Keywords: *Cattle domestication Beginning Humpless cattle Chambal valley*

BEGINNING OF CATTLE DOMESTICATION IN INDIA WITH SPECIAL REFERENCE TO CHAMBAL VALLEY: PERSPECTIVES OF ROCK ART AND ARCHAEOLOGY

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Abstract: Scholars have never given a serious thought for understanding the transition from one techno-cultural phase to another one, particularly in India. It is also true with the transition from Mesolithic to Neolithic and Neolithic to Chalcolithic. While Mesolithic represents hunting-foraging economy, Neolithic witnessed the fully developed agro-pastoral economy and beginning of settled life, though hunting-foraging mode of life also continued in one way or other. But when and how this transition took place, Indian archaeology is silent about it. There are stray references of the occurrence of some bones of domesticated cattle in Mesolithic cultures, particularly in the upper Vindhyas and Ganga valley, but no serious work was ever undertaken on this issue.

Evidence of rock art present an interesting picture of the transition from hunting foraging to pastoral life, and the evidence from Chambal valley is rather distinct. Here, cattle domestication began with humpless cattle in the late phase of Mesolithic. Humped cattle appear afterwards. With the appearance of humped cattle a radical change in the socio-cultural life occurred. A number of scenes of family and cultural life appear which present a vibrant picture of the socio-cultural life of the early pastorals in Chambal valley. This paper presents author's observation and preliminary study of this phenomenon.

Scholars have never given a serious thought for understanding the transition from one techno-economic-cultural phase to another one, particularly in India. It is also true with the transition from Mesolithic to Neolithic and Neolithic to Chalcolithic. While Mesolithic represents hunting-foraging economy, Neolithic witnessed the fully developed agro-pastoral economy and beginning of settled life, though hunting-foraging mode of life also continued in one way or other. But when and how this transition took place, Indian archaeology is silent about it. There are stray references to the occurrence of some bones of domesticated cattle in Mesolithic cultures, particularly in the upper Vindhyas and Ganga valley, but no serious work was ever undertaken on this issue. In this scenario, the Indian rock art present an interesting picture of the transition from hunting foraging to pastoral life, and the evidence from Chambal valley is rather distinct (Fig. 1). Here, cattle domestication began with humpless cattle in the late phase of Mesolithic. Humped cattle appear afterwards. Archaeo-zoologists used to identify humpless cattle with Bos taurus and humped cattle with Bos indicus. However a thorough scientific study is needed to identify the early humpless cattle depicted in Indian rock art as it is very different from that of European one.

Evidence from rock art

The spectrum of Stone Age iconic rock art in India is wide and varied and up to some extent unique in terms of vigour and dynamism of figures, quality of lines, different styles and variety of themes. It presents

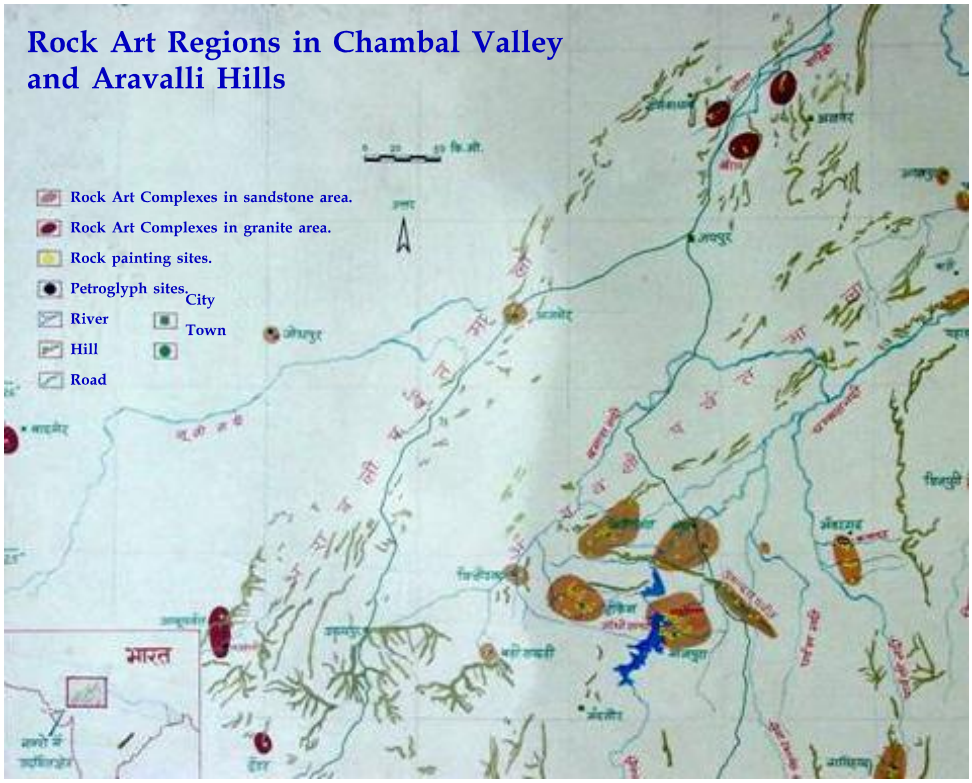

Fig. 1. Map showing rock art regions in Chambal valley and Aravalli hills.

different evolutionary traits, stages and a distinct transition from hunting-foraging to cattle domestication life, especially in Chambal valley. The cattle domestication so began with humpless cattle in late phase of Mesolithic laid the foundation of the Neolithic pastoral mode of life. It continues till Historic period with introduction of different evolutionary traits such as cattle riding with humpless cattle, introduction of humped cattle and activities associated with it, metallic implements and chariots driven by deer, bull and horse, Harappan-Brahmi script like graffiti, Brahmi inscriptions, religious symbols and lately war scenes at different stages of Neolithic-Chalcolithic and Iron age History in the remote areas.

Cattle domestication, seminomadic pastoral and incipient agriculture mode of life and thought processes

Thus, following evolutionary stages have been observed in the rock art, especially in Chambal valley (Kumar 2000-01):

1. Appearance (beginning) of cattle domestication with humpless cattle. Transitional phase: Mesolithic-Neolithic.

2. Appearance of humped cattle. Neolithic-Chalcolithic Cattle domestication as full-fledged economy and incipient agriculture mode of life and accordingly thought processes began.

a. Neolithic-Chalcolithic-1: Pre-chariot breeders of cattle and probably organisers of cattle trade. Appearance of metallic implements.
b. Neolithic-Chalcolithic-2: Appearance of chariots and charioteers with metal implements.
c. Neolithic-Chalcolithic-3: Appearance of early letters (pre-Brahmi) with figures.

3. Appearance of inscriptions in Ashokan Brahmi characters, religious symbols and figures.

Third-Second century B.C.

4. Appearance of caparisoned horses, elephants and warriors with iron implements.

Historic

We have indirect dates for some of these distinct evolutionary phases. For others we will have to wait till further research bears fruit. But one thing is clear that the semi-nomadic pastoral and incipient agriculture mode of life continues throughout with introduction of different evolutionary traits time to time. People were using stone tools and primitive metal implements. Even in Chalcolithic settlements microliths were profusely used.

1. Appearance of cattle domestication

In the Upper Chambal valley early wild humpless cattle without the association of human beings have been observed by the author in the rock art

Fig. 2. Wild humpless bulls at Kapildhara in district Baran, Rajasthan.

at Kapildhara (Fig. 2), Mandol dam (Fig. 3), Kalaji-ki-Kui (Fig. 4), Chamli nala, Chaturbhujnath nala (Fig. 5-6), Modi, Kanwala, Sujanpura, etc.. In this region the transition from Mesolithic hunting-gathering to cattle rearing life is rather distinct and conspicuous. The animals caught and tamed were wild humpless cattle as is evident by such figures found at Chaturbhujnath nala (Fig. 7a & b, 8, 9, 10)) (Kumar 1992:56-68, Kumar and Pradhan 2008:23-51), Chattaneshwar (Fig. 11), Kapildhara, and Pirbheda (Kumar 1983:379, 2007, 2008). Humped cattle appeared later in the following phase (Fig. 12). In the initial cattle catching scenes figures retained the dynamism and other characters of the late Mesolithic paintings.

2. Appearance of humped cattle

Initial efforts of cattle domestication started with humpless cattle and were followed by the appearance of humped cattle. It brought sudden boom in the execution of scenes of cattle husbandry, pastoral life and accordingly changed thoughts and beliefs. In the early phase humpless cattle also continues along with humped cattle (Fig. 12, 13). Figures retained some dynamism of the preceding Stone Age paintings, but are comparatively small, done with a number of experiments. Abstraction and stylisation of figures, reduction in size and use of bold lines and strokes and filled in bodies go on increasing in the succeeding phases.

This rock art of semi-nomades and pastorals witnessed some evolutionary traits which are as follows:

a. Pre-chariot breeders of cattle and probably organisers of cattle trade, Appearance of metallic implements.

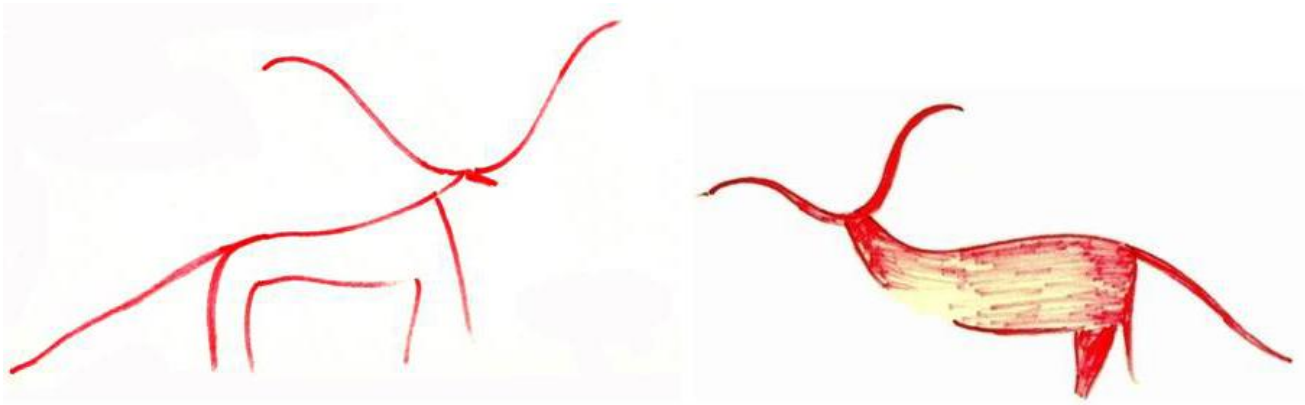

Fig. 3. Humpless cattle from rock shelters near Mandol dam, district Bhilwara, Rajasthan.

