can pick up a little piece of earth and taste it.”⁵ Implied in this statement is the fact that the earth may have suffered contamination which needed purification. There are also stories of *Bala-gopala* stealing butter due to his extreme liking for it and Krishna’s intimate association with cows is emphasized numerous times.

The Notion of Beauty and Environment: Ajanta Paintings

It seems that people of those times also viewed their environment as something that was beautiful, pure and serene. This is evidenced in the Ajanta murals. The caves of Ajanta are located in Aurangabad district, Maharashtra. They are 29 in number, out of which cave no. 1, 2, 16, 17 and 19 have survived. Although they are dated to a vast time-range of 1st-7th centuries CE, most of them belong to the Gupta period. It looks like this site was chosen by great visionaries who appreciated nature and its scenic beauty. The caves are located in a long horse-shaped hill overlooking a deep valley. Depictions of nature and its opulence constitute one of the subject-matter of the murals in these caves. Although the central theme is religious, almost all aspects of secular domain find painted which look so life-like and natural. Flora and fauna have been painted freely in a masterly fashion and these frescoes are replete with floral themes. High mountains, lush vegetation, forests and gardens, blooming flowers, luxuriant creepers, flowering trees, flowing streams, soaring birds, fighting or springing animals, roaming

³ Discourse between Krishna and Arjuna on the battlefield in the form of 700 verses constituting chapters 23-40 of the *Bhishma Parva* of *Mahabharata*.

⁴ Also known as Brij or *Brijbhoomi*.

⁵ Haberman, David L. (2006). *River of Love in an Age of Pollution: the Yamuna River of Northern India*. University of California Press.

predators, monkeys jumping from branch to branch, naïve beings like deer and elephants have been painted, which show how closely the painter has observed, grasped, perceived and understood the world and environment around him.



LEFT Depiction of Elephants and Horses, Ajanta Mural titled “The Coming of Sinhala” in Cave no. 17. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:Coming_Of_Sinhala_\(Mural_At_Ajanta_In_Cave_No_17\).jpg](https://commons.wikimedia.org/wiki/File:Coming_Of_Sinhala_(Mural_At_Ajanta_In_Cave_No_17).jpg)).



RIGHT: Depiction of Elephants and Flora, Colour Illustration/Creative Reproduction of Ajanta Fresco titled “Adoration of the Buddha” in Cave no. 17. Source: Wikimedia Commons. ([https://commons.wikimedia.org/wiki/File:Ajanta_Cave_17_antechamber_to_the_shrine_Adoration_of_the_Buddha_\(color_illustration\).jpg](https://commons.wikimedia.org/wiki/File:Ajanta_Cave_17_antechamber_to_the_shrine_Adoration_of_the_Buddha_(color_illustration).jpg)).

Inscriptions

The Gupta period demonstrates changes in political economy in which exploitation of agricultural resources became necessary. Agriculture became significant to support the growing population and to produce surplus to sustain a considerable part of the population not directly engaged in food-production. A major part of state revenue also came from agriculture. Inscriptions of this period mention various types of land: the term used for land under cultivation is *Kshetra*. The tracts not under cultivation are referred to as *Aprahata* and *Khila*. Epigraphs give the impression that uncultivated land was regularly brought under cultivation. Classification of land also as per soil, fertility and the use to which it was put was not unknown. Different land measures were known in different regions. It is not possible to segregate regions precisely as per the crops grown, but all the main varieties of crops – cereals like paddy, wheat and barley, different kinds of vegetables, pulses and grams as well as cash crops like sugarcane and cotton were known long before this period and continued to be widely cultivated.

