
Prehistoric human colonization of India

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Human colonization in India encompasses a span of at least half-a-million years and is divided into two broad periods, namely the prehistoric (before the emergence of writing) and the historic (after writing). The prehistoric period is divided into stone, bronze and iron ages. The stone age is further divided into palaeolithic, mesolithic and neolithic periods. As the name suggests, the technology in these periods was primarily based on stone. Economically, the palaeolithic and mesolithic periods represented a nomadic, hunting-gathering way of life, while the neolithic period represented a settled, food-producing way of life. Subsequently copper was introduced as a new material and this period was designated as the chalcolithic period. The invention of agriculture, which took place about 8000 years ago, brought about dramatic changes in the economy, technology and demography of human societies. Human habitat in the hunting-gathering stage was essentially on hilly, rocky and forested regions, which had ample wild plant and animal food resources. The introduction of agriculture saw it shifting to the alluvial plains which had fertile soil and perennial availability of water. Hills and forests, which had so far been areas of attraction, now turned into areas of isolation.

Agriculture led to the emergence of villages and towns and brought with it the division of society into occupational groups. The first urbanization took place during the bronze age in the arid and semi-arid region of northwest India in the valleys of the Indus and the Saraswati rivers, the latter represented by the now dry Ghaggar–Hakra bed. This urbanization is known as the Indus or Harappan civilization which flourished during 3500–1500 B.C. The rest of India during this period was inhabited by neolithic and chalcolithic farmers and mesolithic hunter-gatherers.

With the introduction of iron technology about 3000 years ago, the focus of development shifted eastward into the Indo-Gangetic divide and the Ganga valley. The location of the *Mahabharata* epic, which is set in the beginning of the first millennium B.C., is the Indo-Gangetic divide and the upper Ganga-Yamuna doab (land between two rivers). Iron technology enabled pioneering farmers to clear the dense and tangled forests of the middle and lower Ganga plains. The focus of development now shifted further eastward to eastern Uttar Pradesh and western Bihar which witnessed the events of the *Ramayana* epic and rise of the first political entities known as *Mahajanapadas* as also of Buddhism and Jainism. The second phase of urbanization of India, marked by trade, coinage, script and birth of the first Indian empire, namely Magadha, with its capital at Pataliputra (modern Patna) also took place in this region in the sixth century B.C. The imposition by Brahmin priests of the concepts of racial and ritual purity, pollution, restrictions on sharing of food, endogamy, *anuloma* (male of upper caste eligible to marry a female of lower caste) and *pratiloma* (female of upper caste ineligible to marry a male of lower caste) forms of marriage, *karma* (reaping the fruits of the actions of previous life in the present life), rebirth, *varnashrama dharma* (four stages of the expected hundred-year life span) and the sixteen *sanskaras* (ceremonies) on traditional occupational groups led to the birth of the caste system – a unique Indian phenomenon.

Keywords. Bronze age; caste system; chalcolithic; early historic human evolution; hunter-gatherers; iron age; megalithic; mesolithic; neolithic; palaeolithic; urbanization

Abbreviations used: BP, before present; ca, *circa*; IAR, Indian Archaeology Review; NBPW, northern black polished ware; OCP, ochre-coloured pottery; PGW, painted grey ware; TL, thermoluminescence.

As a consequence of the expansion of agriculture and loss of forests and wildlife, stone age hunter-gatherers were forced to assimilate themselves into larger agriculture-based rural and urban societies. However, some of them resisted this new economic mode. To this day they have persisted with their atavistic lifestyle, but have had to supplement their resources by producing craft items or providing entertainment to the rural population.

1. Introduction

Humankind's past is divided into two broad periods: the prehistoric and the historic. The prehistoric period belongs to the time before the emergence of writing and the historic period to the time following this event. Modern humans, evolved in Africa and have lived on our planet for about 150,000 years. However, they learnt writing only about 5000 years ago. This means that only about 0.1% of humankind's past is known through the written word. In fact, knowledge of writing diffused very slowly and even today a large section of humanity remains illiterate. Further, before the invention of printing technology in the medieval period, written documents were few and far between, and many of them have been lost due to being written on perishable materials like tree bark, palm leaf, papyrus and cloth. This means that the story of humankind has to be reconstructed largely with the help of non-literary or archaeological sources. These sources comprise objects – tools, weapons, ornaments, structures and artistic creations which were produced and used by humans and which have survived the ravages of time.

Man differs from other creatures in his ability to learn, accumulate knowledge and pass it on to future generations. He has learnt to use various raw materials available in nature – stone, wood, bone, clay, metal, etc. – for shaping them into useful objects for satisfying his needs. Objects made of comparatively durable materials survive for varying lengths of time and constitute the main source of information for knowledge of the human past.

Like other creatures, humans too have had to adapt themselves to the environment in which they live. However, unlike other beings, they have done so with the aid of technology and material culture (material objects like tools, weapons, utensils, houses, clothes, ornaments, etc). Moreover, since the environment – landscape, climate, flora and fauna – tends to change over time, archaeologists have to reconstruct past environments as well. The biological remains of men have contributed to the understanding of not only his biological evolution but also cultural evolution. Archaeology, thus, is a multi-disciplinary study involving disciplines like geology, palaeontology, palaeobotany, biological anthropology and archaeological chemistry. Further, since cultural changes take place at an uneven pace in different regions, in many parts of the world, particularly in India, prehistoric ways of life have survived more or less unchanged into modern times. The

study of non-industrialized societies, especially those practising hunting-gathering, fishing, primitive cultivation and pastoralism, known as ethnoarchaeology, contributes to interpreting the archaeological record.

The story of man began in the Miocene period, around twenty million years ago, when the great apes, from whom the humans evolved, flourished in large areas of the Old World. Proto humans appeared in the Pliocene period, around five million years ago, and their cultural evolution largely took place during the Pleistocene period, which began about two million years ago. While biologically humans differ from the other apes in their upright posture, ability to walk on two feet or hind limbs, extremely versatile hand, and an unusually powerful brain, culturally they differ in their ability to manufacture and use tools.

The prehistoric period is divided into three ages, namely the stone, bronze and iron ages. These ages, besides being technological stages, also have economic and social implications. The Stone Age is divided into three periods, namely palaeolithic, mesolithic and neolithic. As the name suggests, the technology in these periods was primarily based on stone. Economically the palaeolithic and mesolithic periods represent the hunting-gathering stage while the neolithic represents the stage of food production, i.e. plant cultivation and animal husbandry. The palaeolithic period is further divided into three sub-periods, namely lower, middle and upper.

A point which needs to be emphasised is about chronology. Chronology is of two types, relative and absolute. Relative chronology dates prehistoric events in relation to other events and geological deposits. It only tells us if a particular event is earlier or later than another event. Absolute chronology, on the other hand, dates events and phenomena in solar calendar years. This chronology is based on physical techniques and methods like radiocarbon, K/Ar, fission tracks, thermoluminescence, $^{230}\text{Th}/^{234}\text{U}$ and dendrochronology. While dendrochronology is applicable only to a period of a few thousand years and only in the few areas where old wood samples have been preserved, radiocarbon dating can date events up to sixty thousand years old. The other methods can, however, date events belonging to the entire prehistoric period. However, their application is dependent on the availability of suitable materials like volcanic ash and rock at archaeological sites.

2. Earliest human colonization of south Asia

The early human colonization of south Asia is represented largely by an abundance of stone tool assemblages. The oldest known tools, comprising simple cores and flakes, have been reported from the Siwalik hills at Riwat, near Rawalpindi in Pakistan. They have been dated to two million years on the basis of magnetic polarity stratigraphy (Rendell and Dennell 1985; Rendell *et al* 1987). This exciting discovery made in 1985 has not yet been corroborated by more findings from other sites and for the present it stands in spatial and temporal isolation. The earliest reliable stone tool assemblages belong to two distinct cultural and technological traditions, namely (i) the Sohanian and (ii) the Acheulian.

2.1 Sohanian culture

The Sohanian culture is named after the river Sohan (or Soan), a tributary of the Indus, and was found at a number of sites in the Siwalik hills in northwest India and Pakistan. It was first reported by de Terra and Paterson (1939) over sixty years ago. These scholars distinguished three developmental stages of the Sohanian culture. The artefacts of these stages were found in river terraces which were correlated with the phases of the four-fold Pleistocene glaciation identified by them in the Himalayan and the Siwaliks. The earliest stage of the sequence, namely early Sohan on Terrace 1 (T1) was found cutting the boulder conglomerate of the second glacial age in the Potwar plateau. They also found Acheulian tools in the same deposit, though at discrete localities. They dated T1 to the second interglacial age. The faunal remains from this deposit included horse, buffalo, straight-tusked elephant and hippopotamus, suggesting an environment characterized by perennial water sources, tree vegetation and grass steppes. T2, with gravel at the base and loess on top and dating to the third glacial period, yielded Acheulian and Late Sohan A industries from the basal gravels. Late Sohan A comprised refined pebble choppers and Levallois flakes. The overlying loess produced Late Sohan B industry, characterized by Levallois flakes and blades and by the complete absence of Acheulian elements. The fauna of this horizon included horse, bovids, camel and wolf (Wadia 1928; p. 287).

Recent research in the area by the British Archaeological Mission to Pakistan has shown de Terra and Paterson's geological, climatic and archaeological sequences to be untenable. The Sohan terraces turn out to be erosional features rather than depositional terraces. Archaeological materials found by de Terra and Paterson (1939) cannot be associated with any specific deposits nor can they be

dated. The Mission members did not find evidence of an independent Sohanian tradition although they found artefacts of Acheulian and other traditions (Allchin 1981; Dennell *et al* 1988).

However, investigations in the Indian Siwaliks appear to conform to de Terra and Paterson's observations in Pakistan. Five terraces comparable to those of the Indus-Sohan in the Potwar region have been recognized in the valleys of the Sutlej, Beas and Banganga rivers in the Punjab-Himachal Pradesh region. Pebble tools of Sohanian style have been collected by Lal (1956) and Karir (1985) on these terraces. Mohapatra (1976), who discovered both Sohanian and Acheulian sites in the Hoshiarpur-Chandigarh sector of the Siwaliks, has argued that the Acheulian and Sohanian populations inhabited distinct environments; the former occupying the flat surfaces of the Siwalik frontal range and the latter the *duns* or valleys of the Himalayan flank. Using magnetic polarity data from the Upper Siwalik beds, Mohapatra has dated the Sohanian tradition from the Mindel-Riss interglacial (300–400,000 B.C.) to the end of the Pleistocene. However, according to him the Acheulian tradition cannot be older than 200,000 B.P. because it is only around this time that the range (Siwalik range or hills) became sufficiently stable to support human population.

2.2 Acheulian culture

2.2a Geographical distribution: The first effective colonization of the subcontinent was accomplished by the makers of the Acheulian culture, named after the French site of St. Acheul. The remains of this culture have been found extensively from the Siwalik hills in the north to areas near Chennai in the south (Misra 1987a). The areas devoid of the Acheulian occupation are the Western Ghats and the coastal region running parallel to them, northeast India and the Ganga plains. Heavy rainfall and dense vegetation in the Western Ghats and northeast India probably inhibited early man from colonizing these regions. In the case of the Ganga plains, the non-availability of stone and the swampy environment may have discouraged early man from occupying them. Acheulian hunter-gatherer populations adapted themselves to a wide variety of ecozones. These include the semi-arid regions of western Rajasthan, Mewar plain, Saurashtra, Gujarat alluvial plain, subhumid dry as well as moist deciduous woodland zone in central India, semi-arid Deccan plateau, Chota Nagpur plateau and the Eastern Ghats, north of the Cauvery river (Misra 1989; also for detailed bibliography).

Acheulian sites are particularly densely concentrated and are richer in central India and the southern part of the Eastern Ghats. These regions today receive adequate rainfall, have perennial rivers, a thick vegetation cover

and are rich in wild plant and animal food resources. Chemical analysis of the sediments yielding Acheulian assemblages in rock shelter III F-23 at Bhimbetka in Madhya Pradesh suggests that conditions during the Acheulian occupation were as humid as, if not more than, they are today (Rajaguru 1978). Therefore, both plant and animal life must have been abundant. Faunal fossil evidence from the alluvium of the Narmada, Godavari and their tributaries supports this inference (Badam 1979). On the northern Deccan plateau Acheulian sites are comparatively sparse. A plausible explanation for this phenomenon is that basalt which was the rock used for tool making in this region is highly susceptible to weathering and therefore many of the sites that did not get buried in the alluvium may have been destroyed (Mishra 1982).

Within these broad ecozones, the Acheulian people occupied a variety of microhabitats. In the semi-arid region of western Rajasthan sites, now buried in fine-grained alluvium around Didwana in Nagaur district, Acheulian hunter-gatherers camped along lakes and pools in the wide flood plains of shallow meandering streams, on the surfaces of extensively exposed older gravel beds and on stable sand dunes (Misra 1987b; Misra and Rajaguru 1986). In the Vindhya hills of central India they occupied rock shelters as at Bhimbetka (Wakankar 1975; Misra 1978). Acheulian assemblages similar to those found in the excavations of the rock shelters have also been found at open-air sites like Barkhera near Bhimbetka and at Putlikarar (Jacobson 1985), both in Raisen district of Madhya Pradesh. It would appear that the rock shelter and open-air sites represent seasonal camping places of the same populations, the former being used during the rainy season and the winter and the latter during the summer months. Over most of the country, however, the Acheulian hunter-gatherers lived in the open along perennial as well as seasonal streams.

2.2b Palaeoenvironment: The Pleistocene period in which Palaeolithic colonization took place was marked by significant climatic and environmental changes. The best evidence of such changes and human responses to them comes from the semi-arid zone of western Rajasthan (Misra 1987b; Misra and Rajaguru 1986). In the sandy plains which have low rainfall and are devoid of flowing drainage, mighty rivers, which must have had their origin in the Himalaya, flowed during the early and middle Pleistocene. These rivers laid down extensive and thick boulder beds in Nagaur and Jodhpur districts. The beds were subsequently tectonically up lifted. The new streams that came into existence were shallow and anastomosing, flowing in wide flood plains marked with numerous pools and lakes. They deposited marls and calcareous clays in pans or shallow depressions. Acheulian artefacts in mint condition (the fresh condition in which the tools were

manufactured) are found buried in these deposits, suggesting that their makers camped along the pools and lakes. They also camped on exposed gravel beds where an unlimited supply of fine-grained quartzite for making tools must have been a strong attraction. The climate during this period was essentially semi-arid but it fluctuated several times between cool and dry and warm and wet. During cool and dry phases extensive and thick deposition of sand sheets and dunes took place, while during warm and wet phases the dunes were stabilized. Acheulian groups occupied the stable dune surfaces. The density of Acheulian sites around Didwana strongly implies that plant and animal life must have flourished in abundance.

In peninsular India, Acheulian artefacts are usually found buried in boulder and pebble gravels of the Chambal, Son, Mahanadi, Narmada, Godavari and Krishna rivers and their tributaries. These gravels are believed to have been deposited during semi-arid climate with intermittent, erratic rainfall when there was sparse to no plant cover (Williams and Royce 1983). The gravels are invariably covered by fine silt and silty clay which are usually devoid of archeological material due to the fact that these sediments were deposited by low energy streams which were incapable of carrying coarse material, including artefacts. Acheulian occupations contemporary to the deposition of the fine sediments are probably represented by the numerous surface sites found in central India and the Eastern Ghats.

Faunal remains have been preserved in Acheulian-bearing gravels in peninsular rivers like the Narmada, Godavari and their tributaries (Badam 1979). These comprise wild boar (*Sus namadicus*), cattle (*Bos namadicus*), elephant (*Elephas hysudricus* and *Stegodon insignis-ganesa*), horse (*Equus namadicus*) and hippopotamus (*Hexaprotodon namadicus*). These animals indicate the existence of both forest and open grassland environments and the availability of plentiful water round the year. There is little doubt that all these animals formed a source of food for the Acheulian populations but whether they were hunted or scavenged or exploited can be ascertained only when their remains are found in association with archaeological material in undisturbed occupation contexts.

2.2c Technology: Acheulian tool assemblages comprise choppers, chopping tools, polyhedrons, spheroids, discoids, handaxes, cleavers, scrapers, denticulates, notches, flakes, blades and cores. Though our knowledge of most of these tool types is imperfect, it is certain that they served a variety of functions like hunting, butchering and skinning of animals, breaking bones for extraction of marrow, digging of roots and tubers, processing of plant foods, and making of wooden tools and weapons.

On the basis of stratigraphy, typology and technology, two developmental stages can be recognized in the

Acheulian industries. The first and chronologically earlier stage is characterized primarily by such core tools as choppers, polyhedrons spheroids, handaxes, a low proportion of crudely made cleavers and flake tools, predominant use of stone hammer technique, and absence of Levallois technique (Levallois is the name of a technique of making stone tools and the name is after a French place where stone tools made by this technique were first found). This stage is represented at sites like Singi Talav near Didwana in Rajasthan (Gaillard *et al* 1986); Chirki-Nevasa in Maharashtra (Corvinus 1983), Hunsgi-Baichbal valleys (Paddayya 1982, 1991), Anagwadi (Pappu 1974) in Karnataka, and Kortallayar valley in Tamil Nadu (Pappu 1996). The second and later stage is marked by low proportions of bifaces, high ratio of cleavers to handaxes, very high proportion of flake tools like scrapers, and extensive use of soft hammer, Levallois and discoid core techniques. This stage is best represented in the rock shelters at Bhimbetka (Misra 1978) and open-air sites (Jacobson 1985) in Raisen district of Madhya Pradesh, Tirupati valley in Andhra Pradesh (Murty 1966; Gaillard *et al* 1986) and Hunsgi-Baichbal valleys in Karnataka (Paddayya 1991; Paddayya and Petraglia 1997).

The raw material used for tool making varied regionally according to the geology of the area. In western Maharashtra dyke basalt or dolerite was the only rock available. Over the rest of the country quartzite was the preferred rock and occasionally quartz was also used. In the Hunsgi valley in Karnataka limestone was the main material but occasionally basalt and granite were also used. Coarse-grained granite was also used in northern Bundelkhand.

2.2d Chronology: Our knowledge of the antiquity and duration of the lower Paleolithic culture is far from satisfactory. Members of the British Archaeological Mission to Pakistan have reported three handaxes from two localities in the Rawalpindi area of the Siwaliks which are dated to between 700,000 and 400,000 years on the basis of magnetic polarity stratigraphy (Rendell and Dennell 1985). Volcanic ash associated with Acheulian tools at Bori in Maharashtra has been dated by potassium/argon method but the dates ranging from 1.4 myr to 75,000 years present a confusing picture. Application of $\text{Th}^{230}/\text{U}^{234}$ and thermoluminescence techniques to Acheulian sites of Umrethi in Saurashtra (Marathe 1981) and 16R locality at Didwana in Rajasthan (Misra and Rajaguru 1986; Raghavan *et al* 1989) has given dates ranging from 390,000 years to 150,000 years. $\text{Th}^{230}/\text{U}^{234}$ dates obtained on travertine from Kaldevanhalli and on *Elephas* molar from Sadab and *Elephas* and *Bos* molars from Tegehalli in the Hunsgi-Baichbal valleys in Karnataka range from 350,000 to 166,000 B.P. Dates obtained on calcrete from the Acheulian site of Nevasa in Maharashtra

and Yedurwadi in Karnataka are more than 350,000 B.P. (Mishra 1992). It is likely that with the refinement of dating techniques and their application to more sites, the antiquity of the lower Palaeolithic will go back to the lower Pleistocene i.e. between 2.0 and 0.7 million years. The upper limit of the Acheulian culture is equally uncertain. However, since at many sites the Acheulian grades into the middle Palaeolithic and since the absolute dates of the middle Palaeolithic sites range from ca. 150,000 to ca. 20,000 B.P., it is quite likely that the Acheulian tradition persisted, at least in some areas, well into the upper Pleistocene.