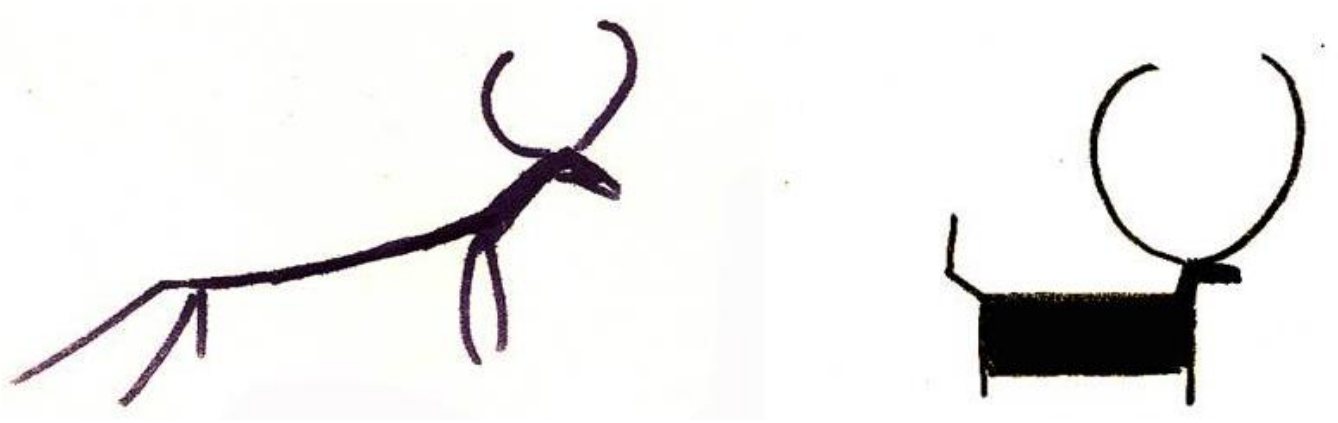

Fig. 4. Wild humpless bulls from Kalaji-ki-Kui near Darrah, district Kota, Rajasthan

On the basis of superimposition and stylistic ground it can be observed that in the rock paintings of Chambal valley arrows tipped with broad metallic point were in use in the early pre-chariot phase, though in limited number. Microlith tipped multibarbed arrows also continued (Fig. 14, 15, 16).

b. Appearance of chariots

The use of copper implements in the form of metal tipped arrows, axes and *parashus* (similar to that obtained in the excavations of Chalcolithic habitations) became popular in the middle phase and continued in the succeeding phases till they were replaced by iron

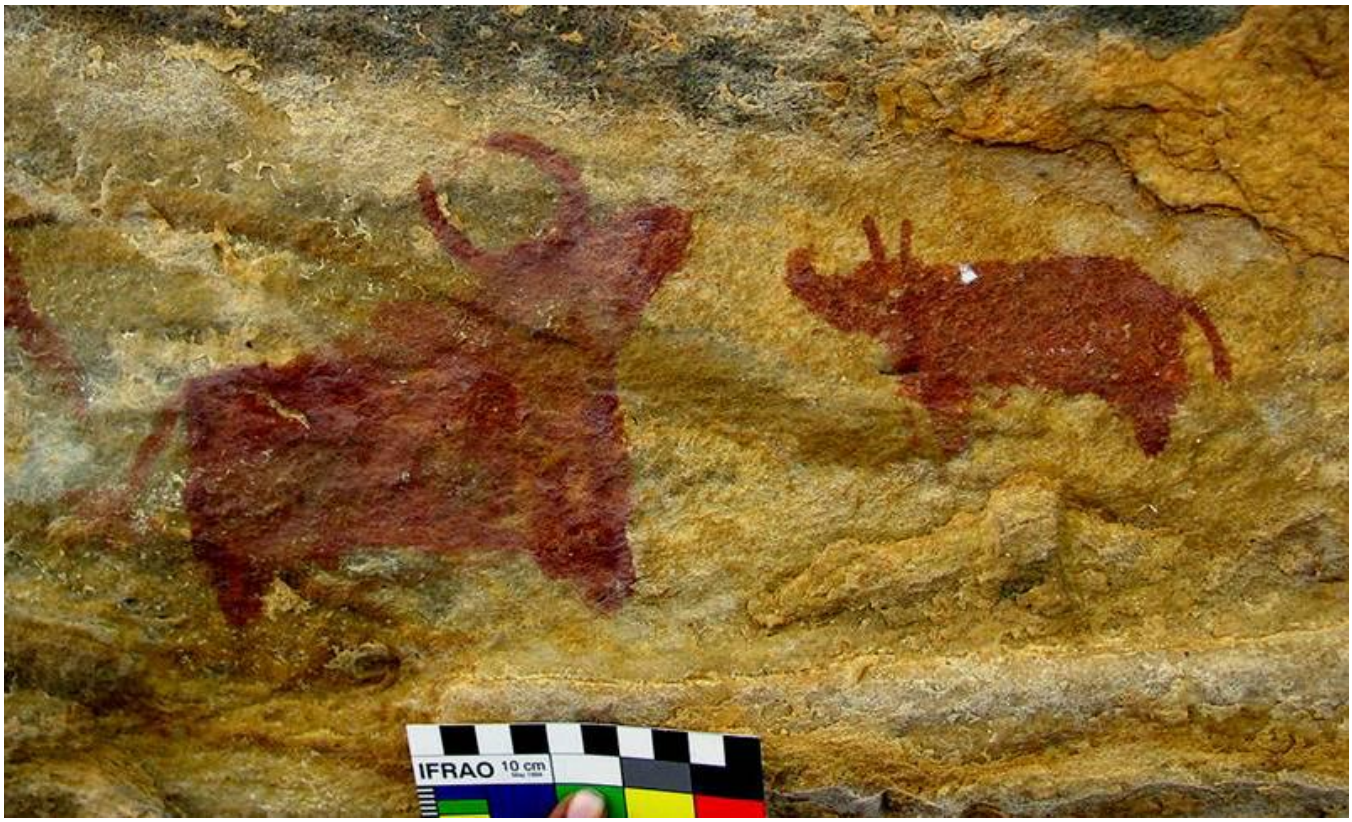

Fig. 5. Wild humpless bull and a rhinoceros, Chaturbhujnath nala in Gandhisagar game sanctuary, Chambal valley.

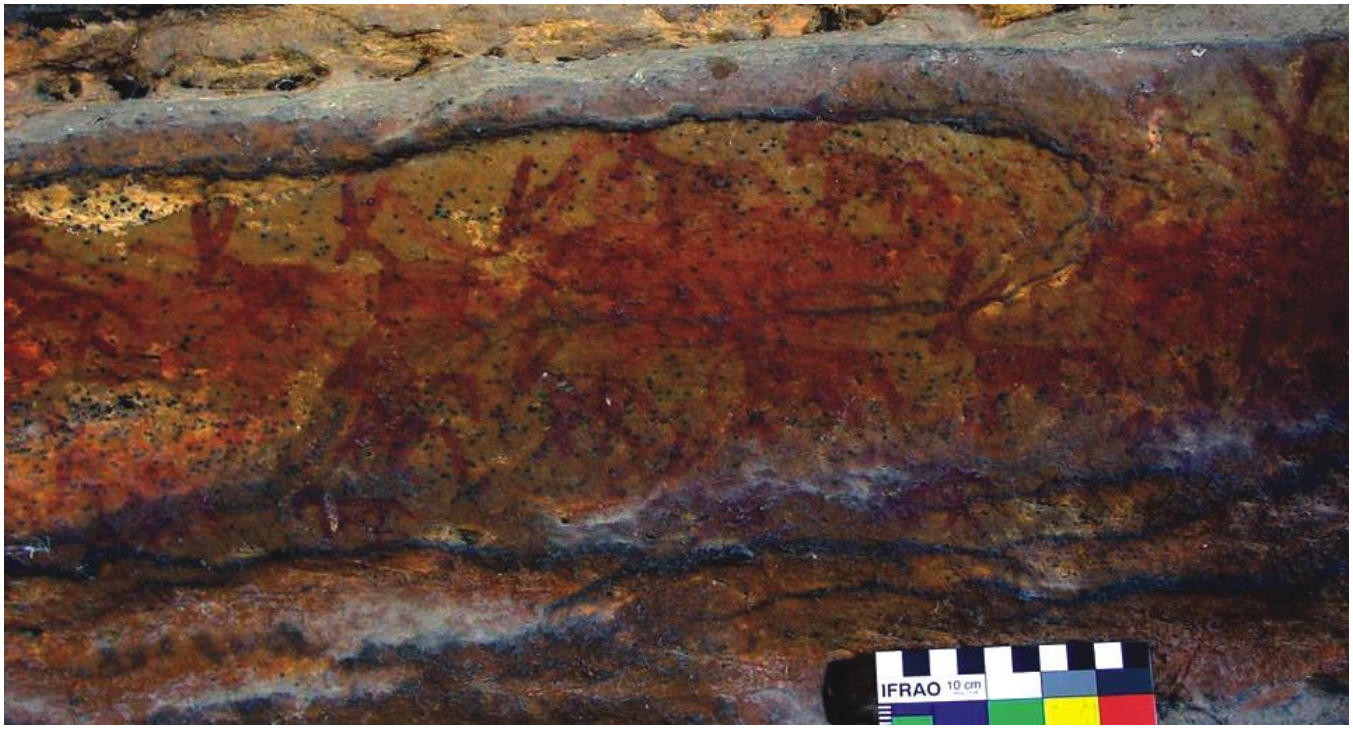

Fig. 6. A group of wild humpless bulls with straight and broad horns going upwards, Chaturbhujnath nala.

implements (sword, spears, etc.). It is in this second phase that we see the appearance of chariots which are very simple with two spoked-wheels joined at the end of the axle. Between the wheels a small space has been made for standing the charioteers on it, but generally they are not depicted (Fig. 17). Chariot is drawn generally by two or four, sometimes even by six horses or bulls. The reins reach their mouths generally from over their heads in the early ones (Fig. 17) and hanging from their mouths in the later ones (Fig. 18) (Kumar 1983:390-91). The chariots are not a common feature. They are made in selected rock shelters occupying a good and strategic position. Introduction of copper implements and chariots in rock art was the result of the contact and exchange of the goods by the nomadic pastorals with the copper producing and agricultural

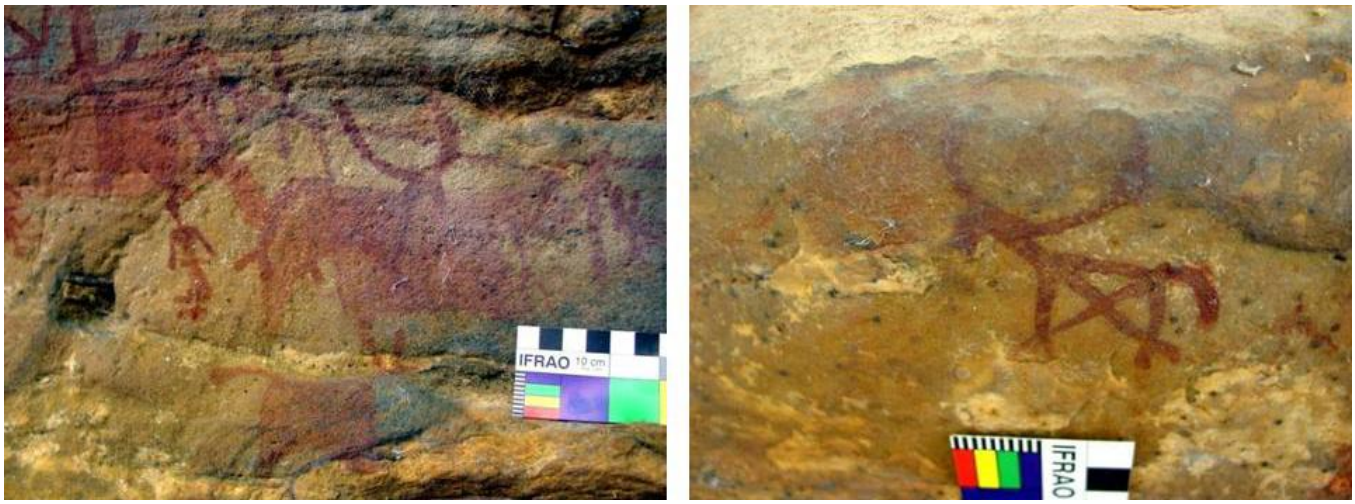

Fig. 7a left and 7b right. Humpless bulls with strait upraised, broad and curved horns, Chaturbhujnath nala.

Fig. 8. A person with camouflaged head (wearing head gear) holding a humpless bull, Chaturbhujnath nala.

Fig. 9. Cattle pan with humpless cattle with broad horns in it, Chaturbhujnath nala.

Fig. 10. Persons holding no implement riding humpless bulls in majestic way, Chaturbhujnath nala.