Hsuan Tsang’s Travelogue

Xuan Zang/Huien Tsang, the Chinese pilgrim, visited India between 629-645 CE. He has left behind fairly detailed travel accounts and has described political, social, religious and economic conditions during Harshavardhana’s times. He mentions Harsha as an industrious king who undertook many charitable tasks⁶ –

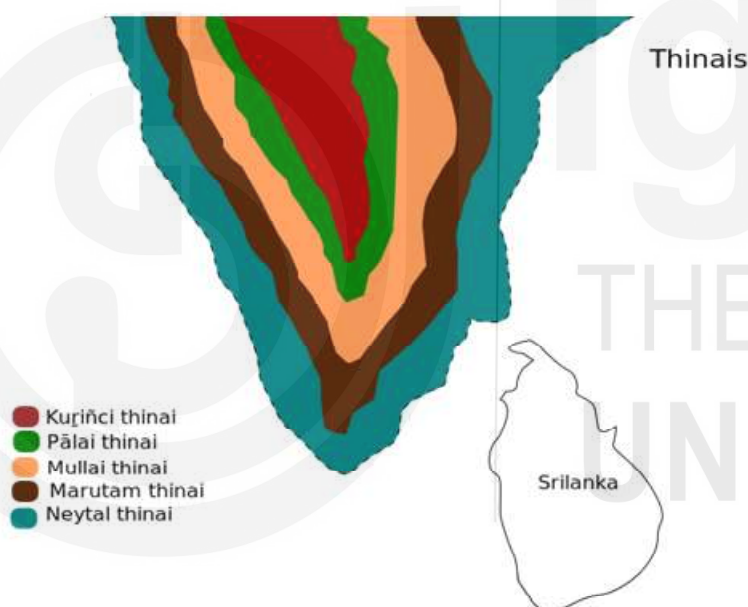
⁶ Such as establishment of hospitals for the needy, opening of educational establishments, distribution of charity, provision of free rest-houses on highways etc.

planting of fruit-bearing and shady trees was one of them. He was familiar with his extensive empire which added to his proficiency as an administrator. He was aware of the topography of his region and temperament of the populace of varied terrains that helped him choose right governors of provinces.

Sangam Poems

The geographical tract between the hills of Venkatam and Kanyakumari is referred to as *Tamilaham*. It includes the whole of present-day Tamilnadu and Kerala. With forested highlands, undulated terrains, pastures, wet lands, arid zones and long sea coast, it exhibits a combination of distinct and diverse landscapes/eco-zones as elucidated in *Sangam* literature⁷ in the form of *aintinai* (five eco-zones):

- 1) *Kurinji/Kurinchi* (hilly backwoods),
- 2) *Palai* (arid zone),
- 3) *Mullai* (pastoral tracts with low hills and thin forests),
- 4) *Marutam* (river valleys and fertile agrarian plains particularly suitable for wetland cultivation of paddy and sugarcane), and
- 5) *Neytal* (sea coast).



Credit: Praveenp. Source: Wikimedia Commons(https://commons.wikimedia.org/wiki/File:Thinai_en.svg).

There were areas in which one or the other *tinai* was dominant. But, most of the *tinai*s were generally fragmented and mixed up all over the region. The mode of

⁷ The earliest Tamil texts are found in the *Sangam* corpus/collection (c. 300 BCE-300 CE). It is close to 30,000 lines of poetry on the themes of love and war. Their authors assembled in literary gatherings/academies of scholars, patronized by chiefs and kings, called the *Sangams* and the literature produced was, thus, called the *Sangam* literature. Three *sangams* are believed to have taken place: first and last at Madurai and second at Kapatapuram. It is believed that compositions of the last *Sangam* alone have survived. They are a mine of information on everyday lives of the people of those times and on many occasions it is corroborated by archaeology and foreigners' accounts. The mention of some kings and events is supported by inscriptions also.

human adaptation differed from *tinai* to *tinai* depending on its ecology. Socio-economic groups also varied. The forest-tribes of *kurinji* (variously termed as *Kuravars* and *Vetars*) pursued hunting and gathering of forest produce. Being dry land, the inhabitants of *Palai* (called *Maravars* and *Eyinars*) could not produce anything due to scarcity of water. They engaged in cattle lifting, wayside robbery and plundering.⁸ Those of *mullai* (known as *Itaiyars*/*Idaiyars* meaning cowherds/shepherds) were engaged in cattle rearing and shifting cultivation. Dwellers of *marutam* (labeled as *Uzhavars* meaning ploughmen) practiced plough agriculture and those of *neytal* (called *Parathavars* meaning fishermen) did fishing, pearl diving and salt making. *Uzhavars* produced considerable surplus of paddy and the inhabitants of other *tinai*s relied on them for rice which was their stable food. Thus, *Tamilaham* demonstrates different forms of subsistence as determined by ecological conditions of the five *tinai*s and ecological differences between them. Occupants of each *tinai* entered into barter with those of other *tinai*s. For example, the residents of hilly backwoods came down to other zones to exchange their resources like honey, bamboo, meat, fruits, rice, roots and other wild products. They also practiced “slash and burn” cultivation on hill slopes and produced millets and pulses. Such hilly zones also facilitated abundant production of pepper and other spices. We find literary descriptions of the production of pepper and facilities for watering the gardens.

