CHAPTER 11
ARCHAEOLOGICAL BACKGROUND

There are numerous megalithic sites in the peninsular India. Barring a few sites where their habitation deposits have been excavated, megalithic sites are mainly the cemeteries. The burials are often grouped in small clusters or even appear singly. Occasionally such cemeteries extend over large areas.

Excavations in megalithic sites have revealed that the megaliths generally include:

i) Post-ex-carnate skeletal remains

ii) Black and red ware

iii) Iron objects (Sundara, 1975.4)

However, for easier presentation, whole of the peninsular India may broadly be divided into four regions, conforming roughly to the natural geographical divisions, which do not necessarily define cultural boundaries. They are:

Region I: Tamil Nadu, covering approximately the North and South Arcot Districts, Chingleput, Trichinopoly, Tanjore, Pudukkottai, Madurai, Ramnad and Tinnevely Districts.

Region II: Covers mainly western coast and western ghats between Coorg in Karnataka and Parambantallu in Kerala.
Region III: Much of the former Mysore State Bellary, Bijapur, Dharwad, Kongunadu (modern Coimbatore and Salem in Tamil Nadu), and Cuddappah District in Andhra Pradesh fall in this fold.

Region IV: This includes Telengana and Vidarbha, erstwhile Hyderabad state, Krishna, Karimnagar, Mahaboobnagar, Nagpur, Wardha and Raichur are a few of the major areas included under this region.

Since most of the representative iron objects studied here belong to North Karnataka and a few to Andhra Pradesh, a brief survey of the sites would be quite helpful to know the proper background of the problem.

North Karnataka includes eight districts: Bellary, Bidar, Belgaum, Bijapur, Dharwad, Gulbarga, North Kanara and Raichur. The region is surrounded by Goa, on the west, Maharashtra on the north and northwest Andhra Pradesh on the east and remaining part of Karnataka on the south.

The sites under reference are: Gaudageri-Unachageri, Rajur Hallur in Dharward district; Komaranahalli in Chitradurga district, Hingani and Halingali in the Bijapur district. All the three districts are now in Karnataka. Uppalapadu and Chinnamarur are located in the Mahaboobnagar district and Kadampaur in the Karimnagar district of Andhra Pradesh.
A Brief Survey of the Sites

1. Gaudageri - Unachageri:

These are two sites situated very close to each other in the Ron taluka of Dharwad district. Both of these sites are situated within the radius of one kilometer from Gajendragad: Gaudageri in the east and Unachgeri in the south. In this area, Megalith I, at the foot of Someshwara Hill was exposed. The burial was found to contain iron objects, black and red ware. Skeletal remains that were found included a fragmentary skull and a few pieces of bones (Sundara, 1975, 125-126; Fig 19.1.3). The sample studied from this site is a piece from a dagger (Fig 2A.2).

The Gajendragad group of pit burials are spread over a large area in the district Dharwad. Gajendragad itself is a village at the foot of a long chain of sandstone hills that run near Badami. The megaliths at Gaudageri, Unachageri, Kalakaleshwar and Rajur fall in this group. Out of a number of megaliths present in the Gajendragad area, two were examined in detail by Sundara (1975, 87), which are referred to as Megalith I & Megalith II. Megalith I is in Gaudageri - Unachageri zone. While the Megalith II is situated in the Rajur area. They are briefly described below.
2. Rajur

The village is situated near Gajendragad in Ron Taluka of Dharwad district. The site is located in the valley of a small hillock, locally called Someshwaragudda. The burials in this area are in various stages of preservation. A few of them are exposed in the section of a channel cut along the foot of the hill. One of them has been termed as Megalith II by the exiavator. The earth of the pit was found to be exceedingly compact. The pit had a vase containing skull fragments and a few pieces of iron objects. Most of them are of indeterminate shape. The objects were highly corroded and fragile. The black and red ware, and red ware pottery pieces were also collected from this Megalith II which are similar to those of Megalith I described above. (Sundara, 1975, Fig 19.1.1). The sample studied here is a spoon (Fig 2A.1).

3. Hallur

It is situated on the left bank of the river Tungabhadra in the Hirekerur taluka of Dharwad district. Here, Megalithic culture over laps the Neolithic culture (Nagaraj Rao, 1971, 11). Sankalia (1979, 113) has observed that the megalithic people at Hallur were probably an agricultural-cum-hunting community.