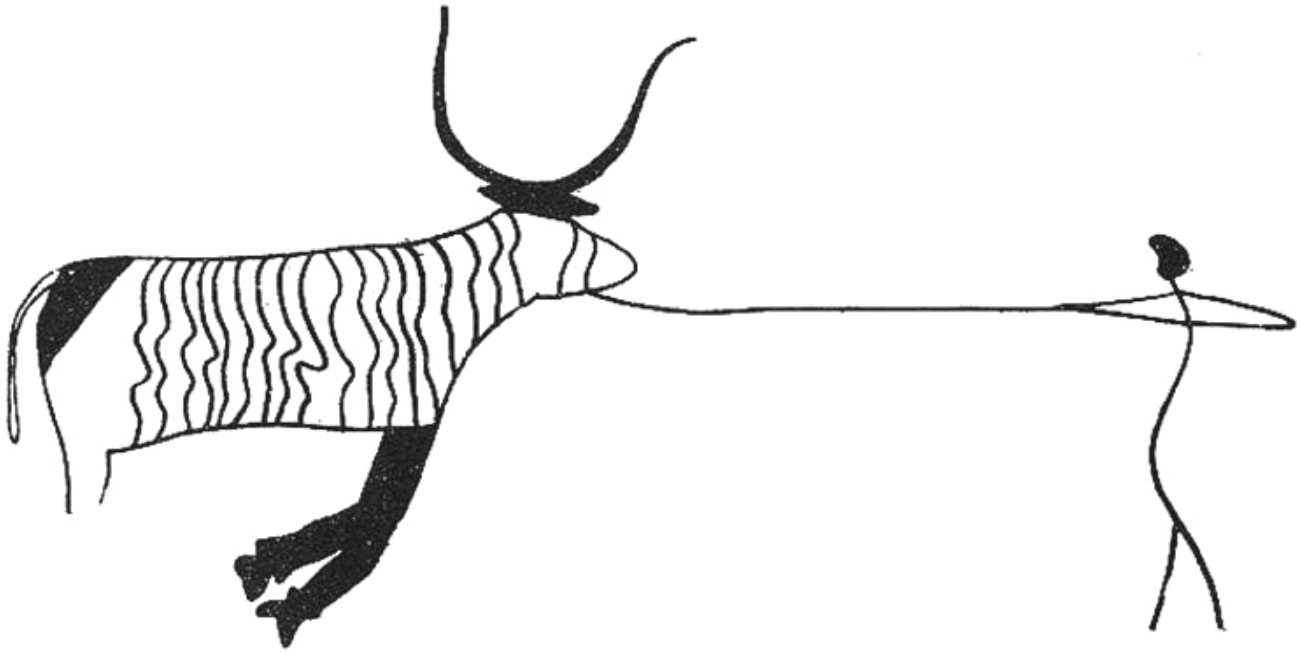

Fig. 11. A man dragging a humpless bull, Chattaneswar, dist Kota, Rajasthan. Late Mesolithic.

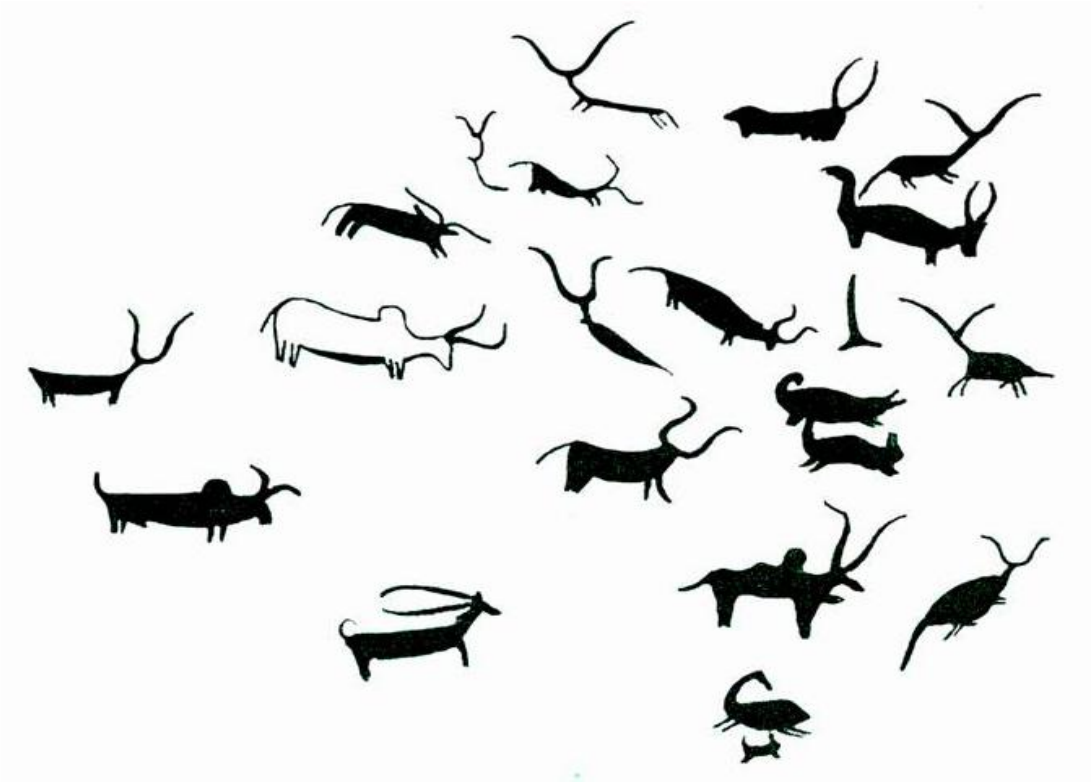

Fig. 12. A group of wild humpless and humped bulls, Kanyadeh in river Bilasi, district Baran, Rajasthan.

communities in the plains (Kumar 1983:379-80; Neumayer 1991:39-70).

c. Appearance of early letters (post- Harappan or pre-Brahmi)

In Chambal valley rock paintings we also come across two compositions with early letters in post- Harappan or pre-Brahmi characters. One such inscription is with two cattle and four persons from Chaturbhujnath nala (Fig. 19) and another is with a rhino trapped and aimed at by a hunter at Kanyadeh (Fig. 20). They remind the pictographic script of the Harappan culture. Their exact antiquity has to be fixed by future research (Kumar et al. 1992:50.51), but they form the earliest written record with figures in Indian rock art, thus establishing a chronological demarcation line in it.

3. Appearance of Brahmi inscriptions and associated religious figures

The appearance of Brahmi inscriptions in Ashokan characters and associated religious figures form another demarcation line. They are done mainly red colour, sometimes engraved on open bedrock or boulders or inside rock shelters. Thus, we can safely put such inscriptions and associated figures in third century B.C. somewhere around Ashokan period (272 to 236 B.C.). Brahmi inscriptions depicting different stages of their evolution are also found in rock art.

The appearance of Brahmi inscriptions and associated figures was the result of the religious missionaries coming to these remote areas.

4. Appearance of caparisoned horses, elephants and warriors

Appearance of caparisoned horses, elephants and warriors with swords and spears with iron points, sometimes actual battle scenes, camels, etc. also form another demarcation line. Their antiquity has to be decided by future research.

Discussion

Archaeological evidence

From the excavations of the Mesolithic and Neolithic sites and osteological study of the bones

Fig. 13. A man with bow and arrows holding a humped bull, another archer is behind the bull, Chaturbhujnath nala.

Fig. 14. Humped and humpless cattle in a cattle pan and outside it, Indragarh, Bhanpura. (After R. K. Pancholi).

obtained from these excavations, the chronological scenario of the transition from hunting-foraging to animal husbandry mode of life emerges as follows:

Ganga valley: Sarai-Nahar Rai

This is a small semipermanent Mesolithic camping site situated on the bank of one of the oxbow lakes on the northern side of the Ganga river in Allahabad district. In the excavation of the pre-ceramic phase the animal bones obtained include those of cattle, buffalo, sheep, goat, elephant and tortoise. It was suggested that while most of the cattle were probably wild, some may have been domesticated. One 14C date obtained from it is 8395 +_ 100 B. C.

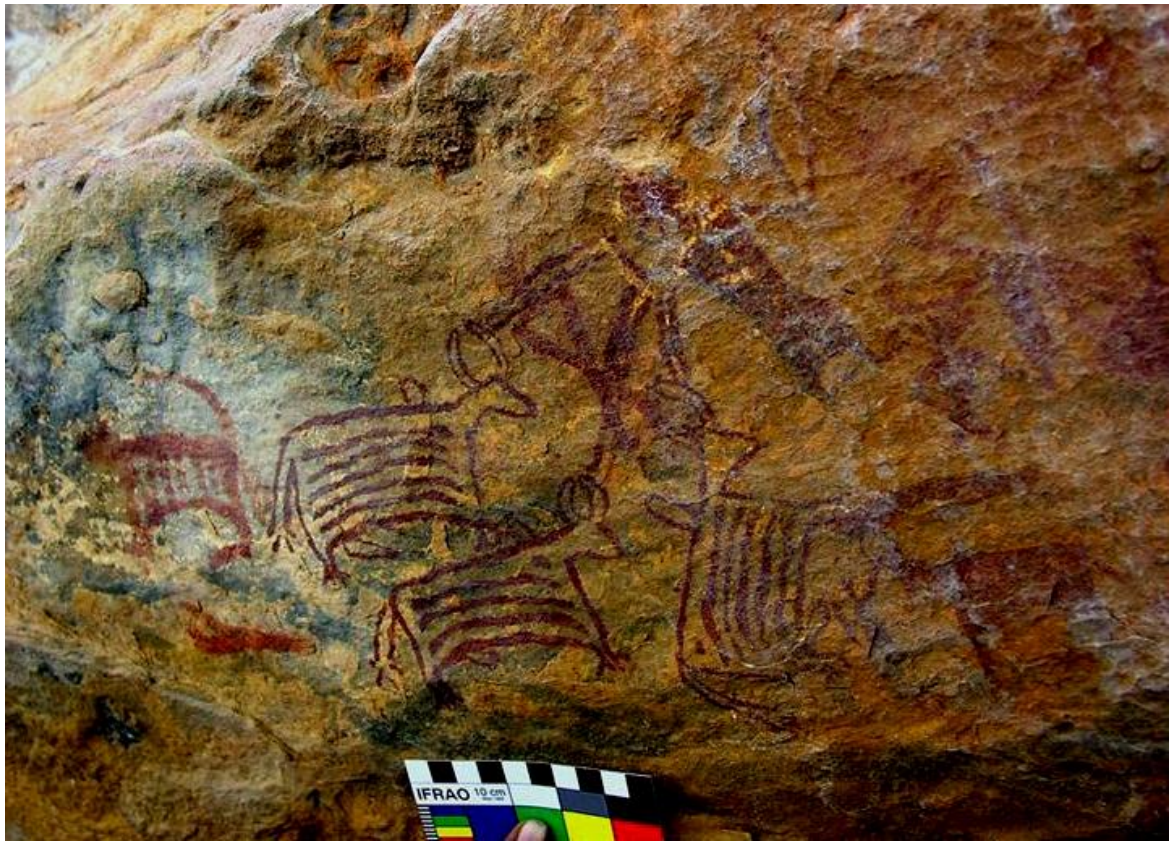

Fig. 15. A man holding bow and arrows taking away three humped bulls executed in different style, a wild cat is there behind the bulls, Chaturbhujnath nala.

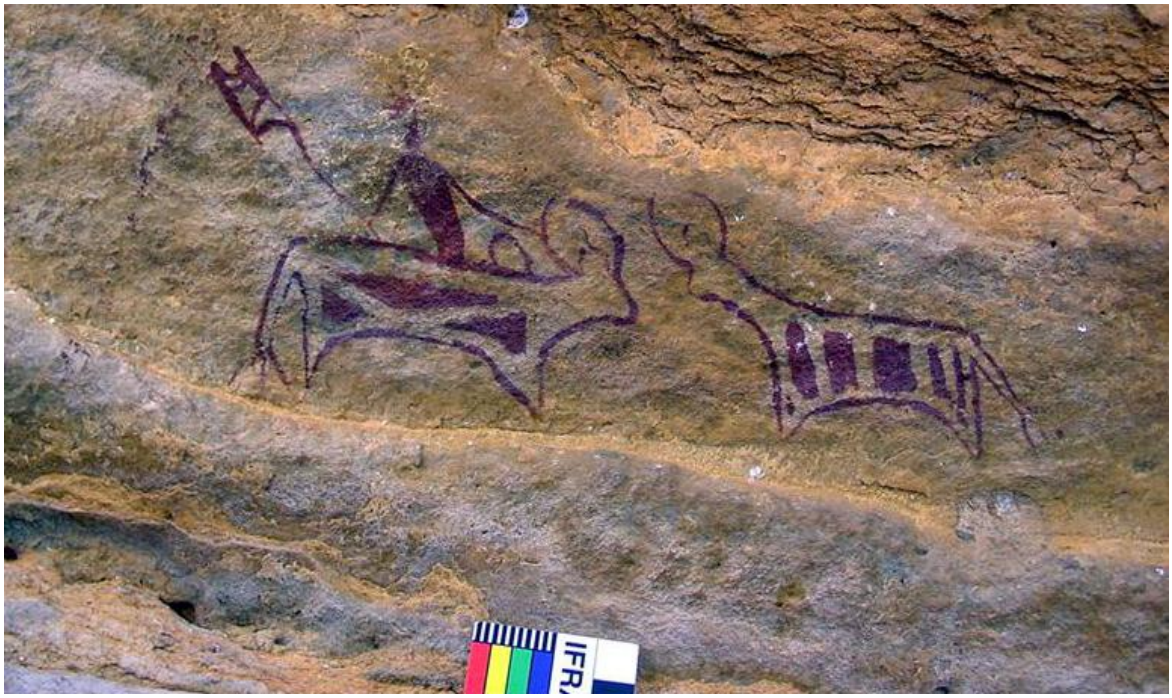

Fig. 16. A man wielding a metallic axe riding a humped bull, facing is a humpless one, Chaturbhujnath nala.