The populace of pastoral tracts exchanged their dairy products and the coastal denizens – fish, salt and pearl. Agricultural zones attracted all of them. The small, self-sustaining *tinai*s grew into larger eco-zones through such interaction and interdependence. The terrains of better productivity had a relatively developed social division of labour. Society in the eco-zones of lesser productivity was simple and consisted of clans ruled by chiefs. All in all, *Tamilaham* represented a complex society of unevenly developed components which shared a common culture and the state was yet to emerge.

Check Your Progress Exercise 1

- 1) Discuss the perspectives towards environment with reference to any two historical sources of the period between c. 200 BCE and c. 700 CE.

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- 2) Mark the following statements as right (✓) or wrong (×):
 - a) Kautilya classifies the landmass between Himalayas and oceans into eight zones.
 - b) The *Manusmriti* states that killing of animals like horse, elephant, deer, camel etc. was a sin.
 - c) *Sangam* literature enunciates the concept of *Aintinai*.
 - d) Huien Tsang mentions that Harsha ordered planting of shady and fruit-bearing trees.

⁸ Salt merchants and dealers of other goods often traversed through *Palai* tracts in caravans and *Sangam* literature refers to their plunder by *Maravar* robbers.

18.3 FORESTS

In many ancient Indian literary sources the settlement (*kshetra*) – village (*grama*) or city (*nagara*) – reflected an organized and systematized social order. On the one hand, the forest (*vana/aranya*) was the abode of ascetics and renouncers as well as a terrain that included desert and semi-pastoral tracts of land. These are differentiated from each other and presented as polar opposites. However, they are also viewed as being closely linked in the form of a continuum. Thus, there is both dichotomy and complementarity between the two and the texts often try to understand and comment upon the influence of *kshetra* on *aranya* and vice-versa. It also needs to be kept in mind that with the rise of urban centres and particularly in the early centuries of Common Era there was also a growing demarcation between *grama* and *nagara*. The former was not static and could also be a mobile village of migrating cattle-keepers. *Grاما* also subsequently became an intermediary zone between *nagara* and *vana*.

Now let us delve into a few historical sources to get an idea of how forests were perceived by ancient Indians.

Arthashastra

Kautilya devises a detailed way of demarcating and classifying ecological spaces with the intent to harness their resource potential and forests figure prominently in his scheme. The terms used in the *Arthashastra* for a forest are:

- *vana*,
- *aranya/aaranya*,
- *atavi*, and
- *kantara*.

Inhabitants of the forest are referred to as:

- *vanacharas*,
- *aranyavasins*, and
- *atavikas*.

Kautilya ascribes importance to the management and protection of forests as well as gardens, groves and orchards. They were not only recreational venues but also potential sources of revenue. *Aranyas* supplied honey, timber, oblation material for sacrifices, herbs of various kinds, flowers, fruits, roots, vegetables, wild grains etc. He classifies the forests into material forests, elephant forests (*hastivanas*) etc. based on their resource potential and use. Kautilya visualizes forest as a terrain to be controlled, exploited, protected and expanded⁹, and a terrain into which the state must aggressively extend its administrative and fiscal activity. He instructs the appointment of superintendents of forests and directors of forest-produce (*kupyadhyakshas*) to promote forest resources. All forests are said to be owned by the government. He recommends rewards to the person who brings a pair of tusks of an elephant which died naturally. He instructs setting up of factories/manufactories (*kar mantaham*) for goods obtained from forests and

⁹ Interestingly, he prescribes “creation” of a forest, thus going against and beyond the notion that wilderness can only occur “naturally”. He states that a *vana* can be altered, manipulated, modified and even created for economic purposes.