A hominid cranium (around 200,000 years old) has been discovered in the Acheulian bearing gravels of the Narmada river at Hathnora in Madhya Pradesh. This cranium represents an advanced stage of *Homo erectus* or early stage of *Homo sapiens* (Henry de Lumley and Sonakia 1985; M A de Lumley and Sonakia 1985; Kennedy and Chiment 1991).

2.3 Middle Palaeolithic

2.3a Geographical distribution: The Acheulian culture slowly evolved into the middle Palaeolithic by shedding some of the tool types and by incorporating new forms and new techniques of making them. In western Europe, the Near East, north Africa and central Asia, the middle Palaeolithic culture is associated with the physical remains of Neanderthal man (*Homo sapiens neanderthalensis*). Though no physical remains of Neanderthal man have been found in India, stone tools very similar to those found with this hominid species in Europe and other regions occur widely in the subcontinent. The middle Palaeolithic culture developed during the upper Pleistocene, a period of intense cold and glaciation in the northern latitudes. Areas bordering glaciated regions experienced strong aridity. That is perhaps the reason why middle Palaeolithic sites are comparatively sparse. In general, however, the middle Palaeolithic populations occupied the same regions and habitats as the preceding Acheulian populations. Middle Palaeolithic stone tool assemblages have been found in the Luni valley (Misra 1961), around Didwana (Misra and Rajaguru 1986), and at Budha Pushkar (Allchin *et al* 1978), all in western Rajasthan; at numerous sites in the valleys of the Belan (Sharma 1980; Jayaswal 1989); at Son (Ahmed 1966; Sharma and Clark 1983) and Narmada (Khatri 1962; Supekar 1968) and their tributaries in central India, in the Chota Nagpur plateau (Ghosh 1970), the Deccan plateau (Sankalia 1956) and the Eastern Ghats (Murty 1966; Misra 1989, also for bibliography). Like the Acheulian, the middle Palaeolithic occupations also occur at open-air sites along perennial as well as seasonal streams and on

hill slopes in most parts of the country, on dune surfaces in western Rajasthan and in the rock shelters in central India.

2.3b Technology: Middle Palaeolithic tools were primarily made on flakes and blades. They comprise side scrapers of various types, end scrapers, denticulates, notches, points and borers. They were made by finely trimming the edges of flakes and blades. Many of these scraper forms are believed to have been used for manufacturing wooden tools and weapons and also for processing animal hide. Some of the points are thought to have been hafted in wooden shafts for use as spears. Tools became smaller, thinner and lighter. Improved and economical techniques of removing flakes from cores such as Levallois and discoid core were used extensively. There was also a significant change in the choice of raw material for making tools. While quartzite, quartz and basalt continued to be used, in many areas they were replaced or supplemented by fine-grained siliceous rocks like chert and jasper. Factory sites at chert outcrops occur at many places in central India and Rajasthan. The smaller size of the tools is partly due to the small size of the natural nodules of chert and jasper.

2.3c Chronology: Several thermoluminescence and $\text{Th}^{230}/\text{U}^{234}$ dates from 16 R dune profile at Didwana range from 150,000 to 100,000 B.P. Over twenty radiocarbon dates obtained mostly on shell and bone from sites in the northern Deccan and central India range from 40,000 to 10,000 B.P. This shows that middle Palaeolithic assemblages persisted over a long period of time from the terminal middle Pleistocene to the greater part of the upper Pleistocene (Misra 1989).

2.4 Upper Palaeolithic

2.4a Palaeoenvironment: The upper Palaeolithic culture developed during the later part of the upper Pleistocene. The climate of this period was characterized by extreme cold and aridity in the high altitudes and northern latitudes. In northwest India extensive formation of sand sheets and sand dunes took place and the drainage became almost totally defunct due to the westward shift of river courses. Quaternary sediments like fluvial and colluvial deposits of upland Maharashtra and Manipur, aeolianites and calcarenites of Saurashtra, Kutch and Tamil Nadu, and oolitic limestones of the continental shelf of the Arabian Sea have been dated by ^{14}C and U/Th decay series methods (Baskaran *et al* 1986; Fontugne and Duplessy 1986; Kale and Rajaguru 1987). Well-dated geomorphic data suggests that the vegetation cover over most of the country thinned out during this period.

Coastal areas of southeastern Tamil Nadu, Saurashtra and Kutch developed quartz and carbonate dunes as a result of the lowering of the sea level. During terminal Pleistocene southwesterly monsoons became weak and the sea level decreased by scores of metres.

The rich fossil record from the peninsular rivers provides a good picture of the fauna of this period. Findings from the Belan and Son valleys, southern part of Allahabad, the Mahanadi valley in central India and Manjra, Godavari, Ghod and Krishna valleys in the Deccan include *Bubalus bubalis*, *Bos namadicus*, *Hexaprotodon palaeindicus*, *Cervus* sp. and *Canis* sp. This fauna suggests the existence of grassland environment with pockets of forests and swamps. The discovery of ostrich egg shells at over 40 sites in Rajasthan, Madhya Pradesh and Maharashtra, several of them dated by ^{14}C , shows that ostrich, a bird adapted to arid climate, was widely distributed in western India during the later part of the upper Pleistocene (Kumar *et al* 1988).

2.4b Geographical distribution (figure 1): Because of the arid climate and consequently sparse vegetation and animal life during this period, human populations were faced with restricted food resources. This is confirmed by the limited number of upper Palaeolithic sites in the arid and semi-arid regions. However, excellent archaeological evidence of this period comes from the Belan and Son valleys in the northern Vindhyas (Sharma 1980; Jayswal 1989; Sharma and Clark 1983), Chota Nagpur plateau in Bihar (Ghosh 1970), upland Maharashtra (Sali 1989), Orissa and from the Eastern Ghats in Andhra Pradesh (Murty 1968, 1981a; Nanda 1984; Raju 1988).

2.4c Technology: The upper Palaeolithic tool assemblages are essentially characterized by blade and burin tools and show a marked regional diversity with respect to the refinement of techniques and standardization of finished tool forms. The principal artifact forms in these assemblages are scrapers (side, convex, notch, end, steep, round, convergent, etc.), flake-blades, blades and cores; backed blade variants (straight back, curved back, backed knives, points, lunates, triangles and trapezes); burins, unifacial, bifacial and tanged points and choppers. Scrapers made on flakes suggest continuity of the middle Palaeolithic tradition. Parallel-sided blades struck from standardized prismatic cores are common in the Thar desert, Belan and Son valleys, Bhimbetka shelters, Maharashtra plateau and the Eastern Ghats. There is considerable regional diversity in tool forms and in the proportion of flakes and blades. The backed blade component among finished tools is conspicuous in the hinterland riverine ecosystems of the Eastern Ghats.

The food procurement technologies and behaviour reflected among the tribal populations of the country –

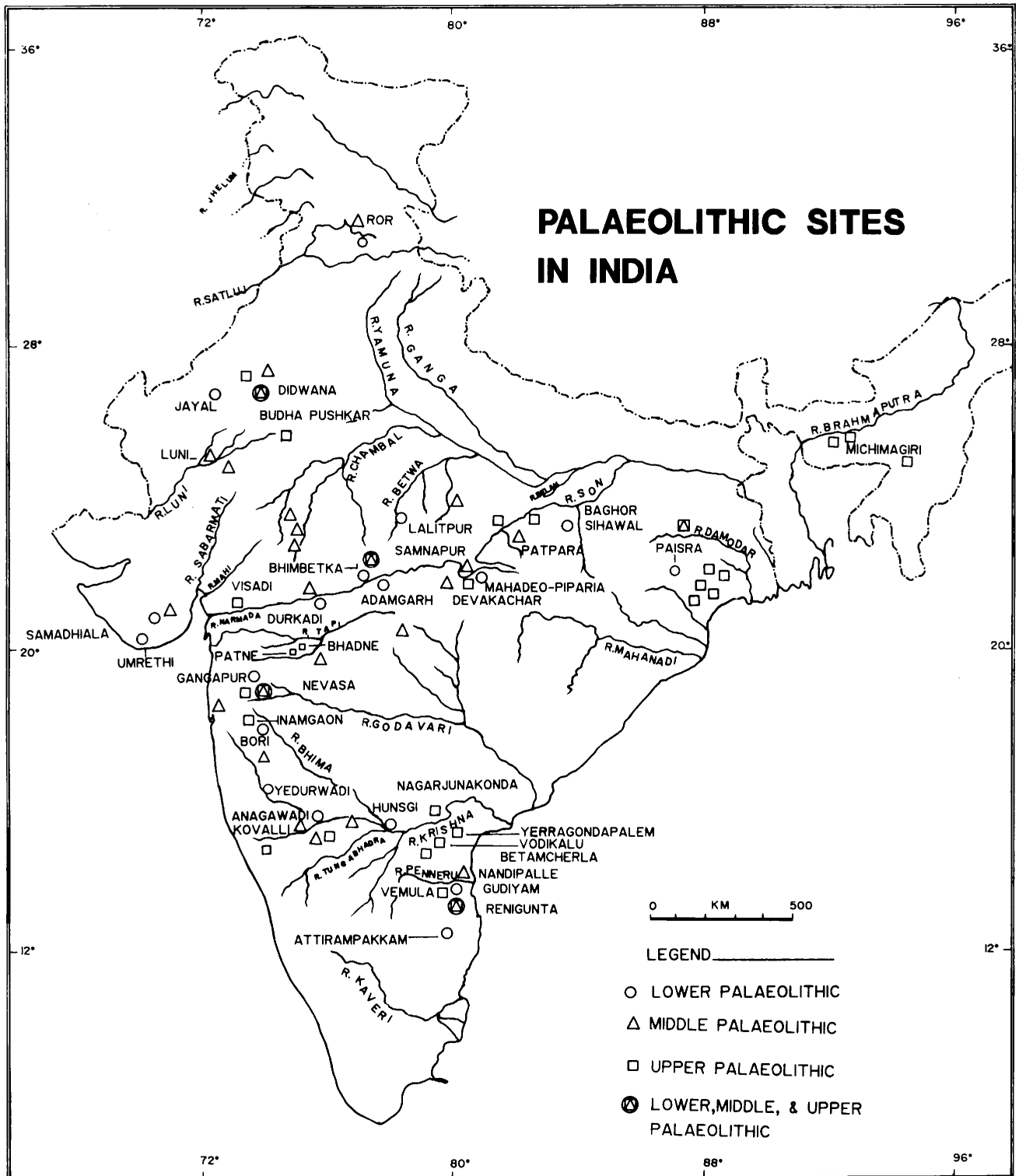


Figure 1. Palaeolithic sites in India.

particularly of central India and the Eastern Ghats – show that prototypes of traps, snares and nets must have been used during the upper Palaeolithic times. The various types of scrapers were probably used for wood and bamboo work. Simple blades and backed blades could have been used as inserts for spear points, arrow points, fishing arrows, barbed fish-hooks, thrusting spears, slicer knives and daggers. The large crescentic backed blade with blunted arc and straight and damaged cord, common in the Eastern Ghats, was probably used for wood work. Another striking feature in this region is the presence of bored stones and grinding slabs. Similar bored stones are being used by the Yanadi (Andhra Pradesh) fishermen as net sinkers in riverine fishing and the heavier ones are used by the Voda Baliye (Andhra Pradesh) and other groups for marine fishing. Upper Palaeolithic occupations in the Eastern Ghats are invariably associated with permanent water bodies, suggesting that aquatic foods must have been an important resource during this period. The grinding stones are likely to have been used for processing plant foods like wild rice (Murty 1981a).

2.4d Religion and art: Continuity of culture from the upper Palaeolithic to present times is especially seen in the sphere of religion. At the site of Baghor II in the Son valley archaeologists found a rectangular stone rubble platform with a triangular stone with natural concentric circles installed in the centre. Similar stones installed on stone platforms are today worshipped as mother goddesses by tribal communities in the area. The Baghor structure probably represented the earliest shrine in India and suggests a remarkably long continuity of mother goddess worship (Kenoyer *et al* 1983).

The earliest evidence of art, in the form of ostrich egg shell pieces engraved with cross-hatched designs from Patne (Sali 1989), comes from this period.

2.4e Chronology: A number of radiocarbon dates from upper Palaeolithic sites, available from Madhya Pradesh, Rajasthan and Maharashtra, suggest the duration of the upper Palaeolithic from 30,000 B.P. to 10,000 B.P. (Misra 1989).

3. Mesolithic

3.1 Geographical distribution and palaeoenvironment

The upper Palaeolithic period was succeeded by the Mesolithic. The subsistence economy of this period continued to be based on hunting and gathering. There was a marked growth in human population as is attested by the significantly increased number of sites (figure 2). For

example, in the case of rock shelters in central India while the Palaeolithic occupations occur only in a few shelters, evidence of Mesolithic culture occurs virtually in each one of the several thousand shelters either in the form of human habitation or paintings or both. Similarly, in the arid and semi-arid regions of western Rajasthan and Gujarat, which are extensively covered by sand dunes, Mesolithic artefacts are present virtually on every one of the thousands of dunes. A significant fact is that the first human colonization of the Ganga plains took place during this period as testified by the presence of more than two hundred archaeological sites in Allahabad, Pratapgarh, Jaunpur, Mirzapur and Varanasi districts of Uttar Pradesh (Sharma *et al* 1980). Similarly, the effective colonization of the deltaic region of West Bengal (Lal 1958) and West Coast, particularly around Mumbai (Todd 1950) and in Kerala (Rajendran 1983), took place during this period (Misra 1997).

The explanation for this dramatic increase in human settlements lies in the increased rainfall and its effect on the growth of plant and animal life at the beginning of the Holocene period, the evidence for which is provided by the pollen data from the salt lakes of western Rajasthan (Singh *et al* 1974), deep weathering of sand dunes in Rajasthan and Gujarat (Misra 1978) and presence of wind blown black clay deposits in central Indian rock shelters (Allchin *et al* 1978; Misra and Rajaguru 1986; Joshi 1978). This led to the availability of increased food resources all over the country and contributed to the growth of population.

3.2 Technology

The technology of the Mesolithic period is primarily based on microliths. These are tiny tools made from microblades of one to five cm length, by blunting one or more sides with steep retouch. The main tool types are backed blades, obliquely truncated blades, points, crescents, triangles and trapezes. These microliths were used as components of spearheads, arrowheads, knives, sickles, harpoons and daggers. They were fitted into grooves in bone, wood and reed shafts and joined together by natural adhesives like gum and resin. Evidence for such hafting comes from later sites in India and from Mesolithic and Neolithic sites in the Near East, Africa and Europe (Misra 1974). The use of bow and arrow for hunting became common in this period, which is evident from many rock paintings in central India (Wakankar and Brooks 1976; Neumayer 1983; Mathpal 1985). Small flake tools like side, end, round and thumb-nail scrapers, and burins also form part of these industries. Bifacial points made by pressure flaking are a characteristic feature of the Mesolithic industries of coastal dunes of

southern Tamil Nadu (Zeuner and Allchin 1956) and Sri Lanka. Bored stones, which had already appeared during the upper Palaeolithic, became common during the Neolithic and Chalcolithic periods. These are believed to have been used as weights in digging sticks and as net sinkers. Similarly, shallow querns and grinding stones

also occur at several sites. These new technological elements led to enhanced efficiency in hunting, collection and processing of wild plant foods (Misra 1976a). Heavy-duty tools like choppers and core scrapers have been found occasionally at Mesolithic sites in Orissa (Ota 1986; Mohanty 1988) and along the West Coast (Todd 1950).

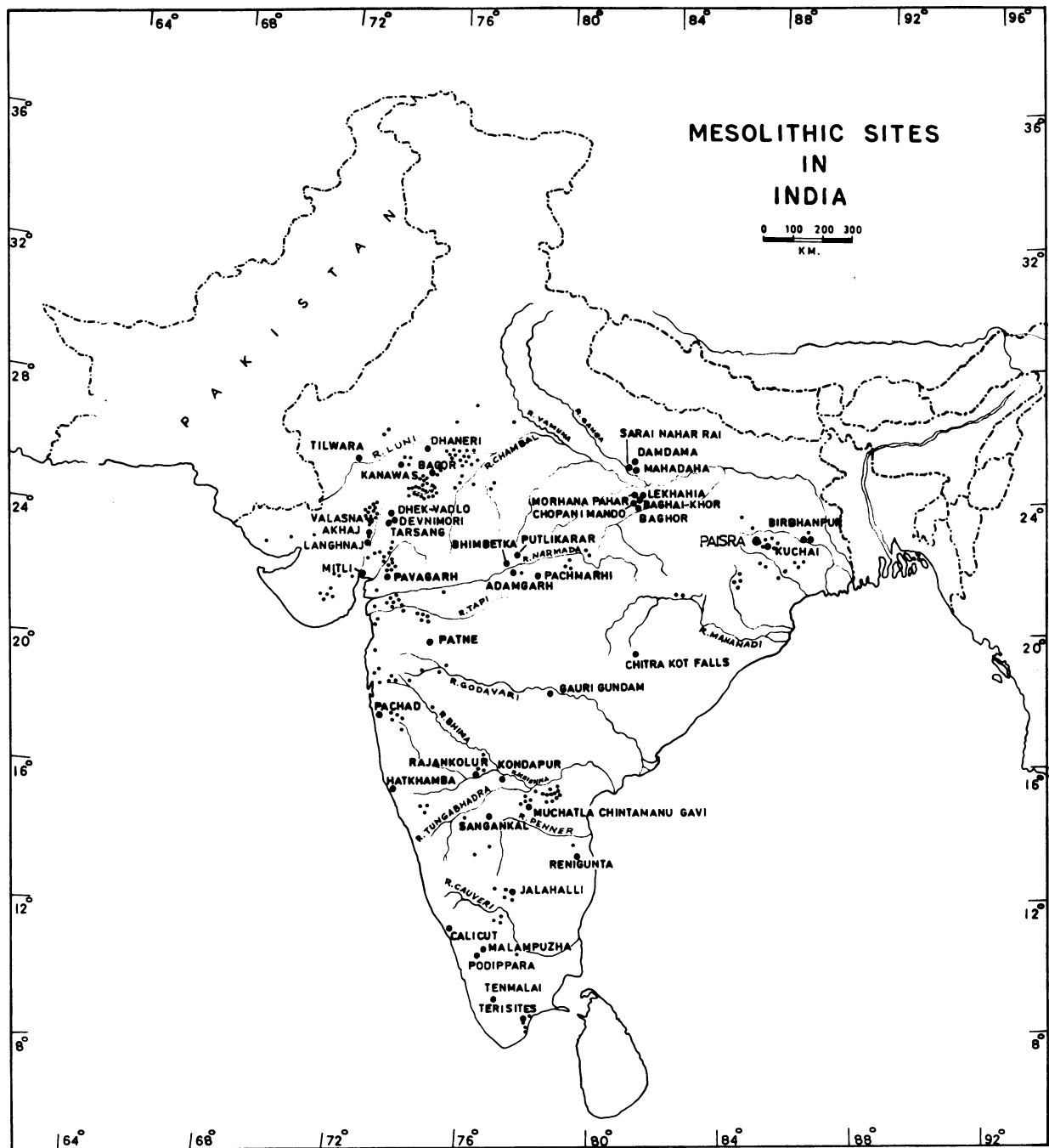


Figure 2. Mesolithic sites in India.

3.3 Settlement pattern and disposal of the dead

Increased food security during this period led to reduction in nomadism and to seasonally sedentary settlement. This is reflected in the large size of Mesolithic sites, thickness of habitation deposit both in open-air and rock shelter sites, and the presence of large cemeteries, particularly in the Ganga plains. The first evidence of intentional disposal of the dead comes from this period. Mesolithic human burials have been found at Bagor in Rajasthan (Misra 1973; Lukacs *et al* 1982), Langhnaj in Gujarat (Sankalia and Karve 1949; Ehrhardt and Kennedy 1965), Bhimbetka in Madhya Pradesh (Misra 1976a, 1997), and Lekhahia, Baghai Khor, Morhana Pahar (Varma 1986), Sarai-Nahar-Rai (Sharma 1973; Kennedy *et al* 1986), Mahadaha (Sharma *et al* 1980; Kennedy *et al* 1992) and Damdama (Varma *et al* 1985; Pal 1992) in Uttar Pradesh. At the last three sites cemeteries containing many individuals have been found. The dead were buried in graves both in extended and crouched position. In some cases two individuals were buried in a single grave. The dead were occasionally provided with grave offerings which include chunks of meat, grinding stones, stone, bone and antler ornaments, and pieces of haematite.