Fig. 17. An early simple chariot drawn by four horses! And without a charioteer, Kanyadeh.

Fig. 18. A chariot drawn by four horses and with charioteers wielding a metallic axe in the hand, Chaturbhujnath nala.

(Sharma 1980: 111-112; Allchin and Allchin 1988:75-77).

Narmada valley: Adamgarh

Rockshelters at Adamgarh were excavated by R. V. Joshi in which the Mesolithic deposit was 50 to 150 cm in thickness. The animal bones found from the Mesolithic deposits include the domestic dog, Indian humped cattle, horse, water buffalo, goat, domestic sheep and pig. In addition there were remains of a number of species of wild animals including sambar, barasinga, spotted deer, porcupine and monitor lizard. Wild and domesticated animals are represented in an approximately equal proportion. Shells from the upper layers (15 to 21 cm) have been dated by 14C to approximately 5500 B.C. (Allchin and Allchin 1988:80-82). It means remains of domesticated cattle may go even earlier.

Chambal Valley: Bagor

Bagor is a late Mesolithic site, situated on a sand dune on the bank of a seasonal stream, a tributary of Chambal river in Bhilwada district of Rajasthan. It was excavated by V.N. Misra in 1960s. Misra recognised three phases on the basis of material culture.

In phase I, dated by 14C to c. 5000-2800 B.C., there is evidence of huts with paved floors. Animal bones include domestic sheep and goat, cattle (probably some wild and some domesticated), several species of deer, wild boar, jackal, rat, monitor lizard, river turtle and fish.

In phase II, dated 2800 to 600 B.G., pottery and copper objects, including three arrowheads make their appearance, have affinities with those from Harappan sites in northern Rajasthan and Sind.

In phase III microliths and animal bones decrease, iron tools, glass beads, brick tiles, wheel- . made pottery appear. These indicate increasing reliance on crop-based agriculture. (Misra 1973 : 92-110).

Neolithic cattle breeders

Bolan river- Indus system

Mehrgarh on the border of Iranian plateau in Baluchistan is an important Neolithic site of pre-¬Harappan antiquity. Its excavation revealed three periods of its development. There are indications that the period I (8000-5100 B.C.), a pre-ceramic phase, witnessed a growing reliance upon domesticated species, and perhaps the first domestication of Bos indicus and Bos bubalus bubalis, and the cultivation of cereals by essentially stone artefact using pre-ceramic

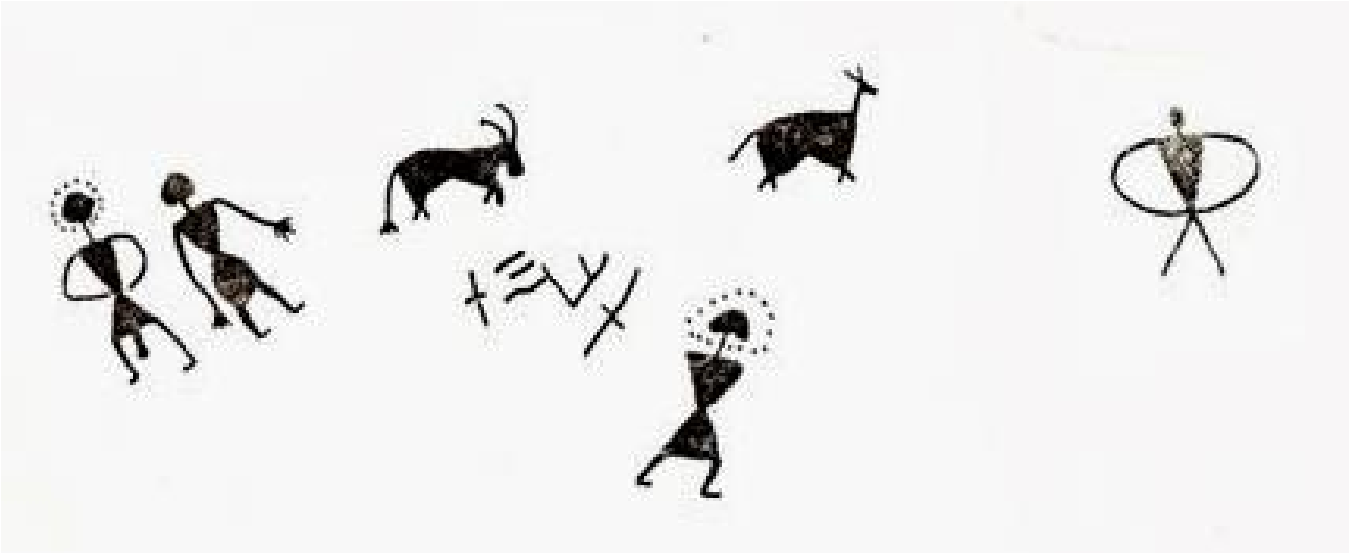

Fig. 19. A scene with four humans and two humpless cattle and a small inscription in post-Harappan characters, Chaturbhujnath nala.

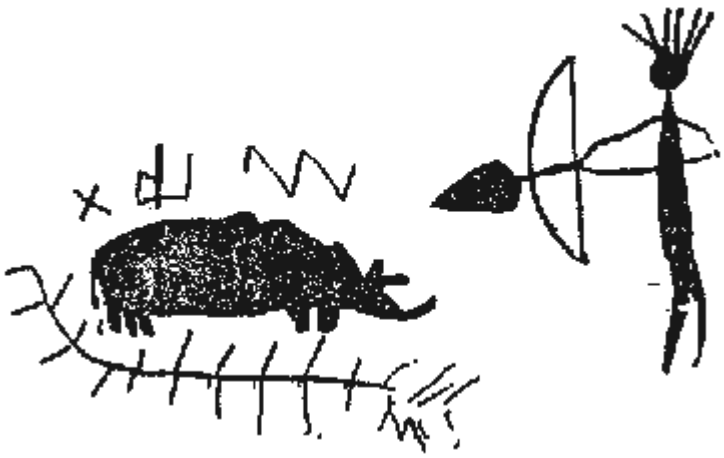

Fig. 20. A rhinoceros hunting scene with a small inscription in post-Harappan characters, Kanyadeh.

society (Allchin and Allchin 1997:105-109; Meadow 1981:143-179 and 1998: 12-21).

Middle Ganga Plain

In the middle Ganga plain excavations were conducted at Lahuradewa in district Sant Kabir nagar from 2001 to 2006 by Rakesh Tewari and his team (Tewari et al. 2007-08: 347-373). It established the beginning of agriculture of rice (early Neolithic) appeared in 9th millennium B.C.

Neolithic culture at Jhusi goes back to the beginning of 8th millennium B.C. (Pal 2007-08:263-281).

Belan river valley

In the Belan river valley in Uttar Pradesh two Neolithic sites, Mahagara and Koldihwa, were excavated. 14C dates obtained from them are as follows (Sharma 1980: 111-112):

Mahagara- 6570+_210 B.C. (Early Neolithic). A cattle pen with hoof-marks has been discovered from here.

Koldihwa- 5440+_240 B.C. (Early Neolithic). 4530+_185 B.C.

From here bones of cattle *(Bos indicus)*; sheep/ goat *(Ovis/Capra)*; deer, horse; wild boar *(Sus scrota)*; tortoise *(Chelonia)*; fish etc. have been obtained.

According to Alur who studied these bones sheep/goat and cattle are of the domesticated variety, though some bones of wild cattle have also been found. The recovery of skeletal remains of both wild and domesticated cattle presents an interesting picture of transition from wild variety, present in the area since long, to domesticated ones (Sharma et al. 1980:184). Further studies in this regard were made by P. P. Joglekar (2007-08: 309-321).

South India

In South India we have more decisive evidence of the early pastorals contemporary with early Indus cultures of the northwest. The granite hills were favoured for settlement and whenever they contained suitable caves or rock shelters, these were used for habitation, and often enlarged by the construction of a leveled stone terrace in front. The sites concerned are the so called ash-¬mound type of Neolithic settlements, which Bruce Foote correctly identified as Neolithic cattle-pens. Such Neolithic cattle pens have been excavated at Utnur, Kupgal, Kodekal and Pallavoy in Karnataka. Cattle hoof impressions have been found at Utnur. The 14C dates obtained for these sites begin from nearly 3000 B.C.

These were undoubtedly the sites where wild cattle were captured, tamed and herded (Allchin and Allchin 1988:123). Indeed, they seem comparable to both the 'Keddahs' used today to capture and tame wild elephants, and the large traps used by hunting people in various parts of the world to secure large animals (Allchin and Allchin 1988:123-124).

There is no doubt that the ash-mounds continued to be used over a long period as places for herding cattle and protecting them from wild animals and raiders. Communities that breed cattle in forest areas of Central and Peninsular India today pen them in much the same way. Given this, it seems most likely that the first settlers were heavily dependent on cattle

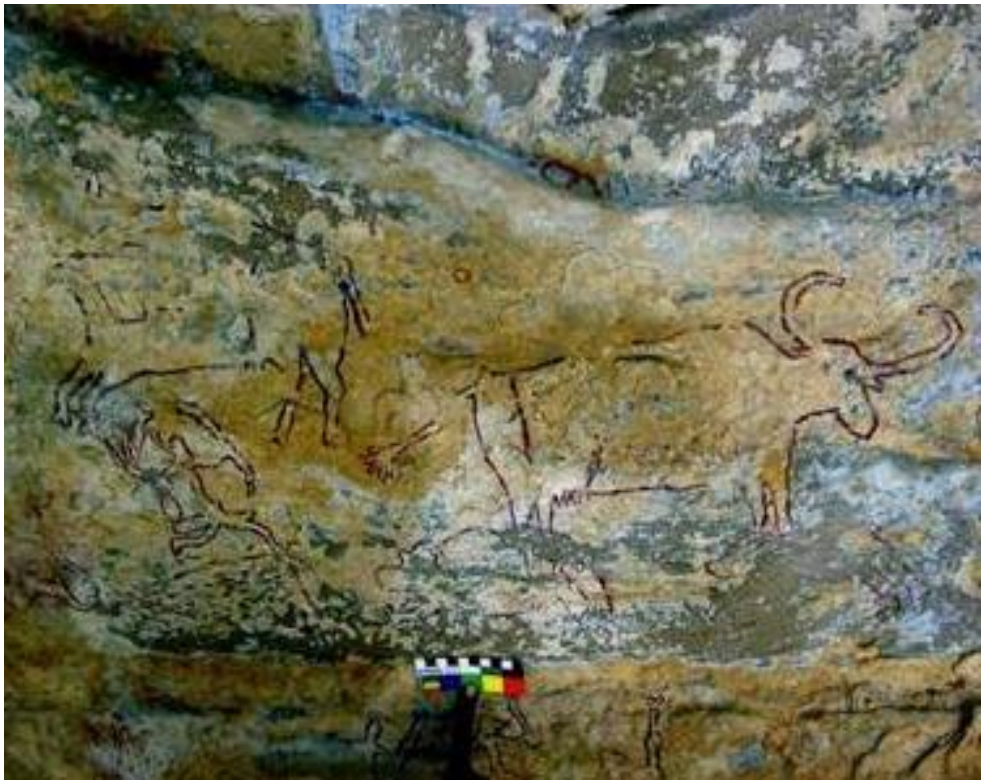

Fig. 21a. Bos namadicus figure, Chaturbhujnath. Mesolithic.