raise income of the state.¹⁰ But, he cautions that forest-products should be used in a sustainable manner. He lays stress on the protection of specifically those trees which yield flowers and fruits and those that provide shade. Fines of varying amounts are said to be imposed for cutting a tree or any part of it, depending on the kind of harm afflicted. He emphasizes on safeguarding particularly those forests that were watered by a river as those could be used as a shelter during rebellion, invasion or other kinds of trouble.¹¹

Kautilya's Attitude towards *Aranyavasins*

Kautilya does not speak very highly of the forest-dwellers. He says that wilderness is an abode of robbers, fowlers and enemies. Forest people are clubbed with *chandalas* (untouchables). He advises that secret agents should win the trust of forest thieves, instigate them to raid cattle caravans, cattle camps and villages, and then have them killed. He warns that they can be a threat when kings are campaigning or hunting in their region and should, therefore, be treated with caution and suspicion. They are frequently associated with rebellion and plunder. He states that *atavikas* who try to loot or ravage a settlement should be scattered into many groups and destroyed. The term *atavika* is used in the *Arthashastra* to connote politically problematic forest chieftains or people, though not always. Forest chieftains are not considered friends of kings but they are acknowledged and reckoned as a political force that kings have to deal with. For example, brahmana sages who lived in the *ashramas* in the forest needed peace and harmony with the forest tribes as well as protection and security from them. *Kshatriya* warriors could have occasions of hostility with them. *Vaishyas* could use them as farmers and animal herders.

The king is, therefore, asked to subjugate the *vanacharas*. They are mentioned not only as cultural others but also as political adversaries, yet at the same time, as potential allies, although usually of an inferior kind. Though maintaining a distance, the *Arthashastra* instructs the presence and attendance of forest chiefs at the coronation-ceremony of a king. Kautilya proposes to use them to create trouble for neighbouring kingdoms or as spies and poisoners in the guise of recluses, householders, merchants, ascetics, students, mendicants, prostitutes etc. Inversely, spies should also move around disguised as forest-dwellers.

According to the *Arthashastra*, *Vanavasins* must offer a sixth part of their grains to the king, saying, "This is the share for him who protects us".¹² A benevolent attitude towards them comes to fore when it says that they should be made to pay less than the residents of settlements for certain offenses such as theft or killing of cocks, mangoose, cats, dogs or pigs. Elsewhere it mentions that an officer called the *vivetashyaksha* must ensure the livelihood of the residents of material forests and elephant forests. Hence, it can be safely concluded that it does not exhibit just one attitude towards them. Different perceptions seemed to coexist.

¹⁰ Raj Kumar, Sen and Basu, Ratan Lal (Eds.) (2006). *Economics in Arthashastra*. New Delhi: Deep and Deep Publications.

¹¹ Rangarajan, L. N. (2016). *Kautilya: The Arthashastra*. Reprint. Penguin Classics.

¹² Chande, M. B. (2004). *Kautilyan Arthashastra*. New Delhi: Atlantic Publishers and Distributors.

In many other treatises also, the forest is visualized as a site of conflict and they refer to clashes between forest tribes and state armies. They also state that vast forest terrains were spaces where writ of the state did not run smoothly or didn't run at all. Forest hunters who, over the centuries, supplied wild game to feed the residents of settlements are generally portrayed in them as violent, uncultured, barbaric, uncouth etc. Violence or the threat of violence against them was necessary for the spread of agriculture and geographical expansion of cities and states and this is brought to fore in various ancient Indian literary compositions.

Epics and Puranas

When Rama leaves for exile to the forest lying south of the Gangetic plains, mother Kaushalya is worrisome about his safety. She exclaims, "May the huge elephants not harm you my dear son, nor the lions, tigers, bears, boars or ferocious horned buffalo". However, forests were a source of pleasure to Sita. *Arjuna*, *Karnikara/Kanaka Champa* and *Japa Pushpa* (Hibiscus) have been outlined as her favourite trees. Sandalwood (*chandana*) tree was particularly popular around that time. Ravana's *Ashoka-vatika* in Lanka is said to be full of *Ashoka*, *Champa*, and *Shala/Sala* trees. Poet Valmiki gives vivid descriptions of honey-scented groves, lotus-ponds, herds of deer, geese and ducks in the forest. He defines *Aryavarta* – land of the Aryans/abode of the Aryans – as the region where black antelope wandered, precisely the landmass to the north of Vindhyan mountain range.¹³