3.4 Art

Another significant feature of the Mesolithic period is art, mostly in the form of paintings. Several thousand rock shelters in the Vindhyan sandstone hills in central India contain enormous quantities of paintings on their walls, ceilings and in niches. They are found in both inhabited and uninhabited shelters. The paintings are made mostly in red and white pigments which were produced from nodules found in rocks and earth. Pieces of haematite used for producing pigment have been found at Bhimbetka and other sites. The paintings mostly depict wild animals and hunting scenes. There are also scenes of fishing, plant food and honey collecting, social and religious life. The paintings throw a light not only on the aesthetic sensibilities and artistic creativity of the Mesolithic people but also on their behaviour with respect to hunting and food gathering techniques, dwellings, their social and religious activities and contemporary fauna.

3.5 Chronology

The Mesolithic period is well dated by a large number of ¹⁴C dates from many sites in western and central India. These dates range from ca. 10,000 to 2,000 B.P. (Misra 1989). The hunting-gathering way of life was slowly replaced by food production from about 6000 B.C. However, even after several millennia of agriculture,

hunting-gathering as a way of life has not completely disappeared with many communities all over the country including the vicinity of metropolitan cities, continuing to subsist on this economic mode (Malhotra *et al* 1983; Misra and Nagar 1994; Nagar and Misra 1989, 1990, 1993).

4. Emergence of food production and its consequences

Even though there was steady but slow technological improvement during the Palaeolithic and Mesolithic periods lasting over a million or more years, the mode of subsistence continued to be based on hunting, fowling, fishing and wild plant food gathering. During this long period of interaction with wild animals and plants, humans acquired a thorough knowledge of their behaviour. This knowledge eventually culminated in the breeding of selected wild animals and cultivation of selected wild grasses. This change occurred around 10,000 years ago in the vast stretch of mountainous and hilly environment extending from the east coast of the Mediterranean to the eastern edge of the Baluchistan plateau. The first animals to be domesticated were dog, cattle, sheep and goat and the first plants to be cultivated were wheat and barley. This new subsistence economy based on food production had a lasting impact on the evolution of human society and the environment. In the humid lands, extending from the middle Ganga valley to China and Southeast Asia, rice cultivation and domestication of pig was accomplished probably around the same time because rice and pig existed in wild form in this region. The cultivation of yams and taro also took place in this region. Domesticated animals proved to be useful not only for meat but also for milk, hide, agricultural operations, and transport.

The assured food supply generated by agriculture led to sedentarization of human settlements and establishment of villages. It increased human population dramatically as also longevity. In the new economy the old people as well as the young, who were unable to contribute to the food acquisition during the preceding hunting-gathering stage, became active participants. They could tend cattle, sheep and goats and protect crops from pests, especially birds. In due course, as the efficiency of agricultural production improved, some farmers were able to generate surplus food. As a consequence, a section of the population were freed from the task of food production and their talents and energies were diverted to tasks such as the production of pots, baskets, quarrying of stone, making of bricks, masonry and carpentry. Subsequently, society saw the emergence of other occupations such as the oil presser, washerman, barber, musician, dancer, priest, etc. The

egalitarian hunting-gathering society thus became divided into occupational groups. The generation of agricultural wealth also led to the division of the society into rich and poor and exploiters and exploited. This transition from hunting-gathering to food production has been aptly designated as the Neolithic revolution (Childe 1936).

Around 7000 years ago, extraction and smelting of copper began in West Asia and a new raw material was added for use in technology. In due course, it was found that the addition of tin to copper produced bronze which was a stronger metal than copper. The use of bronze for tools led to the invention of wheel which revolutionized transport and pottery production.

4.1 Mehrgarh, the oldest agricultural settlement in the Indian subcontinent

Agriculture-based Neolithic settlements, which used only stone tools, have been known from sites like Rana Ghundai and Kili Ghul Mohammad in the hilly terrain of Baluchistan for several decades. Their beginning was dated to ca. fourth millennium B.C. However, excavations at Mehrgarh by the French Archaeological Mission to Pakistan, under the direction of Jean-Francois Jarrige since 1974, have pushed back the antiquity of settled village life in the subcontinent to the seventh millennium B.C. They have also provided excellent evidence of technology, economy, material culture and social organization of the pioneering farmers of South Asia (Jarrige 1986). The site of Mehrgarh is located on the Bolan river, a tributary of the Indus, at the eastern edge of the Baluchistan plateau overlooking the Indus plain.

The cultural history of the site has been divided into eight periods. The earliest period IA, dated from ca. 6,000 B.C. to 4,400 B.C., is characterized by polished stone tools, microliths and bone tools. In this phase the subsistence economy consisted of a combination of hunting, stock-breeding and plant cultivation. The domesticated animals comprise cattle, sheep, goat and water buffalo while the cultivated plants comprise several varieties of wheat and barley. The houses were made of mud and mud-bricks. Multiple rooms without doors are believed to have been used for storing grain. The dead were buried under the floors of the houses where people lived. Some of the skeletons which were buried have been found sprinkled with red ochre. Necklaces of microbeads of steatite along with beads of turquoise, lapis lazuli and sea shell, stone axes and microliths have also been found in the graves. In two cases, bodies of young goats were also found. There was no pottery at this stage but baskets coated with bitumen were used. The presence of beads of several materials, which are not available in the immediate vicinity of the site, indicates the presence of

long distance trade. Period IB saw the appearance of pottery. With the passage of time the role of hunting declined and that of agriculture increased.

Period II, dated to later part of the fifth millennium B.C., is divided into three sub-periods on the basis of changes in ceramic technology. The pottery of sub-period IIA is handmade, basket-impressed coarse ware. Its quality improved in sub-period IIB. In sub-period IIC wheel-made pottery made its appearance. The vessels of buff to reddish colour were painted in black pigment with simple straight and curved lines, rows of dots and criss-crosses. The vessel shapes included bowls and globular pots. Sickles made of stone bladelets, set obliquely in wood handles with bitumen as the adhesive material, may have been used for harvesting. Discovery of a copper ring and a bead show the emergence of metal technology. Terracotta human figurines and bangles also appear in this phase. Appearance of a new variety of barley, viz. *Hordeum sphaerococcum*, which can be grown only in irrigated fields, suggests improvement in farming technology. The presence of cotton seeds suggests the possibility of the use of this fibre for textile manufacture. Narrow rooms were probably used as granaries.

Period III saw a marked increase in the size of the settlement and remarkable development in ceramic industry. Vessels were now decorated with paintings of birds and animals as also with geometric designs. In the agriculture repertoire oats and another variety of wheat were added. There is evidence of stone bead manufacture and copper smelting at the site. Architectural remains include a large granary with multiple rectangular cells, much larger than the granaries of the preceding periods. Period IV is marked by the emergence of polychrome pottery with a tall goblet with wide mouth and a pedestal base as a new shape. There is evidence of extensive use of timber in the construction of houses, of female terracotta figurines with pendulous breasts and of stamped seals of terracotta and bone. The appearance of seals, including compartmented ones, in terracotta and stone indicates the emergence of commercial transactions. Period V was short-lived and is characterized by a marked decline in polychrome decoration on pottery. Period VI, belonging to the first quarter of the third millennium B.C., witnessed an explosion in pottery styles and the first evidence of pottery kilns. *Pipal* leaf and humped bull designs appear on pottery which anticipate Harappan motifs. Similarly, terracotta figurines also witnessed proliferation. The female figurines show elaborate hairdos. Period VII can be dated to the middle of the third millennium B.C. on the basis of ceramic similarities with sites in the Indus Valley and Afghanistan. This period is particularly marked by the richness and variety of terracotta figurines. Some of the figurines have a red paint in the medial partition of the hair suggesting the popular practice among Hindu women.

Among animal figurines mention should be made of terracotta bulls with prominent humps and rams made in alabaster. Terracotta seals have designs of *swastika*, cruciforms and running animals. The discovery of a very large mud-brick platform signifies the emergence of monumental architecture. The last occupation (period VIII) at the site is represented by some structures, graves, semi-precious stone beads and a bronze shaft-hole axe.

The cultural history of period VI onwards at Mehrgarh is continued at the nearby site of Nausharo where the habitation starts in the first quarter of the third millennium B.C. (Jarrige 1990).

4.2 Diffusion of agriculture into the Indus valley

The narrow hill valleys of Baluchistan could hardly contain the population explosion triggered by the agricultural economy, and it was to be expected that this increase in population would overflow into the vast Indus plain. The hills separating the narrow valleys of Baluchistan impeded easy communication and hence the lack of a uniform culture in this area. As a result, several regional cultures like those of Zhob, Nal and Kulli developed with their distinctive ceramic styles. There are a number of other Neolithic settlements in Baluchistan and north Punjab which show that in the fifth and fourth millennia B.C. farmers had started moving to the north and east. These include the sites of Periano Ghundai, Gumla and Rahman Dheri in the Gomal valley and those of Jhang and Sarai Khola west of Islamabad (Allchin and Allchin 1982).

5. Indus/Harappan civilization

As we have seen, a variety of crafts like wheel made pottery and elaborately decorated ceramics, stone bead industry, terracotta animal and human figurines, and copper-bronze metallurgy had already appeared in the village cultures of Baluchistan in the fifth millennium B.C. By the beginning of the fourth millennium B.C. permanent settlements began to appear in the Indus valley as also in the valley of the presently dried-up Ghaggar-Hakra river which was flowing parallel to, and east of the Indus. It is in this vast and fertile alluvial plain that the first urban settlements characteristic of the Indus/Harappan civilization appeared. Indus/Harappan civilization is one of the three oldest civilizations of the world, the other two being those of Mesopotamia (present-day Iraq) and Egypt. All the three civilizations flourished along large perennial rivers flowing through desert environment. But the Indus civilization, covering an area

of about one million sq. km, was geographically the largest of them.

5.1 Geographical extent

Discovered in 1921–1922 during excavations at Mohenjodaro, located on the Indus river in Sindh, and at Harappa, located on the Ravi, a tributary of the Indus in Punjab (both now in Pakistan), this civilization has received more attention from archaeologists (Indian, Pakistani and foreign) than any other ancient culture of South Asia (figure 3). Extensive and intensive explorations during last eight decades have led to the discovery of more than 1500 sites of this civilization. They are spread over a large area encompassing Saurashtra, Kutch, the western plain of mainland Gujarat, northwestern corner of Rajasthan, entire Punjab and Haryana, western Uttar Pradesh and southern part of Jammu in India; almost entire Pakistan, and southern part of Afghanistan. Almost two-thirds of these sites are located along the dry courses of the Ghaggar-Hakra and its many palaeochannels in Punjab, Haryana and Rajasthan states of India and the Bahawalpur province of Pakistan. Over 350 sites of this civilization have been located in the hyperarid Cholistan desert of Pakistan which is covered by extensive sand dunes, receives hardly any rainfall, and has no natural surface water. These sites range from temporary camps and industrial centres through small villages and towns to large cities (Mughal 1997). Two of the largest Harappan sites, namely Rakhigarhi in Haryana and Ganweriwala Ther in Cholistan, are located on this dead river. They are more than 100 hectares in size and are comparable to Mohenjodaro, the largest settlement of the civilization.

5.2 Indus civilization and the Rigvedic Saraswati

The Harappan settlements located on the Ghaggar-Hakra and its palaeochannels could have flourished only if the Ghaggar-Hakra was a perennially flowing river in the past. This would have been possible only if it received water from the melting of Himalayan glaciers. However, the seasonal streams which combine to form the Ghaggar in northern Rajasthan, all originate in the Siwalik hills which have no permanent snow cover. Also, there is no opening in the Siwalik mountains – the source of these rivers – through which Himalayan waters could flow into the bed of the Ghaggar-Hakra. The wide but shallow bed of this river is composed of loam and is lined by sand dunes on both banks and has many historical settlements on its banks. This dry river has been a subject of curiosity to geographers and geologists for more than 150 years. In the last quarter of the nineteenth century scholars like C F Oldham (1874, 1893) and R D Oldham (1887) had come

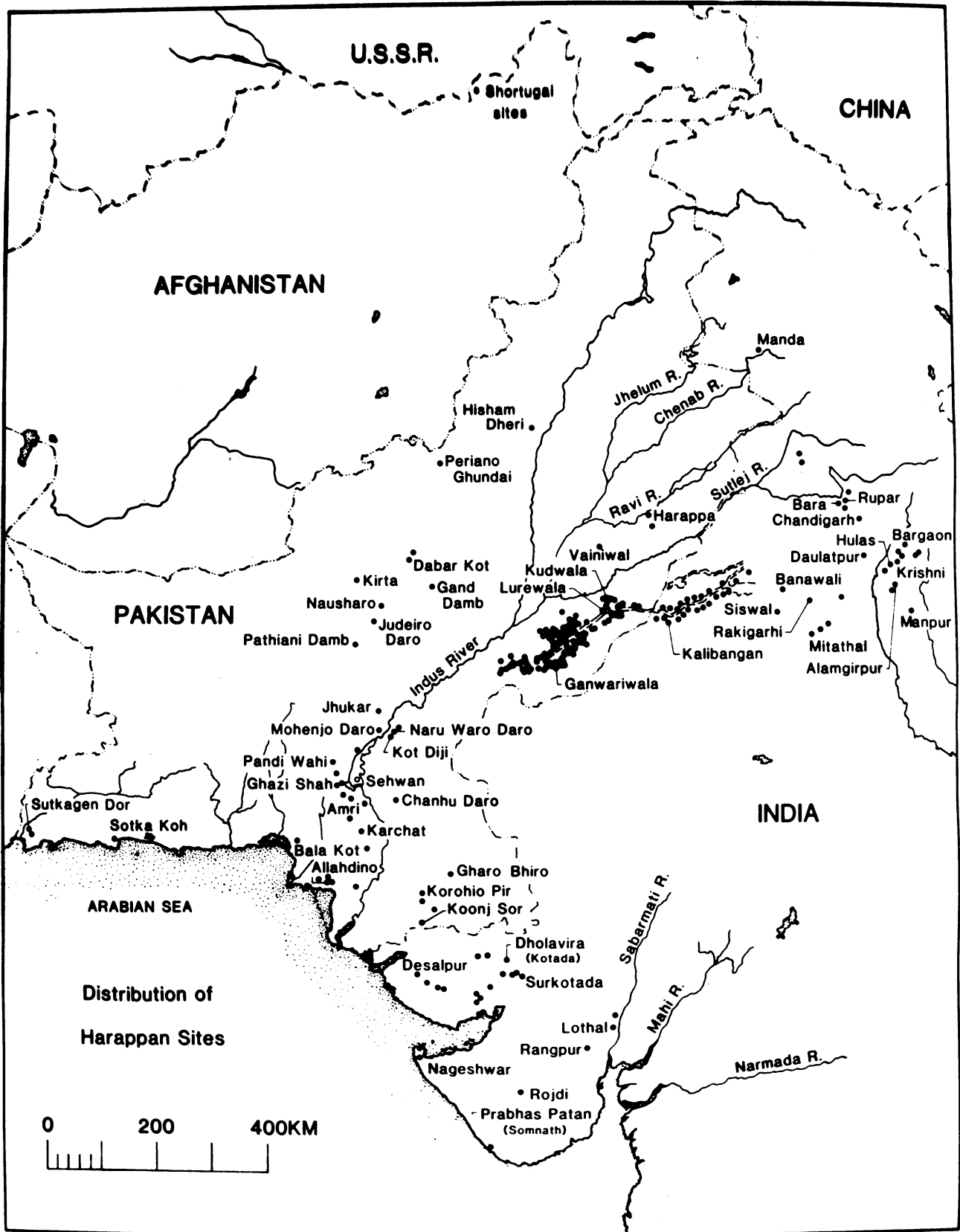


Figure 3. Harappan sites.

to the conclusion that the present-day bed of the Ghaggar-Hakra is actually the bed of the ancient river Saraswati which has been eulogized in many hymns of the Rigveda as a mighty, perennial and sacred river, flowing from the mountains into the Arabian sea. In the later epics (*Mahabharata* and *Ramayana*) this river is described as having disappeared underground. This phenomenon is consistent with the post-Harappan archaeological history of the region. These scholars concluded that the Saraswati could have been a perennially flowing river only if the waters of the Sutlej or the Yamuna or both flowed in the past through the channel of this river rather than through their present channels. There is ample geomorphic, archaeological, historical and folkloristic evidence to conclusively establish that this indeed was the case (Misra 1994).

For example, there is a complete absence of Harappan sites along the present courses of the Yamuna and the Sutlej, barring some late Harappan sites on the upper course of the Sutlej where it flows parallel to the Siwaliks. Had these two rivers been flowing in their present channels during the Harappan times, the Harappan people would have certainly established their settlements along their banks. On the contrary, there are many sites of the later Painted Grey Ware (PGW) culture along the banks of these rivers. This culture is associated with places which figure prominently in the story of the *Mahabharata* epic. The PGW culture is dated by a number of ¹⁴C dates to 1000–600 B.C. This implies that the Sutlej and the Yamuna had shifted their courses into their present channels before 1000 B.C. leaving the Saraswati (Ghaggar-Hakra) with steadily shrinking water supply and eventual desiccation.

Because of the important role played by the Saraswati in the growth and decline of the Indus civilization Gupta (1996) has renamed it as Indus–Saraswati civilization.

5.3 Excavated sites

Nearly fifty sites of this civilization have been excavated during the last eighty years. The more important among them are: Mohenjodaro (Marshall 1931), Chanhudaro (Mackay 1943), Kot Diji (Khan 1964), Amri (Casal 1964), Balakot (Dales 1979) and Allahdino (Fairservis 1982) in Sindh; Nausharo (Jarrige 1990) in Baluchistan; Harappa (Vats 1940) in Punjab; all of them in Pakistan; Shortughai (Francfort 1989) in Afghanistan; Rupar (Sharma 1956) and Banawali (Bisht 1978) in Haryana; Kalibangan (Lal and Thapar 1967) in Rajasthan; Alamgirpur (Sharma 1989) and Hulas (Dikshit 1981) in Uttar Pradesh; and Lothal (Rao 1973), Rangpur (Rao 1963), Rojdi (Possehl and Raval 1989), Surkotada (Joshi 1990), Kuntasi (Dhavalikar *et al* 1996), Nagwada (Hegde *et al*

1988), Nageshwar (Hegde *et al* 1990), and Dholavira (Bisht 1991) in Gujarat. These excavations have produced an enormous amount of evidence which provides a comprehensive picture of this civilization.

5.4 Spatial and temporal variation

Early writers on the Indus civilization like Sir John Marshall, M S Vats, E J H Mackay, Stuart Piggott (1950) and Sir Mortimer Wheeler who used data available only from a handful excavated sites like Mohenjodaro, Harappa and Chanhudaro, had laid great emphasis on the spatial and temporal uniformity of the civilization. However, evidence from many sites excavated during the last fifty years has shown that there was considerable spatial and temporal diversity in the civilization in key areas like town planning, architecture, ceramics, crafts, disposal of the dead and religion.