It is believed that the Neolithic people of Karnataka region preferred to stay on the 'made grounds' upon the
castellated granite hills in the Chitradurga - Bellary - Raichur zone and in the neighbouring district of Andhra Pradesh. Hallur is situated in the southern tip of Dharwad district. The explorations brought to light a highly burnished white painted black-and-red ware, besides neolithic ware. The fabric and shape of the vessels appeared to be those of iron age graves, whereas, the tradition of painting in white was so far known only to a number of chalcolithic sites. In fact, such white painted wares have been important components of ceramics of certain chalcolithic sites like Gilund and Ahar in Rajasthan, Nagda, Nevdatoli in Central India, and Prakash and Takwada in Maharashtra.

The excavations were conducted in the northern part of the site at Hallur. Following distinguishing features were revealed. Two cultural periods are noticed.

Period I, designated as the Neolithic, is further subdivided into Phase I and Phase II on the basis of ceramic evidence. Phase I is characterised by hand made pottery and a few ground stone tools. Phase II is called neolithic-chalcolithic and distinguished by hand made pottery, polished stone tools, stone blade industry and tools of copper, which appear for the first time. House plans and urn burials found in this phase are worthy of mention. Some of these distinguishing features are
similar to those found at Tekkalakota in Bellary district and Nevasa, Daimabad and Chandoli in Maharashtra.

Period II is known as early Iron Age or Megalithic (Nagaraja Rao, 1972, 55) although some of the earlier elements continue to thrive. The new elements that distinguish this period are the typical highly burnished black and red ware pottery with white painted variety and the iron implements. The iron implements consist of arrow-heads, spear-heads and knife blades. The burials of the Iron Age, the Megalithic, comprised cairns and dolmenoid cist circles. Following chronological sequence is ascribed to the different strata of Hallur, a proto-historic site (Nagaraj Rao 1971, 14-15).

Period I: (a) Phase 1, Early Neolithic 1710 +105 B.C.

(b) Phase 2, Neolithic-Chalcolithic 1425 +

105 B.C.

Period II: Early Iron Age or Megalithic 1105 +105 B.C.

and 955 + 110 B.C.

On using MASCA correction. (MASCA Newsletter, 1973) the dates for the Early Iron Age level would be 1270 to 1300 B.C. and 1030 to 1100 B.C.

The object examined here is a piece of an arrow-head, which was heavily encrusted (Fig 2b.3).
4. Komaranahalli

The village is situated on the other bank of river the Tungabhadra in the district of Chitradurga. The cultural sequence obtaining at this site is similar to that of Hallur. The village is just 12 kms east of Hallur. The TL dates from the iron yielding phase of Komaranahalli revealed the period around 1200 B.C.-1100 B.C. (Chakrabarti, 1983, 76).

Two types of megalithic burials were noticed, such as the pit burials with capstone and cairn-circle, numbered Megalith I & III, secondly, pit burials with cairn-circle only numbered Megaliths II & IV. Two burials of each type were excavated (Indian Archaeology-A Review, 1980-81, 1983, 29).

Megaliths I & III are cut into the laterite rock. Megalith I yielded spouted vessels, globular pots, legged jars, black-and-red ware bowls etc. Arrow heads, axe, knives rods etc. are a few of the representative iron objects found in this Megalith. Megalith III was found to contain black-and-red ware skeletal remains and an iron implement.

Megalith II was found to contain black-and-red ware, a grinding stone, iron implements and etc. Megalith IV, which was similar to Meg. II, also yielded iron implements.
The most important aspect of these excavations is that, here also Iron Age overlaps (c.1000 B.C.) the chalcolithic phase as at Hallur, which is about 12 kms away in the west. The sample studied here is a piece of an arrow-head and belongs to Megalith I.

Incidentally, it may be pointed out here that, two other important megalithic sites are located in the nearby areas of Hallur. Tadakanahalli and Kamalapur are at a distance of 8 kms and 2 kms respectively from Hallur. All these four sites yielded similar cultural remains like black and red ware and iron objects. These were found stratified above the Neolithic deposits.

5. Halingali

The village is situated in Jamakhandi taluka of Bijapur district. The megalithic site here is quite important as it provides a possible link with north western routes leading through the Deccan plateau (Leshnik, 1974, 136).

The passage chambers of Terdal-Halingali area, are found in a different geological zone, i.e., Kaladagi series. Therefore, it was felt that the excavations of some megaliths would bring to light their characteristic features, relationship with other megaliths and their chronological aspects. Thus, totally there megaliths, numbered Megalith I, II & III were excavated (Sundara, 1975, 103-110).
Megalith I happens to be a stone circle and contained black-and-red ware pottery also. It was filled with stone rubbles. Megalith II was also found filled with stone rubbles and earth. Some black and red ware pot sherds were also got. In both of these Megaliths, iron objects are not found.