The *Mahabharata* tells us that the capital of Kurus – Hastinapura – was located in a forest zone. Pollen remains from the excavations at Hastinapura (Meerut district, Uttar Pradesh) show the evidence of *Dalbergiasisoo* (a kind of timber), *Pinus* (pine) and other varieties of vegetation.¹⁴ The *Bhagavata Purana* describes the forests of Vrindavana as "full of bees, flowers, fruits, vegetation and pasturing grass"; "as sanctified as the clear mind of a devotee"; "there were chirping birds and clear-water lakes, with waters that could relieve one of all fatigue. Sweet-smelling breezes blew always, refreshing the body and mind"; "Krishna saw all the trees, overloaded with fruits and fresh twigs, bending down to touch the ground as if welcoming him by touching his lotus feet". He lavishes praise to the trees of Vrindavana, "... they have dedicated their lives to the welfare of others. Individually, they are tolerating all kinds of natural disturbances ... They supply various kinds of facilities to human society, such as leaves, flowers, fruits, shade, roots, bark, flavour extracts and fuels."¹⁵

Abhijnana Shakuntalam

It is a drama by the greatest Sanskrit poet Kalidasa: one of the "nine luminaries/gems" (*navratnas*) of the court of Gupta ruler Chandragupta II. It makes references to beautiful *tapovan*as (sacred groves) where sages/saints/ascetics meditated and did penance. It amply highlights the closeness of *rishi* Kanva and her daughter Shakuntala to the forest. The forest is projected as a peaceful and quiet place. Shakuntala held plants and deer of the forest very dear to her.

¹³ Rangarajan, Mahesh (2007). The Forest and the Field in Ancient India. In Mahesh Rangarajan (Ed.), *Environmental Issues in India: A Reader*. New Delhi: Pearson Education.

¹⁴ Chaudhary, K. A., Saraswat, K. S. and Buth, G. M. (1977). *Ancient Agriculture and Forestry in North India*. New Delhi: Asia Publishing House.

¹⁵ Prabhupada, A. C. Bhaktivedanta Swami (1997). *Krsna, the Supreme Personality of Godhead: A Summary Study of Srimad Bhagavatam's Tenth Canto*. Bhaktivedanta Book Trust.

On the other hand, *vana* in ancient India is also viewed as a space that was bereft of the cohesion of the *kshetra*, as the abode of those like thieves and brigands who did not live by *dharma* (courteousness), as “strange, remote, wild and different and teeming with creatures whose appearance and behavior was unpredictable”¹⁶. It was the backdrop of three kinds of human action: the hunt, the hermitage and the place of exile. The Shakuntala narrative opens with Dushyanta hunting in the forest with a large entourage of hundreds of elephants and horses and heavily-armed soldiers as if heading towards a battle. This was because the *aranya* was an unknown territory, inhabited by *rakshasas*.

18.4 WATER RESOURCES

Water resources have been an indispensable part of the agrarian economy. We will study this from the vantage point of irrigation and significance of rivers.

Irrigation

In this section we will discuss the means of irrigation which were practiced in the past as evident in the written records.

Inscriptions

Society's concern with agricultural production is also reflected in the importance given to irrigation. State promoted irrigational measures and activities since it derived its revenue mostly from agrarian produce. Irrigation through wells, tanks, ponds owned and maintained by local populace individually as well as collectively was widespread during this period. State enterprise entailed construction of reservoirs as well as settlement of disputes regarding distribution of water, building of a tank etc. The Junagadh/Girnar rock inscription informs us about the Sudarshana lake (*tadaga*), an artificial reservoir. It was originally built during the Mauryan period by Pushyagupta, the provincial governor of Chandragupta Maurya. It was thoroughly repaired in the time of *Mahakshatrapa* Rudradaman by his provincial governor (*amatya*) Suvishakha (c. 150 CE). It was again severely and extensively damaged due to excessive rains and Parnadatta, the newly appointed governor of Saurashtra by Skandagupta, who was perhaps the last powerful Gupta monarch, and Parnadatta's son Chakrapalita undertook its restoration this time (c. 460 CE). There is special mention of the “enormous money” spent by Rudradaman. The Hathigumpha (“Elephant Cave”) inscription (2nd century BCE-1st century CE) of Kharavela, the third and greatest emperor of Mahameghavahana dynasty of Kalinga (present-day Odisha and surrounding regions), refers to great expenditure done by him on extending a water-channel to his capital. Similarly, the Nasik inscription of Ushavadata (c. 121 CE), son-in-law and viceroy of the Western *Kshatrapa* king Nahapana, gives Ushavadata the credit of constructing many reservoirs and tanks. Another epigraph from Mathura (c. 50 CE) eulogizes a brahmana who built a tank.