5.5 Chief characteristics

The chief characteristics of the Indus/Harappan civilization are planned cities comprising a citadel for the aristocracy and a lower town for the common people, with roads and streets running at right angles; the city enclosed by a fortification with impressive gateways; public buildings like the Great Bath at Mohenjodaro, dockyard at Lothal and granaries at several cities; elaborate drainage system comprising public and private drains; houses provided with paved baths; strict enforcement of municipal laws ensuring maintenance of cleanliness and absence of encroachment on public areas; use of both kiln and sun-baked bricks in construction; sturdy wheel made pottery, profusely decorated by painted naturalistic and geometric motifs; uniform chert weights (the Harappan weights are made of chert which is a fine-grained siliceous rock) and measures of metal and ivory; a uniform script depicted on steatite and other seals and tablets, often accompanied by masterly carved animal and human figures; fine jewellery made of gold, silver, copper, ivory, shell, semi-precious stones, steatite, faience and terracotta. Particularly attractive are etched carnelian beads.

5.6 Economy

The agricultural economy of the Harappans was based on the cultivation of wheat and barley in the Indus plains and of millets like *jowar* (*Sorghum bicolor*), *bajra* (*Pennisetum typhoideum*), *ragi* (*Eleusine coracana*), little millet (*Panicum miliare*) and Italian millet (*Setaria italica*) in

the semi-arid region of Gujarat. At a later stage, probably when the Harappans came into contact with the rural societies of the Ganga plains, rice was also added to their agriculture (Weber 1991).

There is evidence of specialized industrial production of a variety of items from several sites; for example stone beads at Chanhudaro in Sindh and Nagwada in Gujarat; shell objects at Nageswar, Nagwada and Kuntasi in Gujarat; and copper-bronze objects from Ganeshwar in Rajasthan (Lal 1997; Kenoyer 1998). The Harappans had a vast and elaborate trade network covering a large area from western India to West Asia, both overland and by sea. There are depictions of boats on Indus seals and tablets, very similar to those still in use on the Indus river as well as in coastal trade between India and the Persian Gulf countries. The discovery of a large brick structure (220 × 70 m) at Lothal in Gujarat has been interpreted as a dockyard for berthing ocean-going vessels. Dholavira, a large settlement located on an island in the Great Rann of Kutch and overlooking the Arabian sea towards Karachi, was also a port city and was probably intended to protect the sea-borne trade from pirates.

The Harappans obtained raw materials for their manufactures from far off places. These included copper from Khetri region in the Aravalli hills in Rajasthan, semi-precious stones for bead industry from Ratanpura in Gujarat, gold from Kolar mines in Karnataka, and lapis lazuli from Badakhshan in Afghanistan. Harappan seals have been found at a number of sites in Iraq, Iran and the Persian Gulf region. Similarly, Harappan pottery has been found at sites in Oman in the Arabian peninsula. Cuneiform inscriptions from Mesopotamia mention the lands of Dilmun, Magan and Meluhha being involved in the sea borne trade. Meluhha is believed to be the domain of the Indus civilization, particularly the coastal region directly connected with West Asian trade. Dilmun has been identified with the island of Bahrain in the Persian Gulf where distinctive type of seals, sharing features of Indus and Mesopotamian seals and known as Persian Gulf seals, have been found. Magan is thought to refer to the Makran coastal region of southeastern Iran and adjoining Baluchistan. The discovery of a large brick-built tank at Lothal, identified as a dockyard, confirms the presence of sea borne trade (Ratnagar 1981; Chakrabarti 1990). The Harappans also had trading with contemporary hunting-gathering communities (Misra 1976b; Possehl and Kennedy 1979).

5.7 Society

Harappan society was stratified on economic and social bases. The layout of the Harappan cities consisted of two parts, a citadel on the western side and a lower town on

the eastern side, the two separated by empty space. The citadel was situated on artificially raised ground and contained habitational structures for the ruling classes and the aristocracy as well as public buildings like granaries and the Great Bath at Mohenjodaro. The lower town was inhabited by the common people. At Dholavira the settlement consists of three parts, namely lower town, middle town and citadel, the citadel itself consisting of two parts. The society comprised of farmers, artisans, traders, administrators, priests and workers. The religion of the Indus people is thought to have been centred around the worship of the mother goddess, a male deity believed to be a proto type of *Shiva* in his form of *Pashupati* or lord of the beasts and the *pipal* tree. However, there seems to have been regional variation in objects of worship and rituals. Clay figurines of mother goddess are common at Mohenjodaro and sites in Baluchistan, but are rare in the Saraswati valley and in Gujarat. At Kalibangan and Rakhigarhi, fire altars with cylindrical clay objects inside them are believed to be of ritual significance.

In the early days Mohenjodaro and Harappa were thought to be the twin capitals of the Harappan empire. When Kalibangan was excavated in the 1960s, it was interpreted as a provincial capital. Now at least three other cities, Ganweriwala Ther, Rakhigarhi and Dholavira, each extending over more than a hundred hectares, are known. Each of these big cities is likely to have been a regional commercial, political and administrative centre.

5.8 Disposal of the dead and biological composition of the population

The Harappans disposed of their dead usually by burial in pit graves. The dead body was laid in an extended form and buried with many items mainly clay pots, which originally must have contained food and drink. There are instances of graves being lined with bricks and wooden coffins having been used. There are also rare examples of pot burials containing fragmentary bones. Large cemeteries containing many burials have been found at Harappa, Lothal and Kalibangan.

In terms of their biological composition the Harappan populations were very close to the contemporary populations of various Harappan regions. Early studies on human skeletons were almost exclusively concerned with metrical analysis and classification of populations into racial categories. In recent years the emphasis has shifted to understand the adaptation of individual populations to their natural and social environments and in learning about their nutritional patterns and disease (Kennedy 1984, 1992; Lukacs 1992; Lovell and Kennedy 1989).

5.9 Script

A major enigma of the Indus civilization is its script. It occurs in the form of pictographic signs on seals, tablets and pottery. On seals the script is associated with masterly carved miniature animal figures. Recently a short inscription of large letters has been discovered on the floor of a structure at Dholavira. The number of signs in individual inscriptions is very small, from a minimum of five to a maximum of seventeen. The script was written from right to left. In cases where there are two or more lines it is boustrophedonic (a style of writing in which one line is written from one direction and the second line from the opposite direction). A remarkable feature of the script is its uniformity throughout the vast area and long duration of the civilization. A number of claims have been made regarding the deciphering of the script but none has won the acceptance of archaeologists and linguists (Parpola 1994; Possehl 1996).

5.10 Origin, growth and decline

For several decades following its discovery, the origin of the Indus civilization seemed mysterious. The cities of Mohenjodaro and Harappa were known only as fully developed urban centres from the very beginning. It was believed that the inspiration, if not the actual founders, of the Harappan cities came from Mesopotamia which had an older history of civilization. However, during the last fifty years excavations at many sites, particularly at Harappa, Kot Diji, Amri, Kalibangan, Mehrgarh and Dholavira, have revealed the process of the growth of urban settlements from small rural societies. The civilization is now seen as a uniquely South Asian development. Four stages have been distinguished in the development of the civilization. These are: (i) Hakra Ware or Ravi phase (3500–3000 B.C.), known from many sites in the middle Ghaggar valley and at Harappa; (ii) early Harappan phase (3000–2600 B.C.) characterized by the emergence of several urban features like town planning, developed metal technology, and incipient Harappan script and represented at several sites like Harappa, Kot Diji, Amri, Kalibangan and Dholavira; (iii) the mature or urban Harappan phase (2600–1900 B.C.) characterized by the full growth of urban economy and society and represented at a large number of settlements like Mohenjodaro, Harappa, Lothal, Kalibangan and Dholavira; and (iv) late Harappan phase (1900–1500 B.C. or even later) marked by the collapse of the urban character and fragmentation of the urban society into small semi-urban and rural settlements, located mainly in the upper reaches of the Ghaggar tributaries, Ganga-Yamuna Doab and Gujarat.

Many factors are believed to have been involved in the decline and disappearance of this civilization. These include reduction in rainfall, foreign invasions, tectonic rise of the land leading to blocking of the flow of the Indus river and eventual migration of the people from Mohenjodaro, environmental degradation due to excessive use of soil and plant resources, and hydrological changes. While all of them played varying roles in different areas, the cessation of the flow of water into the Saraswati due to shifting of the courses of the Yamuna and the Sutlej towards southeast into the Ganga and towards southwest into the Indus, respectively caused a major disaster, leading to abandonment of settlements in the Saraswati valley and migration of population towards the foothill zone of the Siwaliks, the Yamuna-Ganga Doab and Gujarat.

6. Emergence of farming societies outside the zone of the Indus civilization

Explorations and excavations during the last five decades have thrown a flood of light on the diffusion of farming-based settled village life beyond the domain of the Indus civilization. These have led to the discovery of more than a thousand sites covering all parts of the country except the West Coast, including Kerala. These sites can be divided into two culture groups, namely Neolithic and Chalcolithic. Elsewhere in the World the Neolithic period preceded the Chalcolithic period but in India the two flourished simultaneously during fourth to second millennia B.C. Both groups of cultures represent a farming-based, settled village way of life but Chalcolithic represents a more developed stage. While the subsistence base of both groups is fairly similar – being based on a combination of plant agriculture, animal husbandry, hunting, gathering, fishing and fowling – the role of individual components differs from one culture to the other. Besides, there are important differences between Neolithic and Chalcolithic with respect to the distribution pattern, technology, architecture and ceramics. Similar differences also exist between individual cultures within each group.

The Neolithic cultures have a comparatively restricted distribution, being confined to the Kashmir valley, the northern Vindhya, middle Ganga valley, and eastern, northeastern and south India. The Chalcolithic cultures have a much wider distribution, being found in the entire Ganga valley, eastern Rajasthan, Malwa or western Madhya Pradesh, some parts of Gujarat, western Maharashtra, and the northern Vindhya. With respect to technology, the main component in the Neolithic cultures consists of ground or polished stone tools like axes, adzes, wedges and chisels while in the Chalcolithic cultures

these types are represented by their copper counterparts. However, microliths, flakes and blades, bone tools, and stone and terracotta sling balls occur in both groups, as do domestic stone objects like querns, rubbers, pestles and hammerstones. The architecture in both groups was very simple, consisting mainly of wattle-and-daub circular or rectangular huts, but some of the Chalcolithic cultures show incipient settlement planning, impressive multi-roomed houses made of semi-dressed stones and mud-bricks and even defence architecture like ramparts and moats. In ceramic technology also the Chalcolithic cultures are more advanced. Neolithic pottery is largely handmade, coarse clay. It is poorly baked, mostly undecorated and appears drab having a limited repertoire of shapes and designs. In contrast, the Chalcolithic pottery is largely wheel made, of fine fabric having a superior surface finish. It is fired at a higher temperature and is hence sturdy. It also has a larger range of shapes and decorative motifs.

These early village cultures constitute the basis of present-day Indian rural society which, but for the replacement of copper-stone technology by that of iron and the transformation of ancestral occupational groups into castes, has not significantly changed over the last six thousand years. They also form the foundation of the present-day linguistic-cultural regions of India.

7. Neolithic cultures

Several regionally distinct Neolithic cultures have been identified in the Kashmir valley, the northern Vindhyas and the middle Ganga valley, eastern India, northeast India and south India (figure 4). These are briefly described below.

7.1 Kashmir valley

7.1a Dwellings: In the Kashmir valley nearly forty Neolithic sites have been discovered. They are located on the elevated Karewa deposits overlooking rivers and lakes. Of them two, namely Burzahom (*IAR* 1960–1961, p. 11; 1961–1962, pp 17–21; 1962–1963, pp 9–10; 1964–1965, p. 13; 1965–1966, p. 19; 1968–1969, p. 10; 1971–1972, p. 24; Kaw 1989) and Gufkral (*IAR* 1981–1982, pp 19–25) have been excavated. The finds from these excavations give a fairly good picture of the life of the pioneering farmers of the valley. The Neolithic people lived in pits dug into the compact Karewa loess, obviously to protect themselves from the freezing winds during winter. Post-holes around the mouth of the pits were probably intended to provide a roof thatched with birch and hay of which charred remains have actually been found from the pits. Steps were cut into the walls of the

pits for entry and exit, and the walls and floors were plastered with lime. Shallow pits were probably used for habitation during summer. Evidence of human occupation in the pits occurs in the form of ovens, charcoal, ash, pottery, stone tools, human burials and animal bones. During the later stage, habitation structures were also made on the surface. These were made of mud as well as mud-bricks.

7.1b Technology: The technology of the pioneering settlers consisted of stone, bone and antler tools. The stone tools comprised polished axes and chisels, harvesters, pounders, polishers, querns, grinders and perforated discs, the last probably used as maceheads or weights of digging sticks. The harvesters are rectangular knives with two or more holes on the blunt side, probably for hafting. This type is unknown outside the Kashmir valley in India but is found at north Chinese Neolithic sites. The bone and antler tool industry was sophisticated and produced harpoons, spatulae, needles, awls, spear-points, arrowheads, daggers and scrapers. Other items of material culture are beads of semi-precious stones, terracotta bangles and cowrie shells.

7.1c Economy: The subsistence economy of the Neolithic people was based on a combination of plant cultivation, animal husbandry and hunting-gathering. Among the cultivated crops, seeds of wheat (*Triticum* sp.), barley (*Hordeum vulgare*), common pea (*Pisum arvense* L.) and lentil (*Lens culinaris*) have been found. The domesticated animals include cattle, sheep, goat, pig, dog and fowl. The wild animals include red deer, Kashmir stag, ibex, bear, wolf, hedgehog, beaver and rodents.

7.1d Pottery: The earliest settlers were unfamiliar with pottery but after some time they learnt its manufacture and use. The pottery is largely handmade though in the later stage wheel-made pots also appear. Some of the handmade pots have mat impressions on their bases, suggesting that they were placed on mats for drying. The vessel shapes comprise jars, vases, globular pots, basins, dishes-on-stand and bowls. Occasionally, the pots are decorated with paintings. Of special significance is a globular pot with painting of a horned deity, very similar to specimens from Kot Diji and Gumla in Pakistan. This find, along with that of a copper hairpin from the upper levels of Gufkral, resembling a specimen from Chanhudaro in Pakistan, suggests contact between the Kashmir Neolithic and the Harappan civilization.

7.1e Disposal of the dead: The Neolithic people buried their dead, practising both primary and secondary burial. In a primary burial the body was placed in a crouched position and sometimes dogs were buried with the master

Discovery of semi-precious stone beads in some graves shows that the dead body was buried wearing necklaces. In secondary burials bones were sometimes treated with red ochre. Graves of animals like dog, wolf and ibex have also been found.

Seven uncalibrated C14 dates from Burzahom give a time bracket of 2400–1500 B.C. for the Neolithic culture of Kashmir.

7.2 The northern Vindhyas and the middle Ganga valley

7.2a The ethnographic scene: Historically this region is of crucial importance. It is the meeting ground of three major linguistic-cultural streams of the country, namely the Indo-Aryan, Dravidian and Austro-Asiatic. The bulk of the populations especially of the Ganga valley, speaks

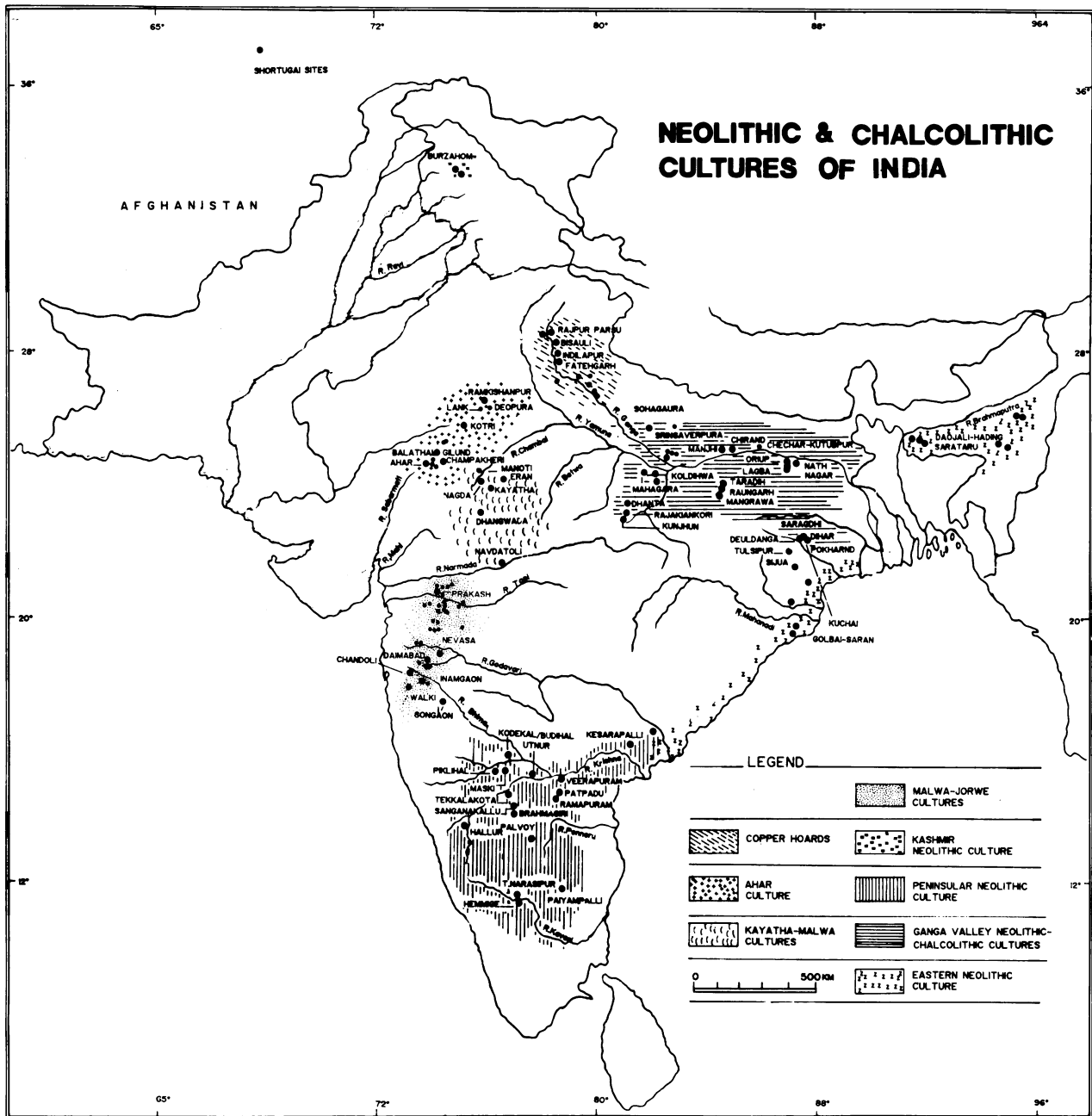


Figure 4. Neolithic and chalcolithic cultures of India.

languages derived from Sanskrit, like Hindi, Oriya and Bengali. However, some of the tribal communities like the *Gonds* of southern Uttar Pradesh, Madhya Pradesh, Bihar and Orissa, and the *Oraons* of Chota Nagpur plateau of Bihar and West Bengal speak *Gondi* and *Kurukh* respectively, which belong to the Dravidian family. Other tribes like the *Kols*, *Musahars* and *Korwas* of southern Uttar Pradesh, the *Mundas* and *Santhals* of Bihar, Orissa

and West Bengal, and the *Gadabas*, *Saoras* and *Bondos* of Orissa speak languages belonging to the Austro-Asiatic family (figure 5).