Fig. 21b. Humped bull figures from Chaturbhujnath nala showing the similar characters of Bos namadicus.

husbandry, and at least were partly nomadic. This clearly implies that plant agriculture did not form a major part of their economy, and there is certainly no evidence presently available to support a different view (Allchin and Allchin 1988:123-124).

History of humped cattle

Joglekar and Thomas (1992:51-54) suggested that it is likely that the ancestor of cattle all over the world was a humpless form which later on gave rise to various subspecies. The wild cattle in India survived at least till the mid Holocene and then genetically continued as modern domestic cattle.

Bos indicus is characterized by large upstanding horns of the larger forms, very short horns for smaller forms, relatively slender skulls and limbs, the pendulous ears, dewlap and hump. Some of the skeletal characters of the species like shape of the skull, length of horns, flat orbital rims, shaped sagittal profile and inter-corunal are shared by *Bos namadicus* (Badam, 2000).

On the basis of the above characters the Indian humped cattle appears to have been evolved from *Bos namadicus* indigenously (Fig. 21a & b, 22 a & b) (Badam, 2000). The origin of hump on it was possibly coupled with

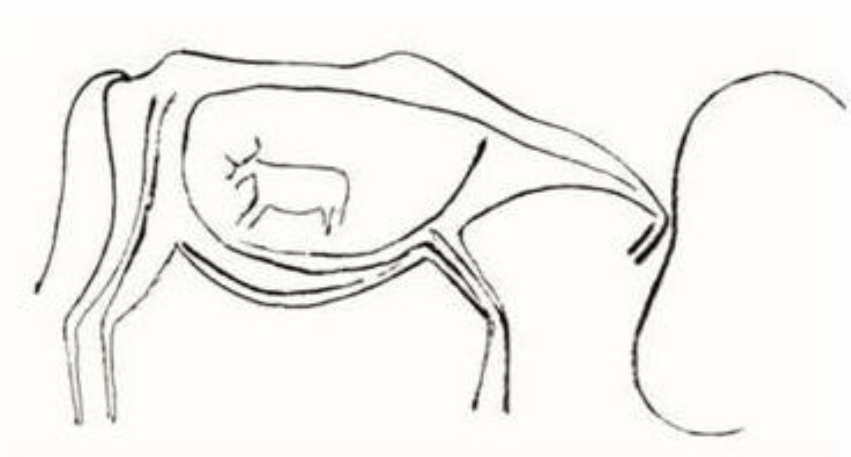

Fig. 22a. Bos namadicus figure, Bhimbetka. Mesolithic. (After E. Neumayer).

a mutation of the gene responsible for controlling the size of the hump. With the generation interval being 6-8 years in cattle, a mutation form is likely to be fixed in about 2000-2600 years in nearly 325 generations. It probably occurred in the case of the development of the hump in cattle (Joglekar and Thomas 1992:51-54). Also along with mutation, domestication could have accelerated the formation of the hump (Haldane 1949, and Franklin 1987). It is likely that animals were selectively bred to emphasise such features as colour, horns, hump and dewlap (Meadow 1984).

Humped cattle and beginning of permanent settlements of the Chalcolithic cultures

Cattle were the first domestic animals capable of pulling a plough, which would result in changes in settlement patterns initiated by more intensive cultivation (Badam 2000). Thus the use of humped cattle in agriculture appears to have been

Fig. 22b.Humped bull figures from Chaturbhujnath nala showing the similar characters of Bos namadicus.

one of the major factors resulting in the development of permanent settlements of Chalcolithic-Bronze Age cultures in river valleys. The available 14C dates place such a beginning in different river valleys and different parts of the country as follows:

Early Indus-Sarasvati Phase - 3100-2800 B.C. (calibrated). Mature Indus-Sarasvati Phase - 2800-1900 B.C. (calibrated).

Late Indus-Sarasvati Phase- 1900-1400 B.C. (calibrated) (Gupta 1992-93:21-29).

Padri in Bhavnagar district, Gujarat

Harappan culture- - 3500-2000 B.C.

Harappan culture - 3500-2000 B.C. (Joglekar 1993-94:35-39)

In the Dhrishadvati valley, the early Ganeshwar culture has been assigned to the beginning of the third millennium B.C., as the ^{14}C date for its upper layer at Jodhpura is 2500 B.C. (Agrawal 1980:89-91).

Banas valley: On the basis of available nine 14C dates the beginning of Chalcolithic settlement at Balathal in Banas valley has been placed at 2800 B.C. One additional 14C date even goes to 3770 ± 100 B.C., but it has not been considered by the excavators (Misra et al. 1997:35-36).

In Malwa-Chambal valley, Chalcolithic settlements begin with the Kayatha culture for which the available ^{14}C date from Kayatha is 2200 B.C. (Wakankar 1967:44-46), while in Tapti-Godavari valley it begins in the form of late Harappan culture at 2000 B.C. (Gupta 1992-93:21-29).

Thus, it is logical to think that the appearance of humped cattle in rock art must be preceding the beginning of Chalcolithic cultures in the river valleys. It is because of this fact that we see the contact of early cattle breeders and early agriculture communities using copper implements in the form of the appearance of some metallic implements in the first phase, which became popular in the second phase of rock paintings with humped cattle in Chambal valley.

Conclusion

With the beginning of cattle capturing and rearing scenes a new trend of evolution begins in Indian rock art. It was a paradigm shift from hunting foraging nomadic life to the self reliant semi-settled life, which later on led to the settled life. This transition occurred in the late phase of Mesolithic which afterwards led the foundation of self relying Neolithic economy at different times in different parts of the country. When the evidence of rock art regarding the transition from hunting-foraging life to domestication of cattle is seen in the light of available archaeological evidence, 14C dates and osteological study of the cattle bones obtained from the Mesolithic, Neolithic and Chalcolithic sites, it becomes clear that cattle domestication was started with humpless cattle (Fig. 48 and 49) in the late phase of the Mesolithioc, in the later half of the ninth millennium B.C, in Ganga valley, in the beginning of sixth millennium B.C. in Narmada valley and in the end of sixth millennium B.C. in Banas-Chambal valley.

Humped cattle appeared afterwards. Appearance of the hump on cattle was the result of gene mutation which might have taken nearly 2000 years. Selective breeding must have played a significant role in producing good breeds of humped bull which brought revolution in agriculture economy (Kumar 2000-01). The Indian humped cattle appears to have been evolved from *Bos namadicus* indigenously (Badam, 2000).

Cattle domestication started becoming the major economy in the Neolithic cultures, though substantiated up to some extent with little bit of agriculture and hunting-foraging also, in the eigth millennium B.C. in Bolan valley in Baluchistan, in the seventh millennium B.C. in Belan river valley and in the beginning of the third millennium B.C. in Krishna river valley (Kumar 2000-01). A scene of wild horse hunting by a group of two hunters by piercing their spears in to the neck and body of the horse at Chaturbhujnath nala (Fig. 50) indicates that like humped bull horse is also an indigenous animal which was domesticated (Kumar et al. 2006) later on.

With the appearance of humped bull a radical change occurred in the scenes of socio-cultural activities of the cattle breeders. The self relying cattle domesticating economy gradually led to a secure and comfortable life as compared to that of hunter-food-gatherers. Gradually hominins started losing close association and affection with nature that Mesolithic hunter-food-gatherers were having. Consequently they started losing the vigour and dynamism of life, which is also reflected in their rock art. Gone is the movement within every line and stroke. Every action now seems to be frozen, figures are repetitive signs, walking or dancing in files. The figures are generally overlapping the earlier ones. The humans and animals start becoming more and more schematic and stylised. Size in general goes on reducing, though a few big figures are also there. Microforms both of humans and animals of only a few millimetres in dimension are new experiments in the rock art of Chaturbhujnath nala. The theme, devices, implements, etc. also witnessed change with time (Fig.48-58). Hunting scenes are there, but hunting as an act of a large group is absent. From now onwards, the solitary hunter and sometimes his dog encounter motionless animals standing in front of the hunter to receive the deadly arrow.

Chariots appeared (Fig. 51), long stringless bows of the previous age gave way to *parashu*, a metallic axe (Fig. 52 and 53). The use of copper implements in the form of metal tipped arrows, axes and parashus became popular soon and continued till they were replaced by iron implements such as swords, daggers, etc. The early introduction of copper in upper Chambal valley was probably because of the impact of copper producing Chalcolithic cultures in the river and hill valleys of Rajasthan probably somewhere in Chittorgarh and Bhilwara regions. From the recent archaeological discoveries we know that copper implements were produced on large scale in the beginning of third millennium B.C. in Rajasthan (Agrawal 1981:59-63). In the Vindhyan region authors of rock art became acquainted with copper implements somewhat latter than Chambal valley as this region being situated deep in the interior, it took sometime to reach the copper implements there from far situated copper producing centres in Rajasthan (or from other states) (Kumar 1983: 413, 2007b:21-134).

From the beginning of pastoral life onward in human history, particularly in Indian context instead of two, there appears to have been three streams of socio-economic-cultural developments:

1) Hunting foraging mode of life.

2) Pastoral mode of life supported by a little bit of agriculture and hunting foraging activities, and

3) Agriculture mode of life supported by a little bit of pastoral economy.

All these streams of socio-economic-cultural developments were interacting with and supporting each other, but the first and the second ones continued almost as they have been in their geographical niches leading to the development of the first one as the tribal communities of the regions, the second one in to Neolithic and Megalithic cultures of rural areas, while the third one led to the development of Rural-Urban civilizations wherever congenial environment was there. These three streams of socio-economic and cultural developments and their time to time interaction with outside world led the foundation of present day India, i.e tribal communities, pastoral communities and agro-pastoral rural India and towns and cities of the country . The process is still going on.

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BEGINNING OF CATTLE DOMESTICATION IN ANDHRA REGION: PERSPECTIVES OF ROCK ART AND ARCHAEOLOGY

N. Chandramouli

Abstract: Domestication of cattle, as one of the major shifts in the subsistence strategies of the prehistoric past, heralds the emergence of early agricultural settlements across the world. Peninsular India contains the richest body of evidence of the emergence of such early agro-pastoral economies. The excavated data revealed rich ground and polished stone tool industry, biological remains of domesticated as well as wild animals, structural evidences, beads and bangles, pottery and so on.

Another important data for understanding the domestication of cattle is the rock art. The rock art of the Neolithic period consisting of both pictographs and petroglyphs, the latter being numerically more in number, contain depictions of cattle in a variety of forms, sizes and shapes. It is in the pictographs that we can delineate certain interesting stylistic traits, which seems to have a bearing on the regional context of the rock art. The Karnataka region of Peninsular India contains the richest and largest concentration of the Neolithic sites. It is in the same zone, in the south-western portion of the Andhra region are some of the important rock art sites which contain interesting paintings of the wild as well as domesticated cattle. Another Mesolithic rock art site in northern Andhra, contain besides the depiction of wild cattle, interesting evidence of the cultivation and exploitation of wild rice by the contemporary agro-pastoral community. This site also contain in one rock shelter a panel of medieval frescoes depicting the Mahabharata epic scenes, which is a part of the sacred complex of the agro-pastoral community. This paper will discuss the beginning of cattle domestication in the perspectives of archaeology and rock art of the Mesolithic and Neolithic period in the Andhra region.

The backdrop

It is said that the domestication of animals, one of the major factors in the emergence of Agro-based village economies, involves first the capture and subsequently the taming of select species and then their breeding and maintenance under controlled conditions. Origins of the domestication of animals may lie in the symbiotic relationship between animals and the early hunter gatherers. Domestication of animals can thus be identified as a natural corollary of the continuous interaction of human beings with the animal world from an economic and biological perspective. Braidwood (1953) proposed the hypothesis relating to the origins of, and the processes leading to, the food production occurred as the culmination of the ever increasing cultural differentiation and specialisation of human communities. Jarman and Wilkinson (1972) suggested the following stages of the domestication of animals: Random predation > controlled predation > herd following > close herding > family farming. These stages, according to Jarman (1972), represent increasing degree of control over and investment of labour in the animals concerned spanning over a long period of interactive coexistence. The classification, however, cannot be taken to represent a chronological succession or a technological ladder of progress. Alternatively, animal and plant domestication may not have necessarily spread together at the same time in any region. In such a situation, the oft – repeated

statement of the Neolithic 'revolution' separating the hunting – gathering from pastoralism and agriculture might not have existed at all since both the stages of development may be on a slow continuum.