However, Meg. III which is a Latin cross type, yielded a large number of artefacts including iron objects. The excavations of this Megalith revealed the following artefacts:

a) pottery of two kinds, such as, red ware and black and red ware. The concentration of red ware was more;

b) some bone pieces;

c) iron objects were found at a depth of about one metre. They included saucer-lamps, straps, hook, curved blade, clip, 13 rods and objects of indeterminate shape;

d) A rectangular copper sheet.

The C-14 dating from charcoal bits is 2080 + 100 B.C. which comes to 80 B.C. Using MASCA chart, the date is calibrated to 20 A.D. - 40 A.D. (MASCA, Newsletter, 1973).

Three objects have been examined from this Megalith - two rods and a curved blade (Fig 2b.1, 2b.2 and 2a.4).
6. Hingani

The village is located in Indi taluka of Bijapur district. Hingani falls in the Deccan trap zone of the lower Bhima valley. The only type of the Megalithic burials noticed in this zone are the pit circles.

About 55 potsherds including black and red ware pottery, some fragments of highly disintegrated iron pieces including a cylindrical tube were recovered from a part of the site by Sundara (1975, 130-166, Fig 19.11.2). Peculiar distribution of the Megalithic artefacts only shows the influence exerted by the megalithic people at certain sites as has been seen earlier (Chapter 1). The highly fragile hollow cylindrical tube is studied here (Fig 2a.3). |

7. Uppalapadu

The village is situated in the Mahaboobnagar district of Andhra Pradesh.

Totally sixteen megalithic burials were exposed in three sites at this village by the Department of Archaeology & Museums, Govt. of Andhra pradesh. Different types of megaliths were encountered here, such as cairn burials with rectangular pits, port holed cists. Notwithstanding the variety of types of the burials, most of them revealed skeletal remains, black and red ware.
black ware and iron implements (Indian Archaeology—A Review, 1977-78, 12). The sample studied here is a piece of javelin from Megalith III of site 3.

At Chinnamarur, another site in Mahbubnagar, two cists were excavated (IAR, 1977-78, 64-65). A piece of dagger from cist 2, site 2 is also studied here.

8. Kadambapur

The village is situated in Karimnagar district, Andhra Pradesh. Toally five megaliths and a small habitation site were excavated here. The megalithic site is located on the bank of river Maneru, a tributary of the Godavari.

Megalith I is a pit burial and was found to contain funerary pottery, skull, fragments of bones, two Javelins etc. The iron artefacts were kept parallel to the skeletal remains. A curved dagger with copper hilt was also kept near the skull. Megalith II had a capstone and in other respects it was similar to Megalith I. Two skulls and other bone pieces were interred in articulated condition. Conch shells and a small dagger were also found near the skulls. Apart from the pottery of megalithic fabric a pair of Javelins of about 85 cm length were also found placed over the pottery (Indian Archaeology— A review, 1979, 3). Megalith III is a pit burial with a capstone. Pit had cairn packing and was rectangular. The excavation of this megalith revealed
a complete skeleton, two gold wire ear-rings, a dagger which was thrust into the clavicle. Pottery of megalithic fabric was also found.

Megalith IV was a disturbed port hole cist and revealed bones, crescentic tanged battle axe, knife, and pottery etc.

Megalith V was similar to megaliths I, II & III. The skeletal remains including two skulls were found heaped without any articulation in this megalith. Besides, megalithic pottery, javelin, spearhead, arrow-head, dagger, knife, are a few of the iron objects recovered from this Megalith.

Excavation at the habitation site yielded red slipped ware, dull red ware, conical bowls and black and red ware from the lower levels. Black-and-red ware continues to occur in the upper levels also, along with red ware represented by lid-cum-bowl.

The sample examined here is a piece of Javelin from Megalith II, a pit burial.

One of the most important aspect of location of the Megalithic sites is the availability of iron ore. It is observed that the rocks/hillocks near many of the sites are rich in gold and iron. There are big megalithic settlements at Hire Benkal in Gangavati taluka of Raichur.
district. Hospet region which is well known for its rich iron ore deposits of high quality is located in the neighbourhood of these megalithic settlements. Maski, another site is located in the bands of Dharwar rocks with auriferous quartz reef. Maski is also known for its ancient gold working pits.

Incidentally, it may be mentioned here that, Kolar in Karnataka, renowned for its gold mines is also the richest for its megalithic remains (Sundara, 1975, 156). Besides this, a number of megalithic sites, are known to have been located near ancient gold and iron smelting sites as noted earlier in Chapter I.