Arthashastra

Kautilya frequently mentions small-scale irrigation works privately owned and maintained. It delineates following chief means of irrigation:

¹⁶ Thapar, Romila (2012). Perceiving the Forest: Early India. In Mahesh Rangarajan and K. Sivaramakrishnan (Eds.). *India's Environmental History: from Ancient Times to the Colonial Period*.

- 1) River (*nadi*)
- 2) Lake (*sara*)
- 3) Fountain (*utsa*)
- 4) Spring (*jalakooopi*)
- 5) Well (*kupa*)
- 6) Tank (*tadaga*)
- 7) Reservoir (*adhara/udkadhara*).

He also refers to the construction of dams on streams (*setu/setubandha*) and classifies them into two categories:

- a) That could be fed by natural sources like springs.
- b) Where water was artificially stored.

He elaborates on water-tax (*udakabhaga*) and enumerates following kinds of irrigated land:

- 1) irrigated by manual labour,
- 2) irrigated by carrying and transporting water on shoulder,
- 3) irrigated by water lifts,
- 4) irrigated by raising water from rivers, lakes, ponds etc.

Some scholars point out that a clear reference to the use of canals or channels for irrigation occurs in the *Arthashastra* when it is stated that water was set in motion by digging (*khatappravrittim*) from a river-dam or tank. Kautilya also gives details of the officials associated with creation and upkeep of water resources. He outlines constant inspection of the places of water-supply (*udakasthana*), water-courses and roads as one of the duties and responsibilities of the head of city administration (*nagarika*). The head of crown lands (*sitadhyaksha*) was expected, among other things, to have the knowledge of “water divining”. The collector of revenue (*samaharta/samahartri*) was supposed to document the number of *setubandhas* (bridges/dams) and sheds for drinking water in his area. And the superintendent of pasture lands (*vivetadhyaksha*) was to sink wells and make other provisions for drinking of water by livestock. He also was entrusted to establish sources of water in waterless or water-scarce pastoral regions.

It is interesting to note that Kautilya duly recognizes the property rights of an individual on wells, tanks, reservoirs etc. and allows one to sell or mortgage the same. He also acknowledges the right to sell water from one’s water-work and the owner may also give water to the cultivators in lieu of their agricultural produce or to anyone “as it may be advantageous to him”. He cautions that an owner shall lose the possession of his tank or any other irrigation-work if he does not use it for five years, except in cases of distress. He also bestows the benefits of constructing irrigation-works by stating that such a person shall be exempted from water-cess for five years, those who repair the ruined or abandoned ones shall be exempted for four years and so on. He underlines the idea of establishing irrigation-works as a joint or communal activity by advising that all local residents should cooperate in building dams etc. and strictly remarks that only those who do so were entitled to claim water from such hydel projects. Also, those who walked out of such joint ventures were to share the expenses but were not allowed the benefits.

Irrigation during Gupta and Post-Gupta Times: A Case-Study

A popular means of irrigation was drawing water from wells and supplying it to the fields through carefully dug channels. A mechanism that was perhaps known before the Gupta epoch entailed tying several pots to a chain which reached down to the water of the well and by making the chain with the pots rotate; it was ensured that the pots would continuously fill with water and empty it. This apparatus was called *ghati-yantra* (*ghata* means pot) or *araghatta*. Banabhatta's *Harshacharita* (meaning Biography of Harsha) written in 7th century CE contains very charming description of how the agricultural fields that produced crops such as sugarcane were irrigated by means of *ghati-yantra*.