Geographically, the region consists of two contrasting environments. The Ganga valley in the north is a vast, flat alluvial plain with a moderate slope from northwest to southeast. It receives ample rainfall, is drained by many perennial rivers, has extremely fertile soil and is the

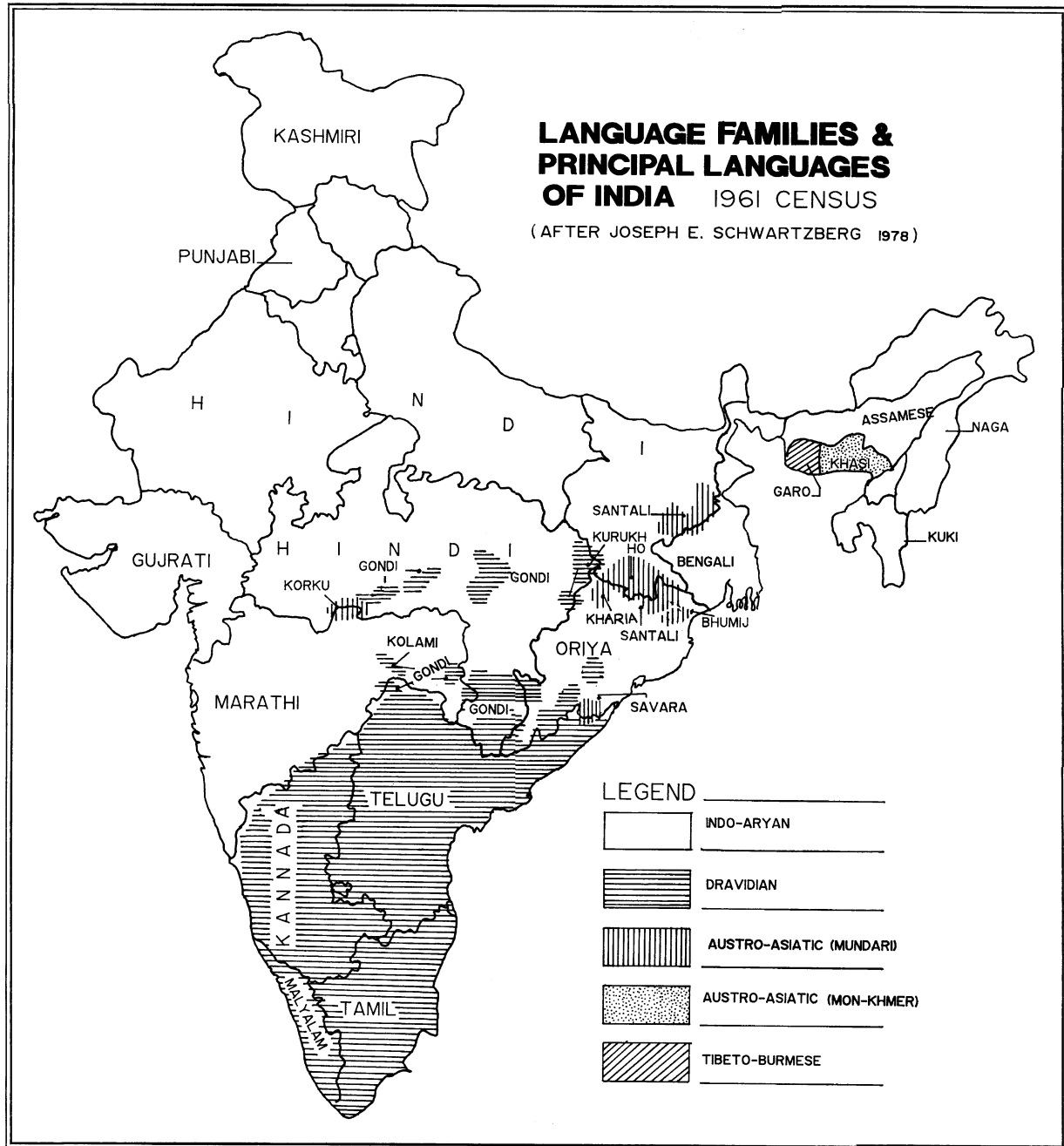


Figure 5. Language families and principal languages of India.

most densely populated region in the country. The land immediately to the south of the Ganga, on the other hand, consists of a flat rocky plateau and beyond it is the escarpment of the Kaimur range of the Vindhyas. The hilly and rocky region is covered by dry deciduous forests and is largely inhabited by tribal communities which include very primitive groups like the *Korwas*, *Musahars* and *Birhors* who still subsist by hunting and gathering; the *Baigas*, *Koyas*, *Parajas*, *Saoras*, *Bondos*, *Gadabas*, *Kondhs* and *Kharias* who practise shifting cultivation, and the *Gonds*, *Mundas*, and *Santhals* who practise primitive plough cultivation. All of them, however, combine a certain degree of hunting and gathering with agriculture.

Even though the tribal population is largely confined to the hilly and forested tracts, south of the Ganga, the lower caste population of the Ganga plains is essentially derived from the tribal stock. The deforestation of the Ganga plains, after the introduction of iron technology, the resultant loss of wild plant and animal food resources saw the assimilation of the hunting-gathering tribal populations into the agriculture-based caste society. They were placed in the lower rung of the hierarchical caste order. Further, hunter-gatherers having omnivorous food habits, so-called unhygienic living and occupations, and maximum distance from the religious practices and social customs of the upper castes, were relegated to the category of untouchables.

Eastern India, east of Allahabad, is also a part of the vast region where many varieties of wild rice grow extensively. Rice was initially cultivated in this region and till today it continues to be the main food crop.

7.2b Geographical extent and economy: South of the Ganga, ground stone tools have been reported as surface finds widely in the hilly tracts of the northern Vindhyas, particularly in Rewa and Sidhi districts of Madhya Pradesh, and Banda and Mirzapur districts of Uttar Pradesh. These are of elongated pointed-butt type, similar to those of south India. Excavations at Koldihwa (Misra 1977) and Mahagara (Sharma *et al* 1980) in the Vindhyas and several sites like Sohagaura (Chaturvedi 1985), Khairadih (Singh 1988), Narhan (Singh 1994), Chirand (Varma 1970–71; Roy 1989) and Senuwar (Singh 1991) in the middle Ganga plains have placed these tools in a proper cultural and chronological context. They have also yielded evidence of plant cultivation and animal domestication, microliths, bone and antler tools and terracotta objects. The best evidence for agriculture and domestication comes from Narhan. The cultivated plants include hulled and six-rowed barley (*Hordeum vulgare*), club wheat (*T. compactum*), bread wheat (*T. aestivum*), dwarf wheat (*T. sphaerococcum*), rice (*Oryza sativa*), pea (*Pisum sativum*), green gram (*Vigna radiata*), gram/chicken pea

(*Cicer arietinum*), *khesari* (*Lathyrus sativus*), mustard (a form of *Brassica campastris*), flax/linseed (*Linum usitatissimum*) and jackfruit (*Artocarpus heterophyllus*). Among the domesticated animals there is evidence of humped cattle (*Bos indicus*) and sheep/goat (*Ovis/Capra*). There is also evidence of hunting of deer and antelopes.

7.2c Pottery: The most distinctive pottery of this culture is cord-marked ware. It is handmade from coarse clay, is poorly baked and has cord designs on the external surface of vessels. These designs are believed to have been produced when the pots were beaten for enlargement by wooden mallets wrapped with cord. Other wares of this culture are black-and-red ware, black-slipped ware (potters apply a coating of clay to the pot and then rub it with some object to produce a smooth and shining surface, the coating is known as slip) with occasional painting in white, and slipped-plain red ware. The principal vessel shapes are bowls, basins, vases and dishes.

Radiocarbon dates from Sohagaura and Narhan show this culture to date to the second half of the second millennium B.C.

7.3 Eastern India

Neolithic artefacts which include pointed butt celts (axes), chisels, bar celts, shouldered celts, hammer stones and perforated discs have been found at a number of surface sites in the Chota Nagpur plateau in Bihar, Orissa and West Bengal since the beginning of the nineteenth century. Small scale excavations at a few sites in Orissa like Kuchai in Mayurbhanj district (JAR 1961–1962, p. 36), Golbai Sasan in Khurda district (Sinha 2000), Kuanr in Keonjhar district (Ray *et al* 2000) and Sankarjang in Angul district (Yule *et al* 1990) have provided more evidence about the Neolithic culture. Kuchai has yielded pointed-butt celts and cord-impressed pottery. Golbai Sasan has produced a rich bone tool industry and evidence of circular and rectangular wattle-and-daub houses, in addition to stone celts and an extended human burial. Kuanr has yielded pointed-butt celts, evidence of wattle-and-daub structures and copper bangles. From Sankarjang several human burials were excavated in association with bar celts and copper artefacts. Ground stone tools are also very common as surface finds in Dhenkanal and Keonjhar districts. They also include miniature celts which were probably intended for some ritual function. Radiocarbon dates from Golbai Sasan and Sankarjang suggest a duration of 2200 to 700 B.C. for the Neolithic culture.

7.4 Northeast India

In northeast India, ground stone celts of shouldered and splayed varieties have been collected as surface finds from many sites in Assam, Meghalaya, Nagaland, and Arunachal Pradesh for more than a century (Dani 1960). These, along with cord-impressed pottery, have also been found in the excavations at Daojali Hading (Sharma 1989), Sarutaru (Rao 1977) in Assam, and Selbargiri (IAR 1967–1968, pp 8) in Meghalaya. The pottery is handmade and of impure clay. Use of the coil or ring method is seen in the making of some pots. Many sherds carry impressions of cord or string and grooved wooden mallets on their surface, suggesting that the vessels were enlarged and shaped by beating with a wooden mallet wrapped with a cord.

In northeast India cord-marked pottery is associated in the archaeological context with ground stone axes of shouldered and splayed types. Ethnographically, it is associated with shifting cultivation, cultivation of yams and taro, raising of stone and wooden memorials for the dead, and the presence of Austro-Asiatic languages. All these traits are also found in south China and southeast Asia. Anthropologists believe that people speaking Austro-Asiatic languages were responsible for the introduction of this culture complex (Fuerer-Haimendorf 1945).

7.5 South India

7.5a Geographical extent: The Neolithic culture of south India is best understood among the other Neolithic cultures of India. It is primarily a product of human adaptation to the semi-arid environment, marked by low (600–1200 mm) rainfall. It has been found to be present in northern Karnataka and western Andhra Pradesh, although a few sites also occur in southern Karnataka, coastal Andhra Pradesh and northern Tamil Nadu. Over two hundred sites of this culture are presently known (Foote 1916; Paddayya 1973, 1992; Murty 1989). Many of them occur on the flat tops, slopes and foot of granitic hills but some are also found on the alluvial banks of rivers like the Godavari, Krishna, Penneru, Tungabhadra and Cauvery. Of them Sangnakallu (Subbarao 1948; Ansari and Nagaraja Rao 1969) and Tekkalakota (Nagaraja Rao and Malhotra 1965) in Bellary district, Brahmagiri (Wheeler 1948) in Chitradurg district, Maski (Thapar 1957), Piklihal (Allchin 1960) and Watgal (Deavaraj *et al* 1995) in Raichur district, Hallur (Nagaraja Rao 1984) in Dharwad district, T. Narasipur (Seshadri 1971) and Hemmige (Hanumantha Rao and Nagaraju 1974) in Mysore district, all in Karnataka; Nagarjunakonda (Subrahmanyam *et al* 1975) in Guntur district, Ramapuram (IAR 1980–1981, pp 3–7) and Veerapuram (Sastri *et al* 1984) in Kurnool

district, all in Andhra Pradesh; and Paiyampalli (IAR 1964–1965, pp 22–23) in North Arcot district, Tamil Nadu have been excavated.

7.5b Ash mounds: A very distinctive feature of the Neolithic culture are ash mounds, which are heaps of ash produced by the burning of cow dung. They are closely associated with habitation sites and provide tell-tale evidence of the role of cattle pastoralism in the economy. It is believed that dung from cattle pens was allowed to accumulate and periodically set ablaze, probably in a ceremonial way as is done at annual cattle festivals in south India even today (Allchin 1963; Murty 1989). Several ash mounds like Utnur in Mahbubnagar district (Allchin 1961) and Palavoy in Anantapur district (Rami Reddy 1976) of Andhra Pradesh; Kuppal in Bellary district (Mujumdar and Rajaguru 1966), Kodekal (Paddayya 1973) and Budihal (Paddayya 1992) in Gulbarga district of Karnataka have been excavated.

The ash in the mounds consists of several distinct layers; in some layers it is soft and loose and in others heavily vitrified, suggesting that cow dung was burnt at varying temperatures. The contents of the ash include stone and bone tools, animal bones and pottery. At Utnur and Budihal hoof impressions of cattle have been found beneath the cow dung, showing evidence of cattle penning. Besides, Budihal has also produced evidence of a butchering floor.

7.5c Economy: The Neolithic people practised an agropastoral economy. The domesticated animals represented in the bone record comprise cattle (*Bos indicus*), buffalo (*Bubalus bubalis*), sheep (*Ovis aries*), goat (*Capra hircus aegagrus*), pig (*Sus scrofa cristatus*), dog (*Canis familiaris*) and fowl (*Gallus* sp.) (Thomas 1974). Cattle played a predominant role in the economy as is evident by the abundance of bone refuse. Further evidence comes from the presence of ash mounds, terracotta figurines, and portrayal in the bruising on rocks near archaeological sites. The vegetation of the Neolithic landscape is characterized by scrub woodland, savanna woodland, scattered shrubby facies and thorny thickets of different vegetational series which is ideally suited for keeping sheep/goat herds. Communities like the *Kuruvas* and *Gollas* in Andhra Pradesh, the *Kurubas* in Karnataka and the *Dhangars* in Maharashtra even today keep large herds but it does not seem to have been an important component of the Neolithic economy. Murty (1989) has used ethno-historical data and has indicated that rearing sheep/goat herds developed as an offshoot of the agropastoral Neolithic economy in later (Chalcolithic and historic) times.

The Neolithic people also cultivated a variety of crops on hill tops and in narrow valleys between the hills using

rained gravity-flow irrigation as also on alluvial banks of rivers. Their main crops were millets, pulses and legumes. These include finger millet (*Eleusine coracana*), kodo millet (*Paspalum scrobiculatum*), horse gram (*Dolichos biflorus*), green gram (*Vigna radiata*), black gram (*Phaseolus mungo*) and hyacinth bean (*Dolichos lablab*). The only cereals known to have been cultivated are barley (*Hordeum vulgare*) and rice (*Oryza sativa*) but they are known only from one site each.

7.5d Technology: The technology of the Neolithic people consisted of ground stone tools like axes, adzes, wedges and chisels and of microliths and stone blades. At Palavoy a rich bone tool assemblage comprising axes, blades and points has been found. In the later stages of the culture copper and bronze tools also came to be used.

7.5e Other traits: The Neolithic people lived in circular or rectangular wattle-and-daub huts with floors having stone pavings. Large stones were placed around the huts on the outside to protect them from winds. Evidence of a burnt hut from Sanganakallu shows that the huts had a thatched roof. The dead – both children and adults – were buried in double or multiple clay urns beneath the floors of their houses. Their pottery was initially only handmade, of poor quality and drab grey colour, and consisted of jars, spouted vessels and bowls of various sizes, sometimes decorated with incised designs. In later stages wheel made, sturdy pottery, occasionally decorated with painted motifs, also came into use. An important new ceramic was the black-and-red ware.

The Neolithic culture is dated by C14 dating from the middle of the third millennium B.C. to the beginning of the first millennium B.C. Although during this long period the basic form of the culture remained uniform, there were changes in the form of improvement in ceramic technology and introduction of metal tools.

8. Chalcolithic cultures

8.1 Distinctive features

The Neolithic period was succeeded by the Chalcolithic. The general pattern of life did not change during this period, barring some significant developments. These include a marked increase in the number of settlements, introduction of copper-bronze for the manufacture of tools, weapons and ornaments, improvement in architecture, introduction of wheel-made pottery and diversification of wares and profuse decoration of vessels by painted, incised and applique designs. A number of Chalcolithic cultures have been discovered in northern,

central and western India (figure 3). These include the ochre-coloured pottery (OCP) culture in the Indo-Gangetic Divide and upper Ganga-Yamuna Doab; the Ahar culture in the Mewar region of Rajasthan; the Kayatha and Malwa cultures in the Malwa region of western Madhya Pradesh; the Malwa and Jorwe cultures in western Maharashtra; and the Narhan culture and variants in the northern Vindhyas and the middle and lower Ganga valley. These are briefly described below.

8.2 Copper hoards and the OCP culture

8.2a Copper hoards: Since the beginning of the nineteenth century, copper objects were found in groups of several pieces, at a number of sites in the Indo-Gangetic Divide (Punjab, Haryana and northeast Rajasthan) and the Ganga-Yamuna Doab. Because of their discovery in groups they have come to be known as Copper Hoards. Almost in all cases they have been found outside habitation and as accidental discoveries during operations like ploughing, canal digging and levelling of agricultural land. The hoards comprise a variety of objects like flat axes with splayed sides and convex cutting edges, shouldered axes, bar celts, double-edged axes, anthropomorphic figures, hooked spear-heads, hatchets, antennae-hilted swords, harpoons with barbs and lugged holes, and rings (Lal 1951; Yule 1985). The objects are very heavy and unwieldy and do not seem to have any utilitarian function, most of them probably being objects of rituals. There is ethnographic evidence that metal tools and weapons are worshipped by the *Gonds* of central India (Nagar 1983).

8.2b Association with OCP: The archaeological context and age of these objects continues to be an enigma. In the early fifties Lal (1951) carried out small excavations at Bisauli and Rajpur Parsu villages in Bijnor district of Uttar Pradesh at spots where copper hoards had reportedly been discovered earlier. While Lal did not find any new copper objects, he came across weathered OCP, and on that basis he suggested a probable correlation between the hoards and this pottery. OCP has since been found at a number of sites, important among them being Jodhpura (Ghosh 1989a) in Jaipur district, Rajasthan; Lal Qila (Gaur 1989) in Bulandshahr district, Hastinapura (Lal 1955) in Meerut district, Bahadarabad (Sharma 1989) and Ambkheri (Dikshit 1989) in Saharanpur district, Atranjikhara (Gaur 1983) in Etah district and Saipai (Wahal 1989) in Etawa district, and Sringaverapura (Lal 1993) in Allahabad district, all in Uttar Pradesh. The pottery is ill-fired, ochrish red in colour, and heavily weathered, with the slip peeling off. It has been suggested that this

condition is a consequence of prolonged waterlogging of the sites (Lal 1968). The shapes comprise storage jars, vases, basins, bowls, dishes-on-stand and miniature pots; they are quite similar to the Harappan pottery shapes. Occasionally the pottery is decorated with incised designs, graffiti and paintings in black pigment. Opinion about the correct cultural status of this pottery is divided among archaeologists. Some think of it as an independent ceramic technique while others think of it as only a poorer version of Harappan pottery (Gupta 1972).

OCP settlements are small in size and have a thin habitation deposit. This indicates that their habitation was of short duration. Because of the small size of excavations very little is known of the economy and material culture associated with this pottery. The available evidence comprises cultivation of rice and barley, domestication of cattle, rammed earth floors, post-holes, baked and unbaked bricks, terracotta human figurines and bangles, and beads of stone and bone. Two thermoluminescence dates on pottery from Atranjikerha are 2600 and 1200 B.C. Because of the wide gap between them the correct age of this culture remains uncertain (Gaur 1989).

8.3 Ahar culture

8.3a Geographical setting: This culture is known from the Mewar region of southeast Rajasthan. Geographically, the region consists of an undulating rocky plain, with narrow patches of fertile black soil. It receives an annual average rainfall of about 750 mm which is, however, very erratic. It is drained by the Banas and its many tributaries like the Khari, Kothari and Berach and their tributaries. The region produces rich crops of maize, *jowar*, *bajra*, pulses, sesame, *urid* and *mung* during the summer season and wheat, barley, gram, common pea, chicken pea, pigeon pea, mustard, linseed, sugarcane and cotton during the winter season.

Nearly one hundred sites of the Ahar culture, named after the type site within the city limits of Udaipur, have been located in the valleys of river Banas and its tributaries and subtributaries in Banswara, Udaipur, Chittaurgarh, Bhilwara, Bundi and Ajmer districts. Four of them, namely Ahar (Sankalia *et al* 1969) and Balathal (Misra *et al* 1995, 1997) in Udaipur district, Gilund (IAR 1958–1959, pp 41–46) in Rajsamand district and Ojiyana (unpublished results) in Bhilwara district, have been excavated. These, especially Balathal, which has been horizontally excavated for seven seasons (1994–2000), have provided an excellent picture of the culture of the Ahar people.