Aspects of Corrosion

As is already noted, most of the iron samples studied here were highly corroded, fragile and thickly encrusted. Only a few had metallic core in them. If the environmental equilibrium in corrosion reaction sets in early, the growth of corrosion products ceases as it happened in the case of celebrated Delhi iron pillar, which is said to have defied the vagaries of nature for the last 1600 years. On account of environmental equilibrium, the corrosion reaction has come to a standstill after forming a thin film of rust on it. This thin film of rust itself acts as a rust-inhibitor for the pillar.
However, three reasons are attributed to this exceptional performance of the Delhi pillar. Broadly they are: absence of appreciable amount of sulphur in the pillar, absence of sulphur compounds in the atmosphere and thirdly compactness of the metal. As a matter of fact, it is observed that oriental iron of early times which was smelted using charcoal as a fuel must have contained very little sulphur. A recent chemical analysis of the Delhi pillar shows the presence of sulphur only in traces in the portion above the ground and only 0.008% in the underground part (Ulick, 1972, 26).

Some authors attribute this exceptional quality of the pillar also to the absence of manganese and presence of phosphorus (Ulick, 1972, 26, 27). But certainly absence of malignant elements like chlorine or sulphur in the Delhi atmosphere has contributed largely to this remarkably excellent state of preservation of the pillar.

The factors cited above are unfavourable to the corrosion reactions which lead to rust formation while not interfering in the production of a protective film of oxide.

Corrosion, essentially is a destructive alteration of metal by electro-chemical reaction with its environment. Rusting is a corrosion of iron, which results in the formation of hydrous ferric oxides. Appearance of orange
and red components as the first products of corrosion is a characteristic feature of rusting (Plenderleith, 1956, 271). These products initially are a mixture of ferrous and ferric hydroxides but on further corrosion, it becomes substantially a hydrated ferric oxide, in which some carbonate is usually present.

As stated earlier, corrosion is an electrochemical process, where two dissimilar metals are in contact in the presence of an electrolyte. This action can be demonstrated where two dissimilar metals are in contact in the presence of a conducting solution of a salt, the essentials of a simple electric cell. Besides the susceptibility to corrosion is greater in the alloyed metals. (Plenderleith, 1956, 189).

From these considerations it follows that different potentials could be established because of local inclusions in the surface, varying porosity, thus allowing electric current to flow, leading often to catastrophic forms of corrosion.

It may be noted here that the objects studied here were buried in the soil for thousands of years. The corrosion behaviour of iron and steel buried in the soil approximates in some respects to the corrosion pattern on the objects if they are immersed in water (Uhlig, 1956, 149). However, the degree of acidity or alkalinity of
soil, its porosity (aeration), presence of naturally occurring soluble salts, moisture, electrical conductivity etc. are also some of the other factors responsible for the growth of corrosion.

One of the most common causes of heavy corrosion is often traced to the presence of a certain sulphate reducing bacteria called, Sporovibrio desulphuricans and sheet forming bacteria, called Gallionella ferruginea. (Plenderleith 1957, 273). The former type of bacteria, in the process of reducing the sulphates to sulphides, are aided by the presence of iron surface. The latter, the sheet forming bacteria form a blistered structure of tubercles which is a common feature of heavily corroded iron. One another important reason for corrosion is the effect of heat-treatment itself, given to the tool/object in question.

A carbon steel quenched from high temperatures has a structure called martensite (see Chapter IV). This structure reduces the rate of corrosion. However, on heating, martensites at low temperatures followed by air cooling (tempering), decomposition to iron carbide of unknown composition takes place. This two phase structure sets up cells with different potentials which accelerate the corrosion reaction. Some finely divided cementite (Fe₃C) also appears by such decomposition. At the
temperatures above 400°C cementite particles coalesce to a size large enough to resist complete dissolution due to corrosion. Thus they can be detected in the residue of corrosion products (Uhlig, 1965, 109-110).

A carbon steel, if slowly cooled from the austenite region, i.e., above 710°C, cementites in part assumes a lamellar shape forming a structure called pearlite. This structure again corrodes, comparatively at lower rate because of the relatively massive form of cementite formed by the decomposition of austenite. Thus the amount of cementite acting as a cathode and its state of subdivision bear out the electro-chemical mechanism of corrosion. Some other major factors that favour corrosion are:

1) presence of cinders constitutes one of the most corrosive environments;

2) soils containing organic acids derived from humus.

3) retention of soluble salts in the porous surface of the objects.

However, there are various substances that act as rust inhibitors, and the active constituent is often the formation of a thin film of ferric phosphate on the surface of the metal. The other reason could be the formation of a CaCO$_3$ film on the surface of the metal. The
calcium carbonate formed due to the decomposition of calcium bicarbonate in the soil has a tendency to deposit on the metal surface. (Uhlig, 1956, 102). Thus it retards diffusion of dissolved oxygen to the metal surface, while affording a protection layer.

It is in this context one can find out the reasons why some objects have been highly corroded and others not. As noted earlier, undissolved carbide particles may give us an idea about the heat-treatment given to the objects under reference.
Fig. 2a.