In a pan-Indian context, the evolutionary stages of the hunting- gathering and agro-pastoral/ food producing economies were not properly investigated, more so in the peninsular part of the sub-continent. As a consequence the significance of the Mesolithic-Neolithic interface in the archaeological context was not accorded its due importance, except such observations as "the Southern Neolithic stands out from the preceding Mesolithic cultures of the region by the more archaeologically visible sites, a condition that is likely to have resulted from food production and increased sedentism. While the visibility of the ash mounds was due to specific practices.... the visibility of the non-ash mound sites is due to their deep stratigraphy, in addition to their hill top locales" (Fuller et al. 2001:183). In almost all the Neolithic sites in South India including the region of Andhra Pradesh, there is a copious evidence of microlithic material, both in the surface as well as in the excavated context, which may be indicative of the contiguous coexistence of both the cultures. However, this aspect was not properly looked into. Domestication of cattle in the Indian context is thought to be one of the Neolithic cultural components along with the ground and polished stone tool industry, ceramic types, and a stone blade industry.

With regard to the domestication of plant species, as many as 20 varieties of wild species of rice are known each of which contain hundreds of different genetic lines. Rice belongs to genus *Oryza*, which includes 27 species. Of these, 25 are wild and two are cultivated varieties. Out of the 25 wild species seven are found in India. In the Eastern Ghats, of which the lower Godavari valley is a part, there are three wild rice species. They grow in swampy areas, along the streams, in ditches, edges of ponds and tanks, in or around rice fields (Murthy 2012:16-17).

Rice *(Oriza)* is unique among the cereals in being an aquatic crop, which can vary between perennial and annual according to water conditions. The wild Oriza rufipogon has both perennial and annual types. Perennials have lower seed productivity, lower self-pollination, long anther length and greater height. Annuals tend to have high seed productivity, self-pollination, short anther length, and lesser stature. Annuals adapt to more heavily disturbed conditions like pond edges and drought conditions, making them likely domestic rice ancestors (Agrawal & Kharakwal 2002:230).

In so far as the exploitation of the wild and domestic varieties of rice during prehistoric times in peninsular India, and for that matter in any other part of the subcontinent is concerned (Fuller 2011), some assumptions are made on the basis of the archaeological evidence from the Belan valley (Sharma et al.1980). At Chopani-Mando, carbonized grains of wild rice are present in lumps of burnt clay in association with mullers and querns in the advanced 'Mesolithic' phase. At Koldihwa, a Neolithic site three kilometres east of Chopani-Mando, potsherds have been found containing rice husk from both domestic and wild species. The Neolithic occupation has three C14 dates: 6570±210, 5440±240, 5430±185 BC. Recent excavations at Lauradewa gave an AMS date (on a piece of charred mass of rice) of c.7000B.C (Tewari et al.2003, 2005; Singh 2005). "It must be cautioned that criteria for recognizing domesticated rice as opposed to wild gathered rice is weak and unsubstantiated and the presence of cultivation practices are unclear"(Fuller 2007:399).

These early dates for the domestication of rice in the Vindhyas though need to be considered with caution, its archaeological context cannot be underestimated, in view of the thousands of landraces of rice spread over a large tract stretching from the north-eastern India to the Godavari valley and further down beyond the southern Eastern Ghats. In view of the above aspects, it can be postulated that the exploitation of wild rice may be expected to be of, at least, the early Holocene age. In the case of the domestication of the animals also, the Vindhyan region contain interesting evidence in the rock art. The rock art of the Mesolithic period here, contain representations of wild ox (Gaur:Bos indicus) which indicate that the domestication process of both the plants and animals should have begun from the

Mesolithic period itself. Pending the evidence of the Vindhyan region, and in the absence of a concrete evidence of the domestication of plants and animals, particularly of the cattle in the Mesolithic context in the remaining parts of the subcontinent, this phenomenon is accepted to be hall mark of the early agro-pastoral economies.

Taking into account the apparent regional cultural specificities over and above the commonalities in material elements, the Indian Neolithic is discussed under four major geographical units: North-western, Northern, Eastern, and Southern. Except the use of ground stone tools, each of the regional cultures differ from the other in material equipment and to some extent in the specific levels of the subsistence economy as well. Recent studies have identified five key regional zones of the Indian agricultural traditions, each of them having a "best guess region(s) for indigenous domestication processes and/or earliest adoption of agriculture and an expanded region of related/derivative traditions of agriculture"(Fuller 2007:402.Fig.4). It must be admitted that none of the above regional Neolithic cultures have produced the details of the transformation from the stage of food gathering to that of food producing and primary or settled village farming. In such a situation, our understanding of the origin and spread of agro-pastoral cultural traits opposed to the hunting- gathering ones is still insecure and fragmentary.

Peninsular India, specifically the granite-gneiss regions of Karnataka-Andhra contain the richest evidence of early agro-pastoral communities in India, which besides the archaeological data, contain rock art which could offer some interesting clues for understanding the evolutionary stages of the Mesolithic –Neolithic interface.

The Neolithic of Peninsular India

Immigrant origin theories have been postulated in the context of the Neolithic culture in south India. In the 1940's the known distribution of lithic materials, especially ground stone axes and shouldered celts, was used to postulate general origins of India's Neolithic coming from the northeast, ultimately from Southeast Asia (Wheeler1948:295; 1959:89; and Worman1949:199). Allchin (1960:132-142) on the contrary argued for the western Asian origin of the Peninsular Neolithic. His argument is based on the similarities between the pottery paintings of Shah Tepe and south India. He identified the authors of the south Indian Neolithic as the migratory people from the Turkaman Steppes and Elbuzurg mountains of the Iranian region. He however noted that in view of the lack of systematic archaeological investigations in the intervening regions, particularly in the northern region, his argument may stand questionable or vulnerable to revision (Allchin 1963:160). Bellwood (2005) too argued that agriculture came to India from outside, primarily by human dispersals.

Thapar (1965) on the other hand advocated the Mesolithic origin theory for the domestication of plants and animals. Paddayya (1973) accepting the west Asiatic origin theory of the south Indian Neolithic, however, cautions that it was not a wholesale transplantation from the northwest and the contribution of the indigenous hunting-gathering groups seem to have been significant. "In fact, a statistical approach to cranial measurements as well as non-metric traits indicates that in the southern Neolithic skeletal series a range of metrical variation possess uniform features that is shared over the larger Deccan peninsula, the region south of Narmada and can thus be seen as representing a single population grouping in prehistory" (Ravi Korisettar et al.2002:189). This suggestion supports the theory of an indigenous development of the early agro-pastoral cultures in south India from their Mesolithic predecessors. Although there is no archaeological sequence as yet for establishing the transition from Hunting-gathering/foraging to farming in the southern Deccan, several lines of evidence from botany and archaeology suggest indigenous plant domestication in the region (Fuller 2001:117; 2003:191; Fuller et al.2001:171; Nicole Boivin et al 2007 - 08:179). The earlier 'racial' theories of the origin of Neolithic in south India are put to serious questioning in recent times, as they are based on the meagre skeletal evidences of a single child skull from Brahmagiri which is of the autochthonous Austroloid type (Sarkar 1972:24) and of one adult skeleton from Tekkalakota, which is of the intruding Mediterranean element

superimposed over proto-Austroloid features.

In southern India, the regions of Andhra and Karnataka contain copious evidence of Neolithic culture. Recent researches (David Raju 1985, 1990; Rami Reddy 1978;Ravi Korisettar et.al.2002; Sarma 2003; Sarma & David Raju1983;Venkata Subbaiah 1992,2007 for example) have listed out nearly 400 sites in these two regions making them the most prolific areas of Neolithic evidences on a sub-continental scale. These sites included as many as 70 'ash mounds', another interesting phenomena of the agro-pastoral context of the Neolithic in south India (Zeunar1959; Fuller 2001;Paddayya 2002). In recent years several of the Neolithic habitation sites were excavated such as: Utnur, Polakonda, Satanikota, Elchuru, Nagarjuna Konda, Kesarapalli, Ramapuram, Palvoy, Veerapuram in Andhra Pradesh; Brahmagiri, Budihal, Piklihal, Tekkalakota, Kupgal, Kurugodu, Kodekal, Hallur, Hemminge, Hulikallu, Maski, Sanganakallu, T. Narsipur, Terdal and Watgal in Karnataka.

Paddayya (1973:87-91) have proposed a new perspective of the distributional pattern of the south Indian Neolithic. On the basis of the occurrence and density of certain characteristic traits of the Neolithic culture he has demarcated five of its regional variants in terms of the material assemblages and their geographical spread. According to him, the present day regions of Bellary and Raichur districts and the adjoining Shorapur doab, located in the Krishna and Tungabhadra valleys of Karnataka, formed the nuclear zone of the evolution of the southern Indian Neolithic. This hypothesis is supported by the occurrence of almost all the important sites of the culture (Piklihal, Utnur, Kodekal, Budihal, Watgal, Tekkalakota and Sanganakallu all belonging to the Phase I of the culture) in this zone which revealed the evolutionary stages of the culture in the excavations. While the culture continued to flourish in the nuclear zone, it began to spread into the outlying regions in the second phase. He then identifies five regional variants of the southern Indian Neolithic in various parts of Karnataka, Andhra and northern Tamilnadu. Of these regional variants, the fourth one is identified to have been spread in the upper reaches of the Pennar River in the Anantapur district of Andhra Pradesh (Rami Reddy 1976). In the adjoining Kurnool district, the fifth variant is identified.

In his recent work (2011:1-19) Paddayya taking stock of the excavations conducted at various sites after the 1970's in Karnataka, Andhra Pradesh, and Tamilnadu (Rajan et al. 2004) have increased the number of regional variants to seven. In this revised scheme, variant 4 with its locus in Anantapur district of Andhra Pradesh covers the upper reaches of the Pennar basin. It is an extension of the nuclear zone. Similar to the nuclear zone, rock art is well represented in this variant zone also (Rami Reddy 1971). Variant 5 is extending in the adjoining Kurnool and Kadapa districts. A common feature in all the four new regional variants is the absence of ash mounds. This according to him is an indicative of the increasing importance given to crop husbandry and sheep/goat pastoralism. However, no osteological evidence is included in his discussion to support his proposition. The coastal variant (variant 6) lies in the regions of Guntur and Prakasam districts. The area is partly covered by lower Krishna Valley and partly drained by Gundlakamma and other smaller streams. The faunal remains from Nagarjunakonda and Elchuru (Thimma Reddy et al. 1990) in this coastal zone show evidence of cattle and sheep/goat pastoralism and wild game hunting. Variant 7 is identified in the northern Andhra (Telangana) region sandwiched between the mid reaches of the Godavari and Krishna rivers. Subba Rao (1956:20-21) made a pointed reference to the distinctive nature of the contemporary peasant way of life in this region with the backdrop of peculiar geographical features. The area with vast stretches of black cotton soil, low granite hill formations with good pasture reserves supported prosperous settled village farming communities. This is indicated by the discovery of nearly a dozen sites such as Thogarrai, Kadambapur, Peddabankur, Budigapalli, Polakonda, Kolakonda and Devaruppula in Karimnagar and Warangal districts (Krishna Sastry 1983:19-50). The remaining two variants of Paddayya's new classification are located in the Karnataka and Tamilnadu regions.