8.3b Architecture: The Ahar culture people lived in single, double, and multi-roomed rectangular, squarish

and circular houses made of stone, mud-brick and mud. The large houses had massive foundations of stone and mud-brick more than a metre in width. Above them stood walls of mud as is testified by the enormous mud debris in the excavations. The houses were provided with over-ground and underground grain storage bins and kitchens equipped with U-shaped *chulhas* or ovens and stone saddle querns and rubbers for grinding cereals and pulses. At Balathal and Gilund a number of deep silos of various sizes lined with grass and plastered with lime have been found, meant for grain storage. The size of the houses, materials and techniques used in their construction, and the material remains found inside the houses show that there was economic disparity in the society. At Balathal separation of the three structural complexes by a street and a lane shows incipient planning of the settlement. There is also some evidence to show that the settlement was enclosed by a stone boundary wall.

At Balathal a large sub-rectangular fortified structure, with an open area of about 600 sq-m inside it, has been discovered in the centre of the settlement. Made of stone, mud-brick and mud, its walls have a width of up to seven metres at the base and up to five metres at the top, and they rise to a height of four metres. The core of the walls is made of mud, mud-bricks and stone, and their sides, up to 1.25 m in width, are made of semi-dressed stones. The fortification was provided with bastions at all four corners. The open space inside the enclosure is filled with burnt cow dung and ash from the base of the fortification to its top. The variations in colour and compactness of the ash show that the cow dung was burnt several times at varying temperatures. In some places the structure of burnt cow dung cakes arranged vertically in a slanting position is clearly preserved. Heavily burnt sherds of Chalcolithic pottery occasionally occur within the ash. Three human skeletons have also been found within the ash. This is unusual because burial as a mode of disposing of the dead is unknown in the Chalcolithic cultures of Mewar, central India and north India. No entrance to the enclosure has been located so far. The function of the structure remains a puzzle. All that can be said is that it did not have an utilitarian function; in all probability it had a ritual significance.

8.3c Economy: The economy of the Ahar people was based on cultivation, animal husbandry and hunting. They cultivated wheat (*Triticum* sp.), barley (*Hordeum vulgare*), lentil (*Lens esculenta* Moench), common pea (*Pisum arvense* L.), finger millet (*Eleusine coracana* L.), Italian millet (*Setaria italica* Beauv.) and panicum millet (*Panicum* sp.). The animals domesticated by them include cattle, sheep/goat, buffalo and pig. Wild animals hunted by them comprise gaur (*Bos gaurus*), nilgai (*Boselaphus tragocamelus*), *chausingha* (*Tetracerus quadricornis*)

and blackbuck (*Antilope cervicapra*). Vast quantities of animal bones, almost all of them charred and broken, suggest that meat was an important component of diet and was consumed after roasting. The bones were split and broken open for the extraction of marrow. There are also remains of fish, turtle and molluscs.

8.3d Technology: The technology of the people was mainly based on copper. Copper objects found at the sites include flat axes, choppers, knives, razors, chisels and tanged arrowheads. A small quantity of microblades and microliths have also been found but they did not play an important part in technology. Several well polished bone points have also been found. The ornaments of the Ahar people comprise beads of semi-precious stones, steatite and terracotta, rings of copper and petalled ornaments of copper and bone.

8.3e Pottery: The Ahar people had a rich ceramic tradition consisting of several fine and coarse wares. The fine wares include tan ware, thin red ware and black-and-red ware, and the coarse wares include thick red ware and grey ware. The fine wares are made of well-levigated clay, have a slipped and burnished surface, and are well baked and sturdy. These wares were meant for eating and drinking. Tan ware has a close affinity to Harappan pottery, and the main forms are carinated (projecting outward and forming an angle) dishes, dishes-on-stand of various sizes, and globular jars with deep grooves between tall applique ridges on the outside. The thin red ware mainly consists of convex-sided bowls and *lota* (tumbler)-like vessels. In the black-and-red ware the main shapes are straight-sided as well as carinated shallow and deep bowls. They are painted on both surfaces in white pigment with geometric motifs. The coarse wares are made of coarse clay and are poorly fired. They comprise jars and *handis* (globular cooking pot) of various sizes for storage and cooking. The upper part of the vessels is treated with a thick bright red or grey slip and is burnished. The vessels are decorated with shallow grooves below the neck and with a variety of incised, applique and cut designs below the grooves on the external surface.

Nearly thirty-five radiocarbon dates, mainly from Balathal, clearly establish the duration of the Ahar culture from 3600 B.C. to 1500 B.C. They show Balathal to be the oldest village in India outside the Indus civilization.

8.4 The northern Vindhya and the Ganga valley

8.4a Geographical extent: The Neolithic culture of the northern Vindhya and the middle Ganga valley was succeeded by Chalcolithic culture. During this period the number of settlements increased considerably and exten-

ded eastward into the lower Ganga valley in Bihar and West Bengal. The new features are increase in the size of settlements, improvement in architecture, appearance of wheel-made pottery, diversification of wares, profuse decoration of vessels with painted and incised designs, addition of copper to technology, and appearance of beads of semi-precious stones, copper, steatite and terracotta and of terracotta animal and human figurines (Misra 2000). A large number of Chalcolithic sites have been excavated. These include Kakoria (Misra 1979), Magha (IAR 1980–1981, pp 72–73), Koldihwa (Misra 1977), Banimilia-Bahera (IAR 1971–1972, pp 39–40), Takiapar (IAR 1971–1972, p. 49), Raja Nal Ka Tila (Tiwari and Srivastava 1996–1997) in the Vindhya and Jhusi (Misra *et al* 1996), Kausambi (Sharma 1960), Sringerapur (Lal and Dikshit 1981), Prahladpur (Narain and Roy 1968), Rajghat (Narain and Roy 1977), Masondih (IAR 1963–1964, pp 57–58), Sohagaura (Chaturvedi 1985), Narhan (Singh 1994), Imlidih (Singh 1993; Singh *et al* 1992), Khairadih (Singh 1988), Chirand (Varma 1970–71; Roy 1989), Chechar (IAR 1977–1978, pp 17–18), Maner (IAR 1984–1985, pp 11–12), Oriup (IAR 1967–1968, p. 6), Champa (IAR 1982–1983, pp 15–16), Sonpur (Sinha and Verma 1970), Taradih (Prasad 1981), Manjhi (Roy 1986), Senubar (Singh 1991) and Agiabir (Singh and Singh 1999), Mahisdal (Mukherjee 1989a), Mangalkot (Mukherjee 1989b) and Pandu Rajar Dhibi (Das Gupta 1964) in the Ganga valley.

8.4b Chief characteristics: The chief characteristic of the Chalcolithic culture represented at these sites are given below.

The houses were generally made of wattle-and-daub as represented by postholes, burnt lumps of clay with bamboo and reed impressions, and compact mud floors. They were usually of rectangular shape. At several sites the houses contained hearths and *chulhas* (ovens) and kitchen equipment like querns and mullers.

The ceramic assemblage consists of red, black-and-red, and black-slipped wares. All these were made on wheel from well-levigated clay. The shapes comprise bowls of various sizes, including pedestalled and channel spouted, flat platters, dishes, basins, perforated vessels, jars and vases. The black-and-red and black-slipped wares were painted in white with a variety of geometric designs on both faces.

The technology of the Chalcolithic people comprised tools and weapons of copper, stone, bone and antler. Copper objects include knives, spearheads and arrowheads. Bone and antler tools comprise awls, points, tanged arrowheads and barbed arrowheads with socketed base. Microliths and blade tools have been found at almost all the sites. They include lunates, triangles,

trapezes, blunted back blades, serrated blades, retouched blades, plain blades and flakes.

The ornaments of these people comprise beads, pendants, bangles, rings and earstuds. Beads are made of semi-precious stones, terracotta, bone, shell, faience (a man-made substance used for making beads, seals etc.), steatite, copper and occasionally gold. Bangles are made of copper, terracotta and bone. Saddle querns, mullers, rubbers, hammerstones, discs of stone and terracotta, fish-hooks, pins, needles and gamesmen are the other objects used in this period.

The economy of the people was based on a combination of plant cultivation, animal domestication and hunting and gathering. Cultivated plants include wheat, barley, rice, *jowar*, *mung*, gram, *kodo* (a coarse millet grown only in tropical countries), lentil, *til* (sesamum), linseed and pea. Domesticated animals include buffalo, sheep/goat, pig and dog, and wild animals include several species of deer and antelopes, and boar. Remains of birds and aquatic creatures like fish and tortoise have also been found at several sites.

Evidence of disposal of the dead in the form of burial comes only from three sites, Kakoria and Magha in the Vindhya and Sonpur in the Ganga valley.

A number of radiocarbon dates from several sites both in the Vindhya and the Ganga valley range from 1500 B.C. to 700 B.C. They clearly show that the colonization of the Ganga valley by farmers took place much later than that of western, central south India.

8.5 Malwa or western Madhya Pradesh

In the Malwa region of western Madhya Pradesh, drained by the Chambal, Narmada, Betwa and their tributaries, two Chalcolithic cultures, namely Kayatha and Malwa, have been found.

8.5a Kayatha culture: Over 40 settlements of the Kayatha culture have been found in the northern part of Malwa, adjoining the Mewar region of Rajasthan, in the valleys of the tributaries of river Chambal. Two of them, namely Kayatha (Ansari and Dhavalikar 1973; Wakankar 1967) and Dangwada (Wakankar and Khare 1981) have been excavated.

The Kayatha culture people lived in small huts having well-rammed floors. They cultivated wheat and probably barley and other crops although unfortunately no attempt has been made to recover plant remains. They domesticated cattle, sheep and goat. The presence of horse bones in the layers of the Kayatha and succeeding Chalcolithic cultures as also a terracotta figurine of a mare at Kayatha is interesting because it takes back the antiquity of this animal to the late third millennium B.C.

The typical ceramic of the Kayatha culture is the chocolate-slipped, sturdy and well baked Kayatha ware. The shapes in this ware are convex-sided jars and carinated dishes, similar to those of the tan ware of the Ahar culture. Occasionally the pots were decorated with linear designs in black pigment. Other wares of this culture are buff ware with paintings in red and combed ware in which the decoration consists of groups of incised wavy lines. In addition, there is a handmade grey ware in which the main shapes are *handis*, basins and storage jars.

The Kayatha people used both copper and stone tools. Copper tools are represented by elongated axes and stone tools comprise microliths and blades. Kayatha has also provided copper bangles, beads of semi-precious stones and microbeads of steatite. Radiocarbon dates suggest a period of 2000 to 1800 B.C. for this culture. After a break in occupation, the site of Kayatha was reoccupied by people whose culture was similar to that of Ahar in Mewar.

8.5b Malwa culture: More than a hundred settlements of this culture have been located in the valleys of the Chambal, Narmada, Betwa and their tributaries. Of these, Nagda (Banerjee 1986), Kayatha, Navdatoli (Sankalia *et al* 1958; Sankalia *et al* 1971) and Eran (Singh 1962) have been excavated. Navdatoli was horizontally excavated and has provided the best evidence.

The Malwa culture people lived in wattle-and-daub houses of rectangular and round shape the evidence of which is preserved in the form of burnt wooden posts and clay plaster with bamboo and reed impressions. Round huts have diameters varying from 2-40 to 3-60 m and with walls from 30 to 60 cm thick. The rectangular structures were more spacious, ranging in size from 3 × 3 m to 6 × 4-5 m. Both had mud walls with wooden posts supporting a thatched roof. At Nagda a rampart made of mud and mud-bricks has been reported, probably constructed for protection against floods of the Chambal river. A defence wall made of mud and having a width of 30 m at the base and a height of 6-4 m, and with a moat running parallel to it has been reported from Eran. Nagda had multi-roomed houses made of mud and sun-baked as well as kiln-baked bricks. One house contained a four-armed *chulha* with provision for three cooking vessels. The floors of the houses were rammed hard and multiple floor levels indicate that they were periodically repaired and relaid. At Nagda a drain built of mud-bricks and measuring 2-28 × 2-13 m and with a height of about 1 m has been reported. At Navdatoli a squarish pit enclosed by mud walls and containing ash and burnt logs of wood has been identified as a sacrificial pit or *yajnya kunda* (Sankalia *et al* 1971).

The Malwa people cultivated cereals, legumes, oil seeds and fruits. Cereals comprise bread wheat (*Triticum*

compactum) and rice (*Oryza sativa* L.). Among the pulses and legumes are lentil (*Lens esculenta*), black gram or urid (*Vigna mungo*), green gram (*Phaseolus mungo*) and khesari (*Lathyrus sativus*). Oil seed is represented by linseed (*Linum usitatissimum*) and fruit is represented by ber (*Zizyphus jujube*). The Malwa people domesticated cattle, sheep, goat and pig. They also consumed the flesh of wild animals like *barasingha* (*Cervus duvauceli*), rat, fish, turtle and molluscs.

The Malwa people used several ceramics. Their main pottery was Malwa ware. It is made on wheel and has a buff or cream slip and bears painted patterns in dark brown or black pigment. The main vessel forms are *lota*, storage jars, bowls and dishes. Of particular interest are channel spouted bowls and pedestalled goblets from Navdatoli. They have significant parallels at Iranian sites and Sankalia (1964) interpreted them as evidence of Aryan migration from Iran into India. The painted designs are primarily geometric such as triangles and lozenges (diamond shaped) but naturalistic designs of animals, birds, dancing human figures and plants are also found. In addition, black-and-red ware with paintings in white and buff ware with paintings in red colour are also found at Malwa sites.

The technology of the Malwa people consisted of copper and stone tools. Copper tools comprise flat celts and spearhead or sword with a mid rib. Such a sword also has affinities with specimens from bronze age sites in Iran, particularly Tepe Hissar and has been interpreted by Sankalia (1963, p. 329, figure 23–24) as another evidence of Aryan migration into India. Malwa culture sites, particularly Navdatoli, have provided an impressive quantity of chalcedony blades and a variety of microliths. The blades were produced by crested guiding ridge technique.

The ornaments of the Malwa people included beads of semi-precious stones and rings and bangles of copper. Navdatoli has produced a large quantity of beads as also evidence of their manufacture on the site. Other technological items are saddle querns, elongated rubbing stones and hammerstones. Terracotta female figurines found at several sites may be representations of mother goddess. A painted male human figure with dishevelled hair and holding a spear in his right hand has been interpreted by Banerjee (1986) as a proto Siva. Terracotta bull figurines found at Malwa sites may be associated with religious beliefs.

Radiocarbon dates from Navdatoli suggest a period of 1700 B.C. to 1450 B.C. for the duration of the Malwa culture.

8.6 The northern Deccan

The northern Deccan or western Maharashtra, particularly the semi-arid region to the east of the Sahayadris, drained

by the Tapti, Godavari and Bhima rivers and their tributaries has provided the best evidence of the Chalcolithic cultures in India (Dhavalikar 1988). Explorations during the last fifty years have led to the discovery of over 150 Chalcolithic sites in this region. Of these, a dozen have been excavated. They are Prakash (Thapar 1967) and Kaothe (Dhavalikar *et al* 1990a) in Dhule district; Bahal (IAR 1956–1957, pp 17–18), Tekwada (IAR 1956–1957, pp 18–19) Jalgaon district; Daimabad (Sali 1986), Nevasa (Sankalia *et al* 1960) and Jorwe (Sankalia and Deo 1955) in Ahmednagar district; Apegaon (Deo *et al* 1969) in Aurangabad district; Chandoli (Deo and Ansari 1965), Songaon (Deo and Mujumdar 1969), Inamgaon (Dhavalikar *et al* 1988) and Walki (Dhavalikar *et al* 1990b), in Pune district. Inamgaon was horizontally excavated over more than a decade and has provided the richest evidence of Chalcolithic culture in India.

The Chalcolithic sequence in western Maharashtra is represented by the following cultures in ascending order (i) Savalda culture (2300–2000 B.C.), (ii) Harappan culture (2200–1800 B.C.), (iii) Malwa culture (1700–1500 B.C.) and (iv) Jorwe culture (1500–900 B.C.). The chief characteristics of these cultures are described below.

8.6a Savalda culture: Named after the type site of Savalda in Dhule district, the chronological position of the culture became clear only from the excavation at Daimabad where it underlies the Harappan culture. Detailed evidence of this culture comes from the large-scale excavation at Kaothe. A large number of pits of different sizes were found at the site and these have been classified as dwelling pits, storage pits and pits for keeping poultry, on the basis of their size and contents. The largest dwelling pit was oval on plan and measured 5.60 m in length, 6.65 m in width and 80 cm in depth. Along the periphery it had 16 postholes, suggesting a superstructure. The discovery of a large quantity of pottery inside the pit suggests that it was used for dwelling. A smaller pit with a diameter of 1.20 m and depth of 1.10 m at the southwestern end of the dwelling pit contained a vast quantity of animal bones, ash, charcoal and other refuse. It may have been initially used as a silo and later converted into a refuse pit. In the courtyard of the dwelling pit there were several smaller pits with varying depths. The deep ones may have been used for storing grains and the shallow ones for keeping poultry at night. The kitchen was located in a small shallow pit. The two-armed hearth consisted of three lumps of clay which obviously supported the cooking vessel. Such hearths made of lumps of clay or stones are still used in the area by nomadic people. The flimsy nature of the house and a makeshift kitchen suggests that the dwellers may have been a semi-nomadic people staying at the site for short periods.

The pottery from Kaothe belongs to three categories. The predominant ceramic is a sturdy red ware of fine fabric with painted designs in black. It shows a strong resemblance in fabric to the Harappan black-on-red pottery from the adjoining Gujarat region. The second ceramic is Savalda ware. It is made of coarse clay but has a variety of painted motifs which include aquatic creatures like fishes and tortoise. These are shown being hunted with harpoons and arrows. Other painted motifs include elephant, bear, birds and reptiles. The characteristic forms comprise rimless bowls and high-necked storage jars. The third ceramic is Kayatha ware. The presence of this well-dated ware of central India at Kaothe along with the single C14 date of 1920 ± 80 B.C. has been used by the excavator to date the habitation to 2200–2000 B.C.

A conspicuous feature of this culture is the total absence of stone as well as metal tools. Instead, there is a profusion of bone tools comprising points, punches, awls and knives. The excavation yielded grains of *bajra* or pearl millet (*Pennisetum typhoides*). It is important to note that *bajra* and *jowar* (*Sorghum bicolor*) are millets of African origin and they were first introduced into India in the Harappan culture of Gujarat. This is another indication of the influence of Gujarat on the early settlers of Kaothe.

The people buried their dead in pits, especially dug for the purpose. The extended skeletons were in either supine or crouching position in north-south direction with head towards the south. The subsistence agriculture, flimsy dwellings with makeshift kitchens, vast quantities of animal bones and absence of metal and stone tools all suggest that the Kaothe people led a semi-nomadic life. They probably lived at the site during the monsoon when they cultivated pearl millet while during the rest of the year they led a nomadic hunting-gathering way of life.

8.6b Harappan culture: The evidence of Harappan presence in western Maharashtra is limited. The most conspicuous example comes from Daimabad in the form of a bronze hoard consisting of a bull chariot, an elephant, a rhino and a bison, all made of arsenic bronze. Excavation at the spot, where the bronzes were found, exposed six houses which seem to have formed a single dwelling unit. The houses were made of mud-bricks. The walls are of uniform size and are built at perfectly right angles, betraying architectural skill of the settlers. The largest room in the complex measured 6.30×6 m. The complex had several pit silos for storage. The bronzes probably belong to the occupants of the house. Besides, two terracotta seals engraved with Harappan characters found inside the house also indicate the high status of the occupants. A number of other late Harappan settlements have been found in the Tapi valley (Shinde 1998).