Rainwater was accumulated in ponds and other types of reservoirs in regions like Bengal and then used for irrigation; tank irrigation became the norm in peninsular India. There were, thus, different systems of irrigation methods. The farmers, of course, depended mainly on rainfall, the importance of which is highlighted in the *Arthashastra* as well as in many texts of the Gupta age.

Importance of Rivers

Ancient civilizations all over the world flourished on river-banks and this is true for the Indian subcontinent too. Rivers bring bounty and prosperity. They provided water for agriculture. They were used for navigation. Fish constituted part of human diet and was also profitable in trade and commerce. The socio-economic, cultural and religious importance of rivers is time and again demonstrated in ancient Indian historical tradition. The auspiciousness and sacredness ascribed to them has been a major focus of our religious awareness. Large rivers like Ganga and Yamuna were personified as deities. In the Udayagiri cave complex near Vidisha (Madhya Pradesh), securely dated to the reign of Gupta monarch Chandragupta II, we find sculptural representation of the river goddesses Ganga-Yamuna flanking the doorway. There are numerous such examples found elsewhere.

Ganga is also associated with lord Siva – one of the primary gods (trinity or *trideva*) of Puranic Hindu pantheon. The story of the descent of Ganga on Siva's hair and then let out in small streams is found in the *Bhagavata Purana*.



River goddess Ganga riding a *Makara* (alligator), 5th century CE. Statue recovered from Ahichchhatra (Bareilly district, Uttar Pradesh) and preserved in National Museum, New Delhi. Credit: Rabe!. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Nationalmuseum_Neu-Delhi_2017-12-27y.jpg).



Sculptural panel of the Pallava period (c. 275-897 CE): “Descent of the Ganga”/“Arjuna’s Penance” at Mamallapuram or Mahabalipuram, Tamilnadu. Penance of sage Bhagiratha, or sometimes believed to be Arjuna, brought it to earth. Siva is shown controlling fury of the descending river through his hair locks. ASI Monument No. N-TN-C32. Credit: Vairam1976. Source: Wikimedia Commons. (https://commons.wikimedia.org/wiki/File:Arjuna%E2%80%99s_Penance_4.jpg).

Likewise, Yamuna is linked with Krishna. As stated earlier, he is said to have rid it from *Kaliya* serpent. Kaveri/Cauvery is associated with Vishnu. The Vishnu temple at Terazhundur (Nagapattinam district, Tamilnadu)¹⁷ has an image of personified Kaveri and the 8th century Vishnu temple at Thirucheraï (Thanjavur/Tanjore district, Tamilnadu) shows her in a maternal pose with a child in her lap.

The *Puranas* also state that a person can attain salvation by bathing in the Ganges which is regarded as a sacred bridge to the divine.¹⁸ As per a legend, an ancient

¹⁷ Original structure of the temple is said to have been commissioned by Karikala Chola (1st century CE) and later additions made by later Cholas during 11th century.

¹⁸ Flood, Gavin (1966). *An Introduction to Hinduism*. Cambridge University Press.

king was resting along the bank of Ganges. Around midnight he saw several women covered in dirt taking bath in Ganga; they were the incarnations of all rivers across the length and breadth of Indian subcontinent who cleansed themselves of the filth left behind by countless pilgrims who bathed in them by bathing in Ganga. Hence, Ganga is projected here as the grand purifier.¹⁹

One can achieve the same goal of emancipation (*nirvana/moksha*) merely by looking at the sacred Narmada which is also said to have sprung from the body of Siva. According to a local proverb, “As wood is cut with a saw, so at the sight of the holy Narmada do a man’s sins fall flat”.²⁰ Puranic literature emphasizes on visiting pilgrimage-places (*tirthas*) on the banks of such holy rivers at least once in a lifetime. The *Kumbha Mela* at Prayagraj (confluence of Ganga, Yamuna and mythical Saraswati), Haridwar (Ganga), Nasik/Nashik (Godavari) and Ujjain/Ujjayini (Shipra) is revered as a great religious and cultural congregation. Huien Tsang refers to a grand bathing conglomeration at the ancient river-bank pilgrimage-site of Prayaga (present-day Prayagraj, Uttar Pradesh) in c. 644 CE during emperor Harsha’s reign. This is held by many as the earliest surviving historical account of the *Kumbha* festival.