The identification of the regional variants within the southern Indian Neolithic by Paddayya does not alter the basic three phase chronological

division adopted by Allchins (1968; 1996) and accepted by most of the scholars (Sarma 2003). Two broad phases were identified in the evolution of this culture in the Andhra region. At Nagarjuna Konda and Utnur in Andhra Pradesh, the principal traits of the first phase consist of handmade pale red ware, grounded stone tools, microliths and occasionally bone implements. Some of the sites were also having ash mounds which were thought to be due to the accumulation of burnt cow dung, indicating the prevalent pastoral economy (Zeunar 1959; Allchin 1963). The second phase is characterised by a dominant burnished dull red ware, a prolific ground stone tool industry, microliths and parallel sided blades. Parallel sided blades consist of almost 60% of the assemblage. The microlithic industry occurring in both the phases of the Neolithic revealed characteristic features of a non-geometric Mesolithic tool kit. This adds strength to the suggestion that both the Mesolithic and early agro-pastoral cultures of the Neolithic were living side by side in the same ecological niches (Murthy 2003: 80).

The Biological record

The bulk of the faunal record from the excavated context, comprises of the cattle (Bos indicus), both in the context of habitation sites as well as ash-mound sites (Allchin 1963a; Paddayya 1975; Clason1977; Thomas 1974, 1975, 1984; Thomas & Joglekar 1994; Sahu 1988; Venkata Subbaiah et al. 1992). Not much information on the breeds of cattle is available for the south Indian Neolithic. In view of the fragmentary nature of the bones recovered in the excavations it is all the more difficult to identify the species of the cattle. Nevertheless, two distinct 'breeds' were identified, one large and one small (Allchin 1963:45). They are: 1. Long horned (acutifrons or longifrons), slender bodied and humped (the zebu) and 2. Massive and relatively short with less pronounced hump (Shah 1973; Paddayya 1975). Allchin and Allchin (1974, 1982 and 1995) have suggested that the acutifrons type, which is characteristic of the south Indian Neolithic, could represent an indigenous breed domesticated from local wild populations of the zebu varieties in the Southern part of the sub continent. The same is yet to be corroborated by the biological remains in the excavated archaeological context. Their argument is based on the morphology of rock art depictions which contrast with contemporary Harappan depictions and suggest the kind of varietal differentiation between southern and north-western zebus which was already established (Fuller 2007:409).

Despite the presence of wild *Bos namadicus* populations in the peninsular India in the later Pleistocene (Badam 1984), the evidences from the Neolithic sites has remained inadequate for drawing inferences on the nativity of the species. Of late, some new evidence is coming forward to suggest that large, auroch sized, wild cattle persisted in southern India into the later Holocene, as their bones have been recovered from Banahalli (IAR 1973-74:17; 1983-84:42-46;1985-86:43-44; 1986-87:42-45). The faunal remains excavated in the Neolithic sites of T. Narsipur in Karnataka and Veerapuram (Sastri et al. 1984) in Andhra Pradesh, contain remains of Bos gaurus indicating that the animal which is a wild one might have subsequently been domesticated (Thomas 1984). The presence of large Bos bones, which suggest the existence of wild cattle populations in the Neolithic –Chalcolithic period in both Gujarat and south India makes additional zebu domestication(s) plausible. The evidence from the Gangetic region of central India and the identification by Sharma et al. (1980) called into question by more recent research on Mesolithic fauna from Damdama, indicating an entirely wild fauna into the (mid) third millennium B.C (Thomas and Joglekar1994).

The excavated southern Neolithic sites have yielded evidence of domestic animals like cattle *(Bos indicus)*, buffallo *(Bos bubalis)*, sheep *(Ovis vignei)*, goat *(Capra hircus)*, dog *(Canis familiaris)*, ass *(Equus asinus)* etc, besides wild animals like elephant, barasingha, spotted deer, blackbuck, nilgai, gazelle, rat, hare, tortoise, monitor lizard, peacock, fowl and some aquatic animals. These faunal remains indicate that though the economy was mainly based on incipient agriculture, it is largely supported and supplemented by hunting –gathering and pastoralism. The presence of marks of cutting, splitting and chopping and the evidence of charring of the bones indicate that these wild animals were hunted and eaten. In the absence of a solid evidence to understand the evolutionary stages of the wild cattle species in the archaeological record, it

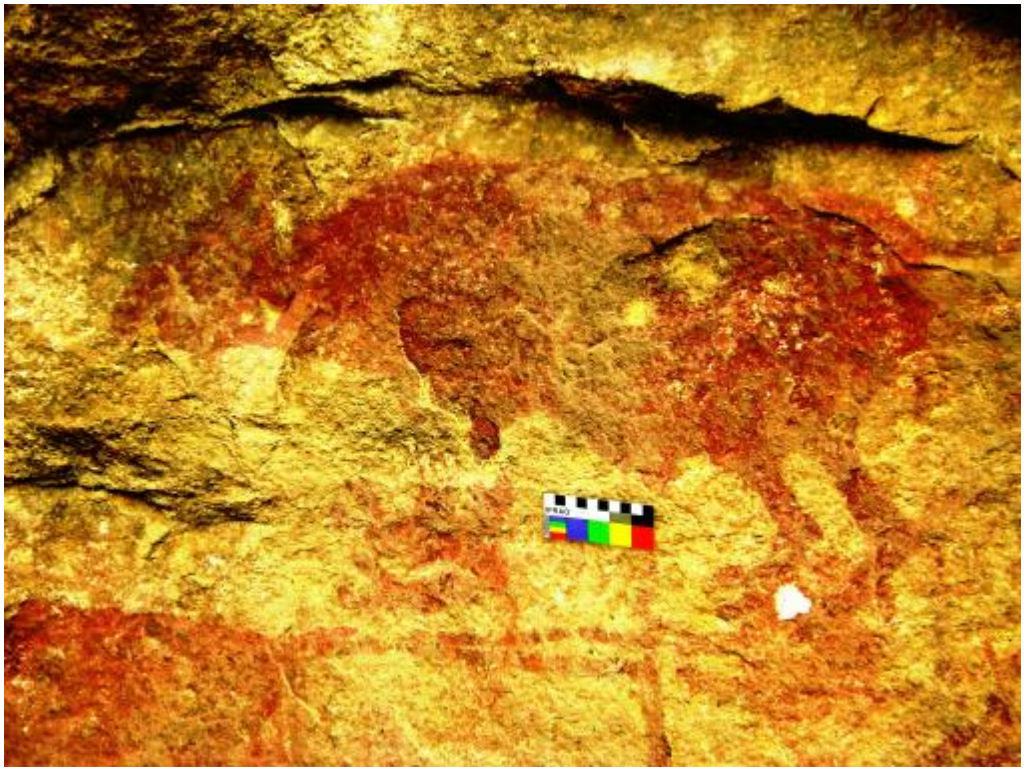

Fig.1. Rock painting of Bos Gaurus in red ochre, Pandavulagutta, Warangal district.

is thought that an analysis of the rock art depictions may be of some help in that direction.

The Rock art data

Identification of the zebu species in the Neolithic rock art of the Karnataka sites, by Allchins (1982,1995) as the indigenous forerunner of the subsequent domesticated Bos indicus species, although questioned by the recent researches (Fuller 2007:409), appears to have some contextual validity in the absence of sufficient biological data about the interfaces of the wild and domesticated cattle of the Neolithic south. Although remains of Bos gaurus have been recorded at a couple of Neolithic sites such as T. Narsipur and Veerapuram (Thomas 1984), their presence in the preceding Mesolithic could not be established.

In the early Mesolithic rock art of Karnataka, so far no depictions of wild cattle *(Bos gaurus)* have been identified. In the rock art of Pandavulagutta in Andhra Pradesh, a solitary representation of these wild cattle *(Bos gaurus)* species is identified (Fig.1). This site contains rock art almost exclusively datable to the Mesolithic period. The circumstantial archaeological evidence in the surface context also is exclusively of the Mesolithic tool clusters (Chandramouli 2001). This identification opens up interesting avenues for the study of the Mesolithic-Neolithic transitionary interface in the rock art. Another dimension of the cultural continuity of (possibly) Mesolithic period is also observed at this site. A wild variety of rice *(Oriza rufipogon)* locally called 'Dussa Vari' (Telugu Dussa: naturally growing; Vari: Rice grain) grows in small ponds and on the banks of a seasonal stream (Pandava vagu) around the village (Fig.2). At the beginning of the agricultural season the villagers will mix a small quantity of wild rice seeds with the domesticated ones to be sown with the belief that the wild rice will increase the crop productivity. Interestingly, no Neolithic material evidence is found in this rock art site on in its vicinity. In the entire rock art of South India, Pandavulagutta appears to be the only one where in the Mesolithic context wild cattle is represented. Besides, this is the only rock art site in south India, which have the evidence of wild rice being exploited by the contemporary agro-pastoral communities (Mudirajus), who are also the 'owners' of the Medieval frescoes in one rock shelter. These frescoes contain the stories of Mahabharata epic (Fig.3). The folk legends narrated by the 'mudiraju' community claim mythical ancestry from the pandavas of the Mahabharata epic. The gotra of the majority of the kin-linked families is "Pandava". One family headed by Narayana Mudiraj which claims the ownership of the rock shelter considers it as a sacred

Fig.2. A bunch of wild rice growing at Pandavulagutta, Warangal district.

place of the Pandavas, and people of many of the surrounding villages believe in the mythical or mystical power of the Mahabharata frescoes and perform rituals near this rock shelter in times of monsoonal failure to beget rains. The folk narrative also preserves a story that Kunti, the mother of the Pandavas, used to mix a small quantity of 'Dussavari' in the rice to be cooked so that it will double the volume of the cooked food needed for Bhima in particular. The underlying fertility belief system of the early Mesolithic/agro-pastoral communities appears to have continued, preserved and manifested in the folk narrative. The exclusive Mesolithic rock art, depiction of *Bos gaurus* in the Mesolithic art, continuation of the usage of wild rice make the rock art site of Pandavulagutta a unique one in Andhra Pradesh.

The Neolithic phase in the rock art of Andhra Pradesh is represented by the sites of Adoni, Budagavi, Velpumadugu,Tenagal and Chintakunta in the plateau region of the south-western Andhra; Budigapalli, Dupadugattu and Sivaru Venkatapur in the northern Andhra (Telangana plateau) region. In this phase, the paintings are predominantly those of humped bulls, either alone or in association with human figures. All the paintings are in red ochre. Petroglyphs make their appearance from the Neolithic phase in Andhra Pradesh and Karnataka. The Neolithic art of Karnataka and Andhra reveal close similarities so far as the thematic content is concerned. Humped bull is the characteristic trait of the Neolithic art of Andhra Pradesh. However, some minor stylistic variations can be observed in the depiction of humped bulls; some of which are the depictions of wild cattle.

The painted humped bull figures at Budagavi are in outline with slender body, low hump, straight horns and the body portion filled with straight, wavy and intersecting lines (Fig.4). At the nearby site Velpumadugu, Rami Reddy (1971) identified a pair of bruisings of humped bulls which are having straight horns. According to him, the bruisings of Velpumadugu are different in stylistic depiction from the Karnataka examples where the humped bulls are always shown with long and curved horns facing each other in a fighting mood. The paintings of humped bull at Budagavi and the bruisings of humped bull at Velpumadugu appear to depict the wild ox *(Bos Namadicus)* with its low hump and straight horns, and as such represent the early Neolithic cultural horizon. It is identified that the bruisings of Velpumadugu, are the representations of the long horned (acutifrons or longifrons). Allchin and Allchin (1960) have suggested that the acutifrons type, which is typical of south India, could be representing an indigenous breed domesticated local wild populations. The paintings of humped cattle at Budagavi also seem to be the depictions of the same species of wild cattle population. These two cases of the humped cattle depictions seem to be the earliest of all the Neolithic rock art depictions of this species (Chandramouli1991, 1994, 2003) in the Andhra region. This proposition seems to be correct in view of the proximity of these sites to the nuclear zone of the Karnataka Neolithic (Paddayya 2011) where the Neolithic phase I is represented in many of the sites. Those sites in other regional variants contain rock art depictions of the humped bulls which are stylistically different from those of the first phase as discussed here.

Most of the humped bull figures at other sites are in flat wash with heavy bodies, prominent humps

Fig.3. The Frescoes of the Mahabharata epic Pandavulagutta, Warangal district.

and long curved horns, which are clearly the representations of the *Bos Indicus* species. At Chintakunta the humped bulls are depicted in with human figures holding bows and arrows (Fig.5). The depiction of the hunters in association with the humped bull may be indicative of the continuation of the hunting practices by the Neolithic people. The occurrence of the bones of many wild animals such as barasingha, spotted deer, blackbuck, nilgai, gazelle, rat, hare, tortoise, monitor lizard, peacock, fowl and some aquatic animals in the excavated sites of the Neolithic further attest to this fact. These features indicate that even in the Neolithic phase II and III, the hunting – gathering way of living must have persisted.