8.6c Malwa culture: The Malwa culture which is dated by radiocarbon method to 1700–1500 B.C. spread to Maharashtra from central India. At many places the Malwa people were the first agricultural settlers in Maharashtra. At Inamgaon and Daimabad a number of houses of the Malwa people have been exposed. They consist of low mud walls about 15 cm high, well rammed floors and a partition wall dividing the house into two parts. Inside the house were two-armed *chulhas* for cooking meals and a large fire pit in the courtyard for roasting meat. In the courtyard there were also pit silos for storing grain. At Inamgaon there were also circular mud platforms for storage bins. At this site the houses were of rectangular shape measuring 7×5 m. There is also evidence of round huts and pit dwellings which probably belonged to a semi-nomadic group.

The typical pottery of these people is the Malwa ware, similar to that found in central India. Besides, there is a finer variety of thin fabric with painted designs executed in black. The shapes are similar to those of the main Malwa ware. The Malwa people cultivated barley, bred cattle, sheep and goat, hunted wild animals, mostly deer, and did fishing. They worshipped the mother goddess and a god surrounded by animals which is depicted on a pot from Daimabad. They buried their children in two urns in a pit and the adults in an extended form in pits.

8.6d Jorwe culture: The agricultural colonization of western Maharashtra significantly expanded during the Jorwe period which is represented at more than 200 sites from Tapi valley in the north to Bhima valley in the south. The Jorwe culture is the most important and characteristic Chalcolithic culture of Maharashtra. It is divided into two phases, early Jorwe (1500–1200 B.C.) and late Jorwe (1200–900 B.C.) on the basis of structures, subsistence economy and materials used. A characteristic feature of the Jorwe settlement pattern is the existence of large regional centres surrounded by smaller villages. Besides the regional centres, the Jorwe settlements can be classified into villages – which were in the majority – hamlets, farmsteads and camps. Most of the settlements are two hectares in size and their population may have been between 100 and 500 persons. However, larger villages like Bahal and Nevasa may have had populations between 500 and 1000 persons. Sites measuring only 1 ha. or less having a population of 50–100 persons may be classified as hamlets. Smaller sites located within 2 to 3 km of major settlements are probably farmsteads meant for cultivation of surrounding land by farmers living in the parent villages. An example of a camp site is a cave at Pachad in Raigad district which has a floor area of only about 10 sq-m. but yielded Chalcolithic pottery (Dhavalikar 1997, pp 172–175).

The largest Jorwe settlement is Daimabad which covers an area of 30 ha. and is one of the largest Chalcolithic settlements in the country. Even with a conservative estimate of 200 persons per ha., the population of Daimabad would have been about 6000 individuals. Prakashe in the Tapi valley, Daimabad in the Godavari-Pravara valley and Inamgaon in the Bhima valley were three regional centres. The density of settlements is highest in the Tapi valley and progressively declines from the Godavari-Pravara to Bhima valley, obviously as an adaptive response to the availability of fertile black soil for cultivation.

Extensive excavations at Inamgaon have provided a very good picture of the early farmers of the Deccan. A granary and diversionary channel may be taken as examples of public architecture. Over one hundred and thirty houses were excavated, the vast majority of them belonging to the Jorwe period. The Early Jorwe houses were rectangular structures, measuring 5 × 3 m with low mud walls over which was a wattle-and-daub construction. The houses were built in rows with the longer axis in a roughly east-west orientation. The floors were made of well-rammed alternating layers of black clay and yellow silt. Inside the house there was usually a small oval fire pit. Outside in the courtyard was a larger fire pit, probably used for roasting meat. Very often there was a pit silo plastered with lime for storing grain.

The late Jorwe period witnessed an economic decline. The rectangular houses of the early Jorwe period were replaced by small round huts with a diameter of 1.5 to 2 m. Inside the hut there was a fire pit or a two-armed *chulha* but no pit silos. This is because the Late Jorwe culture belongs to a dry climatic phase when agriculture was no longer a reliable occupation and people depended more on breeding cattle and hunting and gathering.

The Jorwe people reared cattle, sheep/goat, buffalo and pig. They cultivated barley (*Hordeum vulgare*), wheat (*Triticum compactum*), rice (*Oryza sativa*), jowar (*Sorghum bicolor*), kulith (*Dolichos lablab*), ragi (*Eleusine coracana*), grass pea (*Lathyrus sativus*), lentil (*Lens esculenta*), green gram (*Vigna radiata*), black gram (*Phaseolus mungo*) and hyacinth bean (*Dolichos biflorus*).

The technology of the Jorwe people like that of other Chalcolithic cultures consisted of both metal and stone. Copper objects found at different sites comprise axes, chisels and fish hooks. An antennae-hilted dagger with mid-rib from Chandoli is unique and recalls the antennae-hilted swords of the copper hoards of north India (Deo and Ansari 1965, p. 116, figure 57, No. 9; figure 58, No. 1). Stone tool technology consisted of blades and occasionally microliths made of chalcedony and other siliceous materials.

The ceramic industry of the Jorwe people was quite advanced. The pottery was wheel made and well fired.

Pottery kilns have been found at Inamgaon and Daimabad. The pots were painted in black on red background with simple geometric motifs. The typical forms are spouted jar and carinated bowl. The addition of a spout to the jar probably was meant to control the flow of water, most probably as an adaptation to water scarcity in the semi-arid region. Another ceramic is a red/grey ware. It is very coarse and handmade and was primarily meant for cooking. The third ceramic is black-and-red ware similar in forms and fabric to the same ware of the Ahar culture. The main shapes are bowls and some of them bear paintings in white.

A large number of human burials have been found at Inamgaon, Nevasa and other sites both in the early and late Jorwe phases. The adults were buried in an extended position while the children were buried in two urns placed horizontally mouth to mouth in a pit which was dug into the house floor or in the courtyard. In the case of adults the feet were chopped off before burial, probably because of the fear of the spirit of the dead coming back to haunt the living. The body was laid in a north-south direction with the head towards the south. A number of clay pots, containing food and water, were placed with the dead. There are also examples of twin burials and an unusual burial of a person in a sitting position inside an unbaked clay pot. This has been interpreted as the burial of the chief of the community.

Jorwe people worshipped both gods and goddesses which are represented by baked as well as unbaked clay figurines. The goddesses are of two varieties, namely those with head and others without head. The presence of an applique figure of a human-headed panther on a large jar at Inamgaon has been interpreted as proto-Durga (Dhavalikar 1997, p. 206). Also from Inamgaon are two interesting female figurines. They were found carefully buried in a small hole under a house floor. The hole contained an oval clay receptacle, on the lid of which was kept a female figurine and a bull figurine, both of unbaked clay. Inside the box was another female figurine and below the box was a clay ring which was intended to be the stand in which the female figure from the box could be kept in a standing posture. The manner in which these objects were kept in the hole shows that they signify some ritual. The female figure which was inside the box has a pinched head, curved arms and pendant breasts which indicates of fertility. The female figurine which was over the lid has a blind hole in the abdomen and there is a similar hole in the back of the bull figurine which was found with it. When a stick is inserted in both the holes, the goddess snugly sits over the bull. This may be an early representation of the concept of *vahana*, the mount which later on becomes a distinguishing feature of Hindu divinities. The two clay male figurines from Inamgaon probably represent male deities (Dhavalikar 1997, pp 206–208).

Almost all the Chalcolithic sites of western and central India were deserted between the middle of the second millennium B.C. and the beginning of the first millennium B.C. This abandonment is believed to have been caused by a drastic decline in rainfall which rendered agriculture unfeasible. Populations dispersed from permanent villages to pursue a nomadic pastoral way of life. These areas were reoccupied by settled farmers only in the middle of the first millennium B.C. Only in the Ganga valley there is a continuity of settlements from the Chalcolithic to the Iron Age and historic period.

9. Introduction of iron technology and expansion of settled life

The introduction of iron technology was of crucial importance to the expansion of agriculture-based settled life, particularly in the subhumid region of the Ganga valley. Compared to scanty copper deposits, iron deposits are abundant in India, particularly in Chota Nagpur region and central India. So long as copper was the only metal known to people, tools, weapons, vessels and ornaments of this metal and bronze were scarce and precious and they were accessible only to the rich and influential members of the society. The common people had to depend only on stone tools for their needs. Even in the highly sophisticated Indus civilization, urban families had to use stone blades for their domestic chores. Also, copper being brittle, could not be used for clearing dense and tangled forests of subhumid regions. Therefore, copper-bronze using cultures were largely confined to arid and semi-arid regions.

However, once iron technology was mastered, tools, weapons and vessels of this metal became available to common people and slowly the stone tools went out of use. The effective end of stone age came only after the introduction of iron technology. With the help of iron tools enterprising farmers cleared the dense forests of the subhumid plains of the middle and lower Ganga valley and brought about effective human colonization of this vast fertile region. In the hilly and rocky peninsular India iron tools helped in quarrying stone for erecting megalithic sepulchral and memorial monuments and subsequently in digging wells and irrigation tanks in hard rock. The agricultural surplus generated by the combination of iron technology, fertile soil, perennial availability of water from rivers, lakes and wells, and human enterprise led to the emergence of second urbanization in the country. While the first urbanization took place during the bronze age and was confined to arid and semi-arid northwestern part of the subcontinent, the second urbanization took place in the Ganga valley (Roy 1983) and slowly spread to peninsular India.

After the introduction of iron technology the geographical focus of cultural development shifted to the Ganga plains. The events of the two great Indian epics, namely the *Mahabharata* and the *Ramayana* took place in the upper and middle Ganga valley, respectively. Subsequent to the epic periods, the focus of cultural development shifted further east to eastern Uttar Pradesh and Bihar. It is in this region that Buddha and Mahavira started the revolt against the ritual and animal sacrifice-ridden brahmanical religion and preached their message of non-violence and righteous conduct. It is also in this region that the first political entities, the *Mahajana-padas* and the first Indian empire, that of Magadha, developed.

The principal cultures of the early Iron Age are described below (figure 6):

9.1 Black-and-red ware culture

Although black-and-red ware as a ceramic is found almost all over the country from the Harappan culture in Gujarat to Megalithic culture in south India, it is found in a distinct stratigraphical context above the OCP and below the painted grey ware (PGW) at Noh (Agrawala 1989, pp 318–319) in Bharatpur district of Rajasthan and Atranjikhara (Gaur 1983, pp 76–119) in Etah district of Uttar Pradesh. Because of its distinct stratigraphic horizon this ware and the associated material has been given the status of an independent culture. The earliest occurrence of iron has been reported from the horizon of this culture at Noh. The black-and-red ware is made of fine material and is well baked but unlike its Harappan and Chalcolithic counterparts, it is not painted. The pottery has been found in limited quantities and the shapes represented are bowls and dishes. Other wares associated with it are black-slipped ware and red ware. Other objects of this culture are copper beads and ring, domestic stone objects, beads of semi-precious stones and stone blades found at Atranjikhara. A few burnt bricks have also been reported from the same site. On the basis of TL dating of pottery, this culture has been ascribed to ca. 1450–1200 B.C.

9.2 Painted grey ware culture

The PGW culture is named after the pottery of the same name. This ware was first found at Ahicchatra in Bareilly district of Uttar Pradesh, during excavations in 1944 (Ghosh and Panigrahi 1946) but its importance was fully realized only after its discovery by Lal in the excavations at Hastinapura during 1950–1951 (Lal 1955). The first large-scale and effective use of iron in India is associated

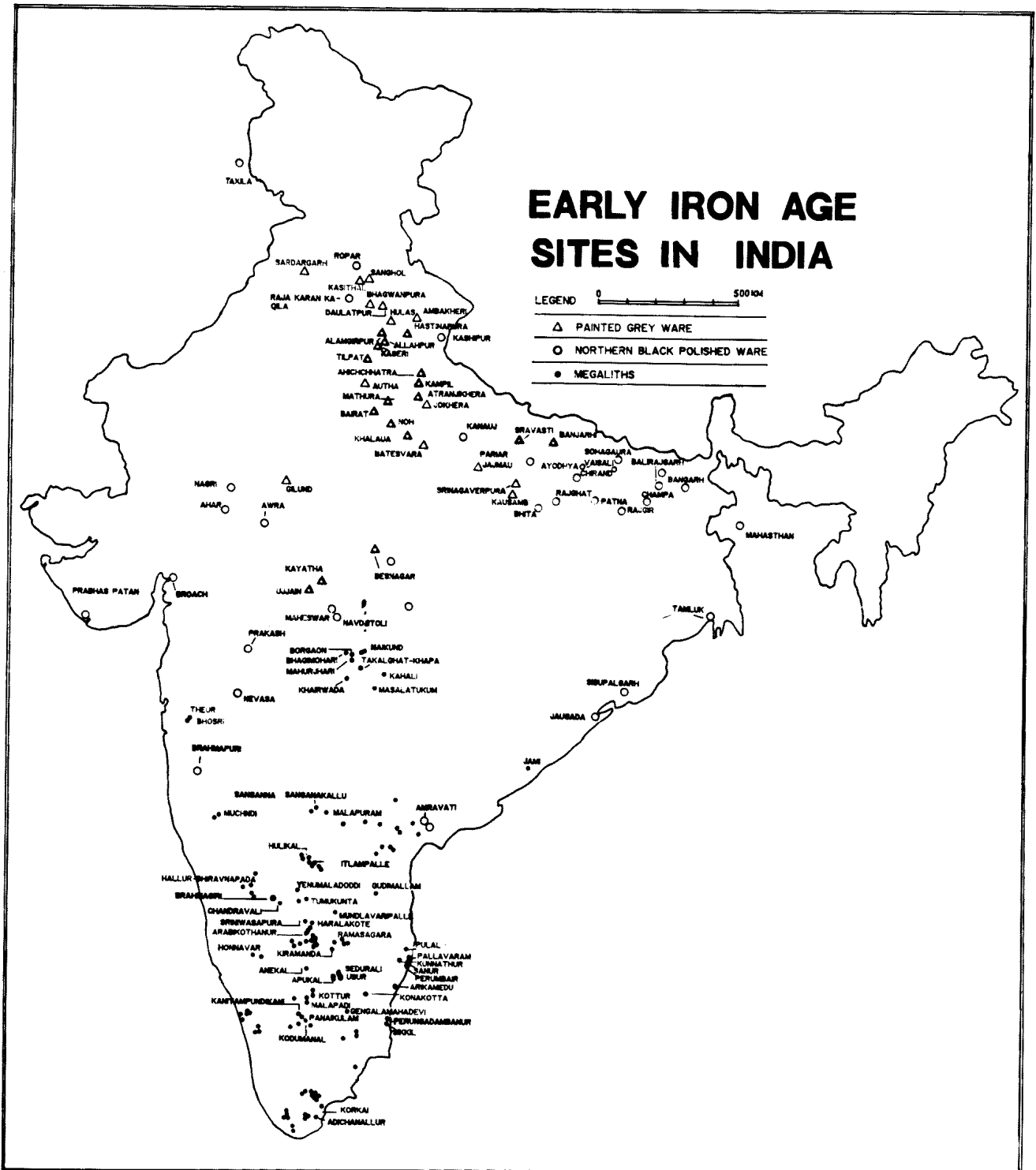


Figure 6. Early iron age sites in India.

with this culture. The PGW culture is found in the Indo-Gangetic Divide and the upper Ganga-Yamuna Doab (ancient *Aryavarta* and *Madhyadesa*). Some of the major sites of this culture are Sardargarh in Ganganagar district, Bairat (capital of *Virata*, one of the kings of the *Mahabharata* period) in Jaipur district, and Noh in Bharatpur district, Rajasthan; Panipat and Varnava (ancient *Varnavat*) in Panipat district, and Ropar in Ambala district, Haryana; Purana Qila identified with *Indraprastha*, a *Mahabharata* period city (modern Delhi); Allahpur in Ghaziabad district, Lal Qila in Bulandshahr district, Hastinapura (capital of the *Kauravas*, one of the two feuding families in the *Mahabharata*) and Alamgirpur in Meerut district, Atranjikhera in Etah district, Ahicchhatra in Bareilly district (capital of the eastern *Panchalas*), Kampil, ancient *Kampilya* (capital of the western *Panchalas*) and Kannauj in Farrukhabad district, and Jajmau in Kanpur district, all in Uttar Pradesh. Stray finds of the ware are reported from Lakhyopir in Sindh, Pakistan; Gondi and Chosla in Bundi district, and Gilund in Rajsamand district in Rajasthan; Kausambi in Allahabad district, and Sravasti in Bahraich district Uttar Pradesh; Vaisali in Vaisali district, Bihar; and Ujjain in Ujjain district, Madhya Pradesh (Tripathi 1976).

A number of sites yielding this ware like Bairat, Panipat, Purana Qila, Hastinapura, Ahicchhatra and Kampil figure prominently in the story of the *Mahabharata* epic and it is therefore, believed that the people of the *Mahabharata* were the same as the PGW people, and they represent the second wave of the Aryans.

The PGW was produced from well levigated clay and manufactured on a fast wheel. A thin slip was applied on both surfaces and the ware was baked at a temperature of 600°C under reducing conditions which produced the smooth ashy surface and core (Hegde 1975). The distinctive shapes are dishes with curved sides and sagger (a pottery shape, meaning dish with curved base as opposed to flat base) base and bowls with straight sides. The vessels are painted in black pigment on both surfaces with geometric patterns like dots, groups of vertical lines, concentric circles, bands, strokes of vertical and slanting lines, dashes, chains, loops, spirals, sigmas and *swastikas*. Naturalistic patterns like lotuses, leaves, bunches of flowers and the sun are also occasionally found.

The PGW people cultivated rice and wheat and lived in wattle-and-daub houses. They were the first people to have definitely used the domesticated horse. The archaeological picture of the culture is far more modest than that depicted in the epics, the *Puranas* and later literature. The culture is dated by radiocarbon to 1000–600 B.C. which again is in sharp contrast to the Hindu belief of the *Mahabharata* battle having ended before 3000 B.C.

9.3 Northern black polished ware culture and the second urbanization

Iron technology accelerated colonization of the middle and lower Ganga valley by farmers from around seventh century B.C. The characteristic pottery of this period is northern black polished ware (NBPW). The NBPW period saw the emergence of cities and first political entities known as *Mahajanapadas* in the Ganga plains in the sixth century B.C. The NBPW region is also the location of the second major Hindu epic, the *Ramayana*, and of the rise of Buddhism and Jainism. This period witnessed the second urbanization of India (Ghosh 1973). By sixth century B.C. a number of these *Mahajanapadas* had been assimilated into the first Indian empire known as the Magadhan empire with its capital at Pataliputra (modern Patna in Bihar). The Magadhan empire was succeeded by the Mauryan empire in the fourth century B.C. The best known Mauryan emperor – Ashoka – expanded the empire up to Karnataka in the south, Bangladesh in the east and Afghanistan in the northwest. He also patronized Buddhism and was responsible for spreading the religion within the country as well as outside to Sri Lanka and other countries of Asia. After the long gap between the first and the second urbanizations, lasting about 1500 years, writing appeared again during this period. The script is known as Brahmi, and the Buddhist and Jaina literatures in Pali language as also the pillar and rock edicts of emperor Ashoka were written in this script. Coinage in the form of silver punch-marked coins also appeared in this period.

The NBP is made on a fast wheel from well levigated clay, free from impurities. It is well baked, with a blackish-grey and occasionally reddish core, and is thin and sturdy. Its most distinctive feature is its strikingly glossy surface with mirror effect. The normal surface colour of the vessels is light to jet black or steel-blue but it occasionally tends to be silvery, golden, brown or chocolate. The most common shapes in the NBP comprise a dish with convex or straight sides and bowl with straight, convex, carinated or tapering sides. The shapes are similar to those of the PGW and the ware itself is an evolved version of the PGW. Only rarely the ware is decorated with painted designs which include horizontal bands, vertical strokes, transverse bands or strokes or simple circular bands or arches in dark steel-blue, grey, light and deep red, black and dark brown colours. Its extraordinary high technical quality, limited occurrence and examples of broken vessels being joined together with copper rivets, fillets or pins are tell-tale signs that the NBP was ‘deluxe’ ware meant for the elite of the society. This pottery is found throughout north India but its main occurrence is in the Ganga plains in Uttar Pradesh and Bihar. Small quantities of NBP have been found at sites in

central India, eastern India, south India and even in Bangladesh and Sri Lanka. It is believed that this pottery was carried to far off places by Buddhist monks and high administrative officials. The high technological excellence associated with the manufacture of NBP is also seen in the production of steel during this period (Gordon 1958, p. 155). The NBP period is dated from 600 B.C. to 100 B.C.