Check Your Progress Exercise 2

- 1) Examine the approach in the *Arthashastra* towards forests and foresters.

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18.5 SUMMARY

The ancient Indians possessed a great deal of environmental awareness. They took pride in biodiversity and ecological wealth around them, such as the appreciation of nature’s beauty and bounty by Krishna in *Bhagavad Gita*. There are also umpteen references in several other texts underlining the ecological awareness which formed a crucial and integral part of the traditional knowledge-system of ancient India. They reflect perspectives and concern of the people towards environmental, forestry and wildlife conservation. Even though its chief aim is to harness resource potential, the *Arthashastra* exhibits a holistic knowledge of biodiversity and prescribes ways and measures to avert and punish injury caused to it. You also learnt about the eco-zones constituting ancient south India as described in the *Sangam* poetry.

It is important to note that forests are an ambiguous category in historical sources of the period under study. As we have seen, on one hand Kaushalya expresses her fear regarding Rama’s safety in the forests and on the other Sita finds delight in her forest abode, Shakuntala held plants and deer of the forest very dear to her

¹⁹ Sharma, Mahesh (2006). *Tales from the Vedas and Other Scriptures*. Delhi: Diamond Pocket Books.

²⁰ Vegad, Amritlal (2008). *Narmada: River of Beauty*. Delhi: Penguin.

and the *Bhagavata Purana* elaborates on the close relation of Krishna with the forest of Vrindavana.

You are also made familiar with the attitude towards water resources. There was considerable concern towards agricultural production and this is reflected from the way irrigation got priority during Gupta period. You learnt about a novel mechanism known as *ghati-yantra*. We have also acquainted you with the organic association of the people of those times with rivers. The socio-economic, cultural and religious significance of rivers in ancient Indian culture is also highlighted in this Unit.

18.6 KEY WORDS

Aryavarta: region where the Vedic Aryans settled after their migration into the Indian subcontinent. It covers parts of north-western and northern India.

Eco-zone: area with its own ecological characteristics such as climate, soil conditions, organisms etc.

Fresco: the technique of painting on a moist plaster surface with colours mixed in water or a limewater mixture; a picture painted in this way.

Mural: a large picture painted or affixed directly on a wall or ceiling.

Puranas: a category of Hindu texts attributed to Vyasa. They are dated to the Gupta and post-Gupta period. There are 18 *Mahapuranas* and numerous *Upapuranas* (supplements or appendices to the *Puranas*). Their content indicates that these were heterogeneous, encyclopedic works of various hands encompassing multifarious topics. For example, the range of topics covered by the *Agni Purana* include ritual worship, cosmology and astrology, mythology, genealogy, law, politics, education system, iconography, taxation theories, warfare and organization of army, theories on proper causes for war, martial arts, diplomacy, local laws, building public projects, water distribution methods, trees and plants, medicine, design and architecture, gemology, grammar, metrics, poetry, food and agriculture, rituals, geography and travel guide to Mithila (Bihar and neighboring states), cultural history etc.

Slash and Burn Cultivation: primitive type of agriculture in which trees and bushes on the hill-slopes are cut down and burnt. Thus, the ground is prepared and seeds are sown.

Shifting Cultivation: mode of agriculture in which the plot of cultivation is shifted periodically. This is to avoid exhaustion of land caused by continuous use of the same plot.

Smritis: law-books in which social and religious norms were written in verse. They contain and prescribe rules, regulations and duties for general public as well as for the kings and their officials. These were composed between c. 200 BCE and c. 900 CE. They set out rules for marriage and property. They also prescribe punishments for persons guilty of theft, assault, murder, adultery etc.

Tinai: physiographic division of land in early *Tamilaham* characterized by its own special ecological factors, social groups and their subsistence pattern.

18.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) See Section 18.2
- 2) a) ×, b) ✓, c) ✓, d) ✓

Check Your Progress Exercise 2

- 1) See Section 18.3

18.8 SUGGESTED READINGS

Chattopadhyaya, B. D. (2017). The State's Perception of the 'Forest' and the 'Forest' as State in Early India. In *The Concept of Bharatavarsha and Other Essays*. Permanent Black in association with Ashoka University.

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