The petroglyphs, so prominent in terms of sheer volume in the rock art of Karnataka, also occur to a certain extent in the rock art of Andhra region also. The thematic emphasis in the petroglyphs in Karnataka is on the depiction of the humped bulls as is the case with Andhra Pradesh in the rock art of Budagavi, Tenagal, and Velpumadugu. The bruisings of Velpumadugu are stylistically different from their counterparts of the Karnataka sites (Rami Reddy 1971:78). The bruisings at Velpumadugu depict humped bulls facing each other in a fighting posture, lack the characteristic trifurcations (three

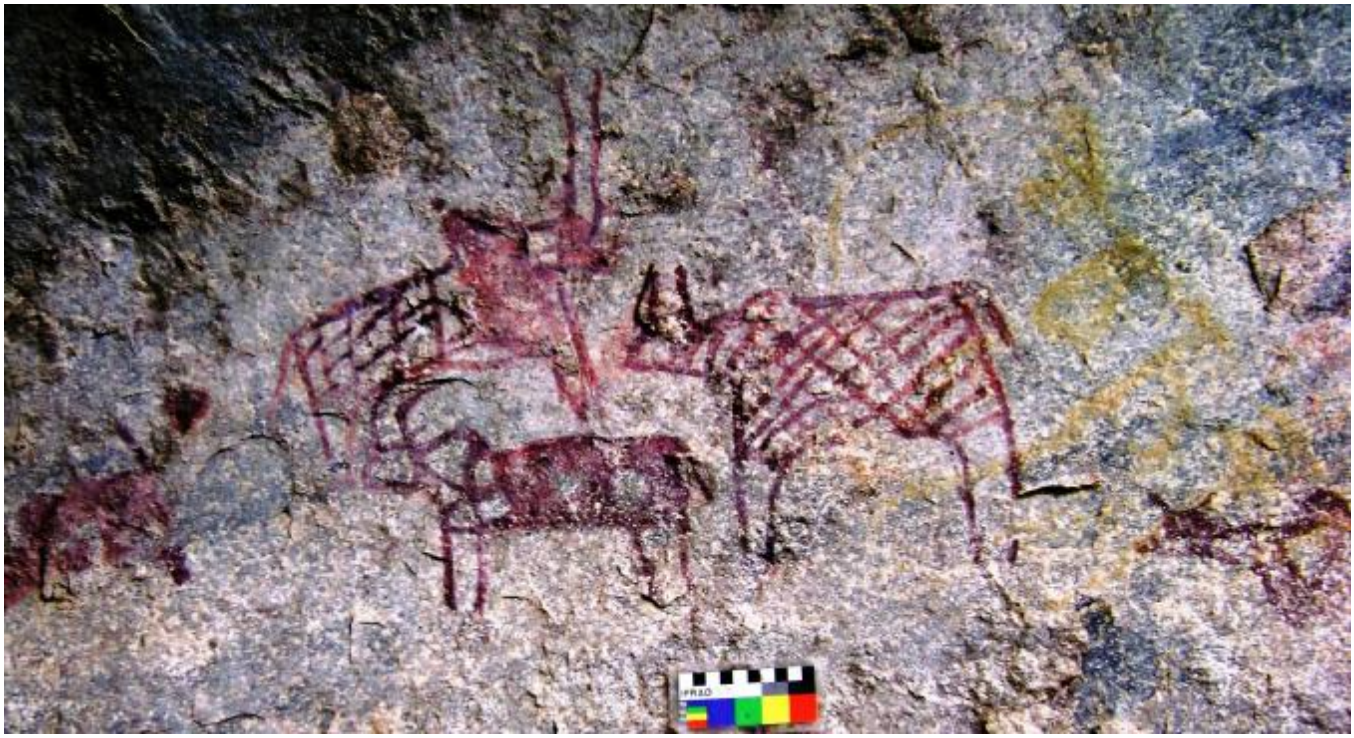

Fig.4. Paintings of Bos namadicus in red ochre, Budagavi.

prongs) of horns, of the bruisings in the Karnataka sites such as Piklihal, Tekkalakota and Kupgal (Allchin 1960,1963; Chandramouli 2003;Nagaraja Rao and Malhotra 1965; Paddayya 1973). Only at Naidupalli, which is located in the Coastal area of Andhra Pradesh (Variant 6 of Paddayya's (2011) classification of the Neolithic zones) quite a large number of petroglyphs are noticed. Here in the shale outcrops, peckings,

Fig.5. Paintings of Bos indicus in association with hunters, Chintakunta.

Fig.6. Peckings of Bos indicus, Naidupalli.

bruising and engravings datable from the Neolithic up to the early historical period, are scattered over an area of more than 5 sq km (Chandramouli 1995). In one instance a pair of humped bulls facing each other has been executed with pecking technique (Fig.6).

In the rock art sites of northern Andhra Pradesh, which forms part of variant 7 of the regional zones of south Indian Neolithic (Paddayya 2011), the rock art depictions of the Neolithic art contain only the depictions of Bos Indicus. This feature is quite interesting, considering the fact that it is in this region of Andhra Pradesh we noticed the depiction of wild cattle (Bos Gaurus) in the Mesolithic rock art as also the continued exploitation of wild rice *(Oriza rufipogon)* and its preservance in the folk belief system at Pandavulagutta. The humped bull depiction at Dupadugattu is (Fig.7) with its prominent hump proves it to be of the Bos indicus species. However, the horns and snout portions are depicted in a peculiar manner. The painting of a solitary humped bull at the site Sivaru Venkatapur, in the same region (Fig.8) display stylistic features parallel with the Chalcolithic paintings of Central India and also the pottery paintings of the same animal. The depiction of the humped bull figures with long and slender bodies and in a sexually aroused condition appears to be of a late phase within the Neolithic rock art as evidenced at this rock art site. Excavations conducted at this site revealed material remains belonging to the transitional phase of the Neolithic-Megalithic such as Black-and-Red Ware, Iron objects etc. A two chambered cist burial was also excavated at this site (Keshav 2006).

Conclusion

Discussing the ethno-archaeological context of the Mesolithic cultures, Murthy (1981, 1985,2003; 2012:1-23) has argued that the cave dwellers of the Upper Palaeolithic in the Kurnool region of Andhra Pradesh and also the succeeding Mesolithic people might have exploited a variety of wild plant foods as the present day hunting-foraging communities such as the Chenchus, Yerukalas and Yanadis in both plateau as well as coastal eco systems respectively. Taking this as an indicator it may be argued that given the congenial climatic and ecological conditions, domestication of plants and animals might have evolved in peninsular India, as in other parts of the sub-continent during the Mesolithic phase itself. The evidence from Pandavulagutta in northern Andhra Pradesh proves this. Here in the Mesolithic rock art the depiction of *Bos gaurus* with all the physical details clearly portrayed, indicate the familiarity of this animal to the Mesolithic folk of this region. Incidentally this is the only depiction of this animal in the entire corpus of early rock art in south India. Coupled to this we also have the continuation of the exploitation of wild rice and the preservation of the fertility belief systems of the hunting – gathering economy, into the folk belief system and religion of the contemporary agro-pastoral community of the mudirajus in the area. In the light of these Mesolithic evidences of the domestication of cattle and plants in northern Andhra, it is quite intriguing that similar evidences are not to be noticed in the succeeding Neolithic of the same region.

Fig.7. Painting of Bos indicus in red ochre, Dupadugattu.

The identification of wild ox *(Bos namadicus!)* in the Neolithic art of the south-western part of Andhra display another dimension of the domestication of plants and animals in the southern Indian Neolithic. This region, which is part of the 'Nuclear Zone' of the south Indian Neolithic display the same stylistic features as noticed in the petroglyphs of Karnataka. The biological record from the excavated Neolithic sites of the region contains evidence of this animal. Its existence during the preceding Mesolithic phase is however not established. The paintings of Bos namadicus in the rock art of Budagavi and in the petroglyphs of a nearby site Velpumadugu indicate that in the 'Nuclear Zone' of the Neolithic of southern India, this animal seems to have been domesticated by the Neolithic folk. The depiction of Bos indicus in the rock paintings of Budagavi may be taken as an indicative of the coexistence of both the wild and domesticated cattle during the early Neolithic of this region.

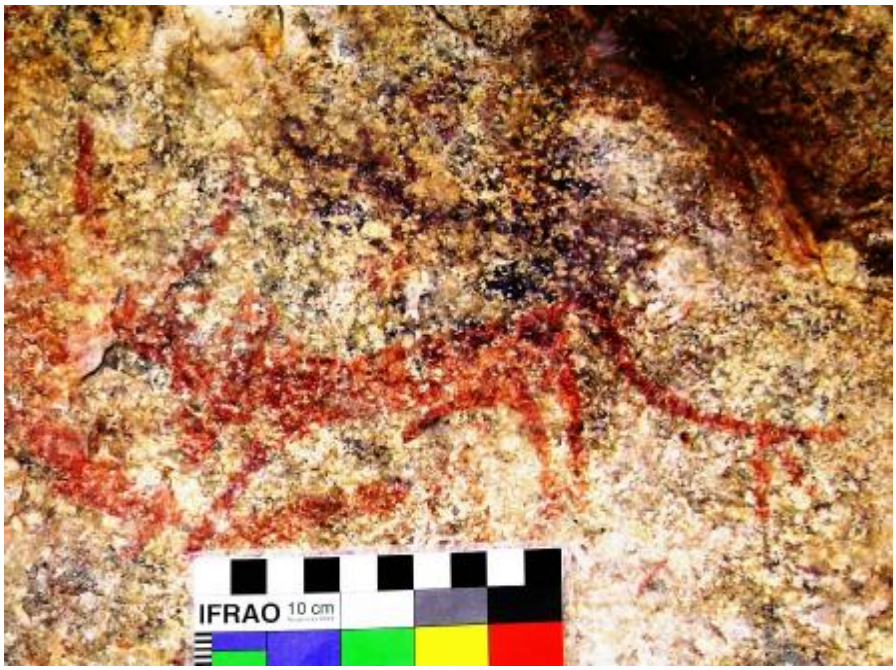

Fig.8. Painting of Bos indicus in red ochre, Sivaru Venkatapur.

One interesting feature noticed in the Mesolithic rock paintings at Kethavaram is the occurrence of a pair of humped bulls, a characteristic trait of the Neolithic phase in south Indian archaeology. This region is a part of the regional variant 7 of Paddayya's (2011) classification of the south Indian Neolithic. This feature is all the more interesting because we do not get any material remains of the Neolithic phase within the site or in its vicinity within a radius of 15 sq.km (Chandramouli1986, 1987). Keeping in view the non-availability of material remains of the Neolithic phase within the Kethavaram rock art site we can postulate that the appearance of the humped bulls in the rock paintings of the Mesolithic period could be due to the cultural or material contacts between the Mesolithic and Neolithic people.

Fig.9a. Painting of a pair of Bos indicus in red ochre, Kethavaram.

This hypothesis gains strength if we see the stylistic rendering of the deer figures in a fighting mood at the same place (Fig.9a & 9b). The depiction of humped bulls in a fighting posture facing each other is a characteristic feature of the Neolithic rock art in Karnataka, both in paintings and petroglyphs. The Mesolithic artists of Kethavaram depicted the deer figures in a fighting posture; a feature in all probability was the result of the cultural interaction. These rock art depictions indicate that Kethavaram could be the seasonal aggregation site for the hunting – gathering and agro-pastoral cultures. Such cultural interactions between different prehistoric groups must have existed in this region right from the Upper Palaeolithic times. The need for a critical appraisal of the Upper Palaeolithic-Mesolithic and Mesolithic-Neolithic interfaces in the archaeological, as well as in the rock art, context of Peninsular India is called for in the light of the above discussion, to understand the varied dimensions of the processes of domestication of plants and animals.

Fig.9b. Paintings of Bos indicus and antlers in red ochre, Kethavaram.

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