10. Megaliths and the spread of iron technology to south India

A variety of megalithic monuments, erected as burials or memorials, are found in the northern Vindhyas in southern Uttar Pradesh, Vidarbha region of Maharashtra and over most parts of south India. These monuments include cairns, stone circles, dolmens, dolmenoid cists, port-hole cists, menhirs, and rock cut caves, the last confined to Kerala (Krishnaswami 1949; Gururaja Rao 1972; Sundara 1975). At several places in the northern Vindhyas, Vidarbha and south India, there are large megalithic fields containing several hundred burial monuments. In comparison to the burial sites, the habitation sites are few and far between, suggesting that a part of the megalithic population may have led a semi-nomadic life. The erection of these burials could be achieved only with the help of iron tools meant for quarrying and dressing large rock slabs and boulders. Some of the burial types like port-hole cists (a type of megalithic monument) are very elaborate, involving several large dressed slabs and provision of a hole in one of the slabs for insertion of new dead bodies at a later date.

A number of burial sites and a few habitation sites have been excavated, the more important being Takalghat and Khapa (Deo 1970), Mahurjhari (Deo 1973) and Naikund (Deo and Jamkhedkar 1982) in Vidarbha; Brahmagiri and Chandravalli (Wheeler 1948) and Jadigenhalli (Seshadri 1960) in Karnataka; Nagarjunakonda (Subrahmanyam *et al* 1975) in Andhra Pradesh; Adichanallur (Rea 1902), Amirthamangalam (Banerjee 1956) and Sanur (Banerjee and Soundara Rajan 1959) in Tamil Nadu; and Porkalam (Thapar 1952) in Kerala.

The excavations have produced a variety of iron tools, weapons and domestic objects in large quantities. Other items found in graves consist of pottery, bronze vessels, ornaments of gold and semi-precious stone beads. In Vidarbha, the practice of horse sacrifice and its burial along with its master and its bronze ornaments and other equipment like bridle and stirrups, was common. The characteristic ceramic of the Megalithic culture is black-and-red ware occasionally bearing graffiti designs. The economy of the Megalithic people was based on agriculture as well as animal breeding. The Megalithic culture

belongs to the first millennium B.C. However, the practice of building megaliths continued well into the historic period and survives even to this day in a symbolic form among the *Lingayat* community in Karnataka. The earliest evidence of writing in south India comes from the Sangam literature in Tamil language the beginning of which is dated to the third century B.C., that is in the later part of the Megalithic period (Moorti 1994).

The introduction of iron technology greatly accelerated the expansion of agriculture, particularly in the alluvial plains. This in turn led to the dramatic increase in human population. One of the consequences of these developments was increased deforestation and loss of wildlife. Hunter-gatherers who had lived for several hundred thousand years in the forests and grasslands were steadily deprived of the resources of their livelihood. They were forced to adopt agriculture or occupations associated with agriculture and get assimilated into the expanding farming society. Some of them, however, refused to accept the new way of life, perhaps because prized their freedom too much to accept the hard work and discipline involved in the farming way of life. However, as wild plant and animal food resources continued to dwindle under the pressure of expanding agriculture, the hunter-gatherers were forced to explore additional avenues for livelihood. Many of them, using their traditional skills in the manufacture of hunting gear, took to occupations like producing items such as rope, stone, etc. required by farmers, entertaining village people through song and dance; distilling and selling illicit liquor, and petty trade in crockery, cosmetics and trinkets. Some are believed to have taken to crime, committing theft and even resorting to physical violence, including murder (Nagar and Misra 1989; Murty 1981a, b).

The British government in the nineteenth century branded the communities indulging in crime as criminal tribes and established special settlements for them where a close watch was kept on them by the police. After independence this pejorative label has been removed and they are now officially designated as denotified and nomadic tribes. Many of them continue to practise hunting and gathering and produce various craft items for the village people. Hundreds of such groups are found all over the country in the vicinity of villages, towns and even metropolitan cities (Misra and Nagar 1989). The central and state governments as well as non-government organizations (NGOs) are encouraging them to settle down by providing them land and grants to introduce them to agriculture and animal husbandry. The important communities in this category are Kanjars (Nesfield 1883; Nagar and Misra 1990), Sansi, Haburas, Bediyas, Bahelias, Bhandus and Bangalis in the Ganga plains; Sansis and Kalbeliyas in Rajasthan; Chharas in Gujarat; Pardhis and Kuchbandhias in Madhya Pradesh (Nagar and Misra

1993) and Pardhis and Vaidus in Maharashtra (Malhotra *et al* 1983).

It is this process of absorption of the tribal population into the caste society that can explain the dramatic contrasting geographical distributions of the Scheduled Tribes and the Scheduled Castes (figures 7 and 8). The tribal population today is confined to the hilly and forested tracts in the Aravalli hills in Rajasthan and

Gujarat, the Vindhya hills in Madhya Pradesh and Uttar Pradesh, the Satpura hills in Maharashtra and Madhya Pradesh, the Western Ghats in Maharashtra, Karnataka and Kerala, the Eastern Ghats in Andhra Pradesh and Orissa, the Chota Nagpur plateau in Bihar and West Bengal, and the entire northeast India outside the Brahmaputra valley. In contrast, in the alluvial plains of Punjab, Haryana, Rajasthan, Uttar Pradesh, Bihar, West Bengal, Orissa,

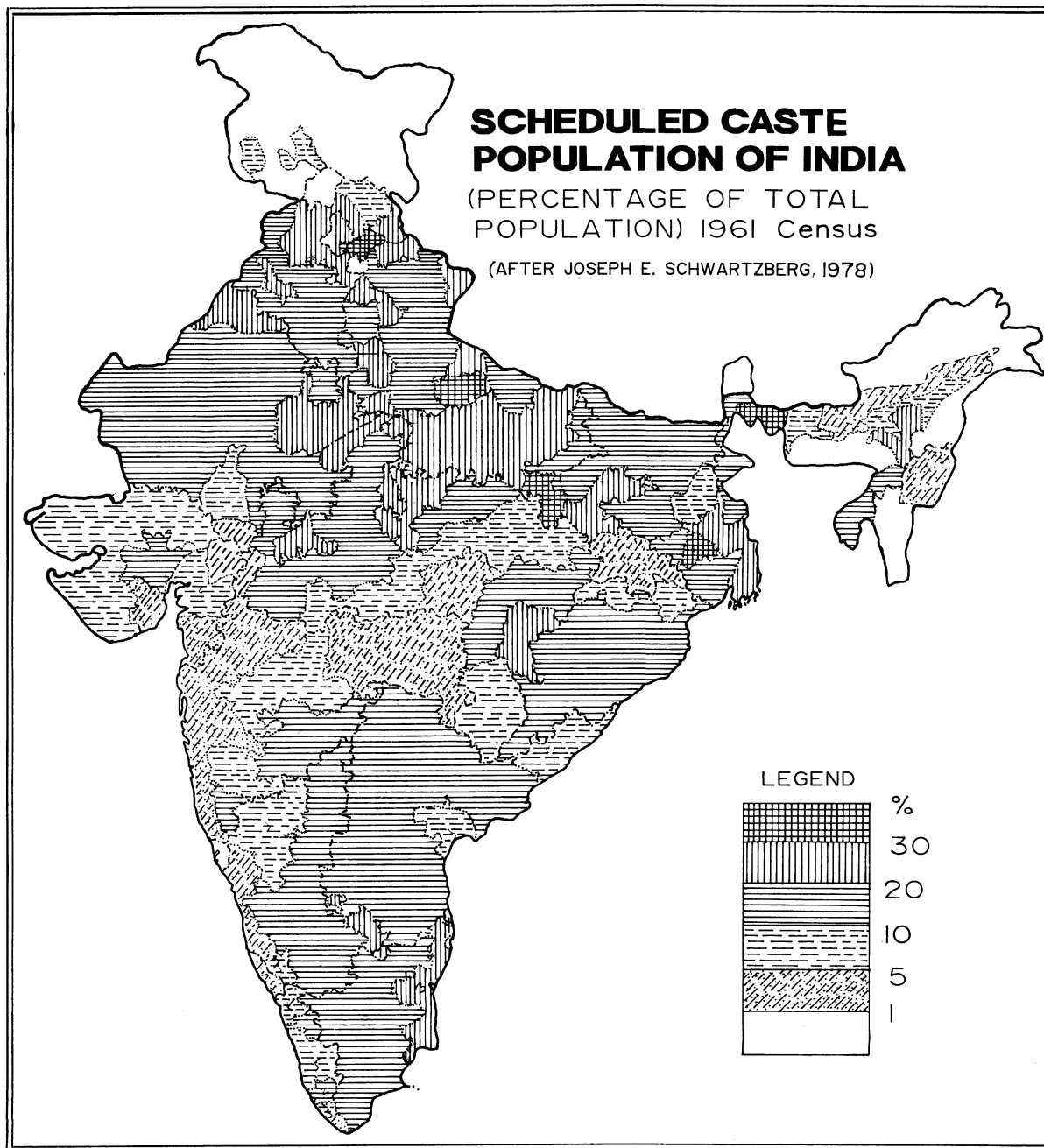


Figure 7. Scheduled caste population of India.

Madhya Pradesh, Karnataka, Andhra Pradesh, Tamil Nadu and Tripura, the percentage of Scheduled Tribes population is negligible and that of the Scheduled Castes is very high. This is clearly seen in table 1 (Misra and Nagar 1997):

11. Conclusion

Human colonization of South Asia began during the Pleistocene period, at least half-a-million years ago and

probably even earlier. This long period has witnessed many technological, economic and social changes. The process of colonization and development was greatly influenced by environmental factors like landforms, climate, flora and fauna. While the older hunting-gathering societies were adapted to hilly, rocky and forested environments where resources for their way of life were in plenty, after the introduction of agriculture the focus of development shifted to fertile alluvial plains. The hilly

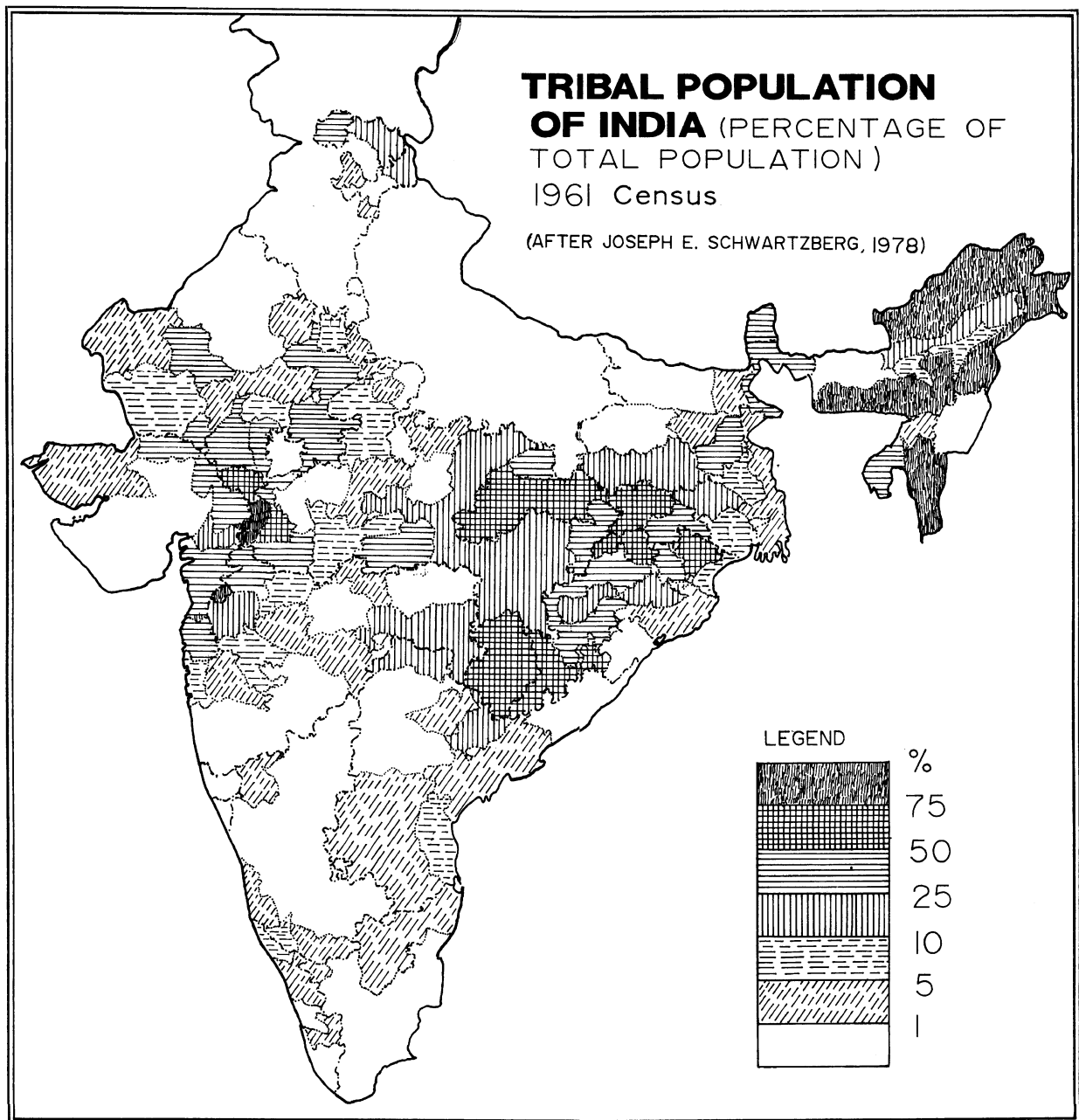


Figure 8. Tribal population of India.

Table 1. The percentage of scheduled castes and scheduled tribes population in the major states of India.

State	Scheduled caste	Scheduled tribe
Punjab	26.9	0.0
Himachal Pradesh	24.6	4.6
West Bengal	22.0	5.6
Uttar Pradesh	21.2	0.2
Haryana	19.1	0.0
Tamil Nadu	18.4	1.1
Rajasthan	17.0	12.2
Karnataka	15.1	4.9
Tripura	15.1	28.4
Andhra Pradesh	14.9	5.9
Orissa	14.7	22.4
Bihar	14.5	8.3
Madhya Pradesh	14.1	23.0
Kerala	10.0	1.0
Jammu and Kashmir	8.3	0.0
Gujarat	7.2	14.2
Maharashtra	7.1	9.2
Manipur	1.2	27.3
Arunachal Pradesh	0.5	69.8
Meghalaya	0.4	80.6
Nagaland	0.00	84.0
Mizoram	0.00	93.6

and forested regions now turned into refuge zones or areas of isolation where the hunting-gathering communities persisted with their traditional life style, sometimes combining it with slash-and-burn or primitive plough agriculture. This situation continues even to this day except that the exploitation of mineral resources, particularly iron ores and coal, has brought modern development to some localities like Jamshedpur and Bokaro in Bihar, Rourkela in Orissa, Durgapur in West Bengal, and Bhilai and Bailadila in Madhya Pradesh, in the refuge zones.

The precise antiquity of human colonization of the country cannot be determined due to the scarcity of geological deposits of the Pliocene and lower Pleistocene and of materials like volcanic rock and ash which can be dated by absolute dating techniques. Almost the entire subcontinent, barring the Ganga plains, northeast India, the Western Ghats, and extreme southern part of the peninsula, was colonized by the lower Palaeolithic people. Lower Palaeolithic technology made use of both core and flake tools, the most distinctive types being handaxes and cleavers. The succeeding middle and upper Palaeolithic cultures are found more or less in the same areas as the lower Palaeolithic. The middle Palaeolithic technology mainly consists of flake tools like scrapers and points and that of the upper Palaeolithic is characterized by blade and burin tools. The earliest art in the form of engravings on ostrich egg shell pieces is known from the upper Palaeolithic. This period saw significant changes in climate and environment. These changes, which were characterized

by alternating cool-dry and warm-wet periods, are particularly marked in northern latitudes, especially in the Thar desert in northwest India.

The end of the Pleistocene Ice Age, around 10,000 years ago, saw a sharp increase in rainfall, which stimulated the growth of both plant and animal life and consequently of human population. This period, known as the Mesolithic, is marked by the introduction of microlithic technology. Microliths are tools made by blunting one or more sides of tiny blades or bladelets, and they were used as components of tools and weapons like spearheads, arrowheads, harpoons, sickles, and daggers. The use of bow and arrow as also of food processing equipment like querns and rubbers began in this period. This new technology augmented hunting efficiency and provided greater nutrition from the available food resources. The earliest human burials as also art in the form of rock paintings are known from this period.

Around 8000 years ago agriculture and settled village life appeared in the northwestern part of the subcontinent. The oldest known agricultural settlement is Mehrgarh in Baluchistan. Agriculture led to a demographic revolution and emergence of new occupations like pottery, basket-making, lapidary and metalsmithy. In due course, surplus agricultural production resulted in the development of trade in raw materials and manufactured goods, diversification of society into occupational groups and eventually to the emergence of towns and cities. The first cities appeared in northwest India around 3000 B.C. in the Indus/Harappan civilization which flourished in the valleys of the Indus and the Saraswati rivers.

Around the same time introduction of agriculture-based life began in other parts of the country. This is represented by a number of Neolithic and Chalcolithic cultures. However, because the technology during this time was based only on stone and copper-bronze, human settlements were mainly confined to the semi-arid regions. Introduction of iron technology around 3000 years ago helped the clearing of dense forests in the subhumid region of the middle and lower Ganga valley possible. Large-scale human colonization of this region took place during the early Iron Age. The focus of development now shifted to the Ganga plains where surplus agricultural production, made possible by iron technology, fertile alluvial soil, perennial availability of water, and human enterprise produced the second urbanization around the middle of the first millennium B.C. and to the birth of the first Indian empire with its capital at Pataliputra (modern Patna in Bihar). Iron tools also enabled the people to quarry rocks for building megalithic monuments and for digging wells and tanks in rocky terrains of peninsular India. By the third century B.C. the urban way of life had spread to most parts of the country,

except climatically unattractive regions like the Thar desert of northwest India and the hyper-humid northeast India.

The intensification of agriculture took a heavy toll of forests and wildlife. As a consequence, hunter-gatherers were compelled to take to agriculture and associated occupations and get assimilated into the steadily expanding caste-based rural and urban society. The enforcement by brahmin priests of the Aryan concepts of racial superiority, rituals of purity and pollution, restrictions on food sharing, endogamy, including *anuloma* and *pratiloma* marriages, *karma*, rebirth, the sixteen *sanskaras* (ceremonies), prohibition on the remarriage of widows and divorcees and ban on all social groups, except the twice-born, on having access to sacred literature, converted the occupational groups into castes. Hunter-gatherers, who were too conservative to adopt the economically beneficial yet arduous agricultural way of life, have persisted with their atavistic lifestyle right into the present. However, because of the steady reduction of their habitat and traditional food resources by continuous encroachment by rural and urban populations, they have been forced to adopt one or more of the additional occupations like providing various craft items produced from rope, grass and stone; entertainment through song and dance to rural and urban populations; petty trade in crockery, cosmetics and trinkets; and, on occasion, even resorting to crimes. Such groups like the *Kanjars*, *Sansis*, and *Pardhis*, to name only a few, are found all over the country, including the fringes of metropolitan cities. It is tragic and ironical that today, in 2001, while India competes with the most developed countries in agriculture, industry and the latest satellite and software technologies, it also harbours the largest number of economically, educationally and socially deprived people in the world.

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