

THE FAUNAL STUDIES IN ARCHAEOLOGY

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INTRODUCTION

The pre-and protohistory of India is shrouded in mystery, as documentation was unknown, then. Besides, 'times' have ravaged the few traces of their habitation, supported by natural upheavals in the form of terrestrial distortions. Hence, the origin of man and animals on the earth, is still elusive. The faunal existence of today, is no doubt a conclusive evidence of its or his prehistoric origin ; but the clues have to be ascertained, if import of authenticity has to be injected into these unknown incidences.

Archaeology which deals with some aspects of this subject, has yet found no alternative to the process of 'excavation', which has its own handicaps. Neither the layers nor the phases, are stationary at all levels. The Carbon-14 method of dating has considerably helped in this process and is confirmatory. An excavation yields many other materials like pottery, human skeletons, animal bones, personal possessions coins, idols etc, besides carbonised material. An evidential approach based on these materials, will be a good corroborator to carbon-14 results. With this objective, the faunal remains from archaeological excavations were collected and studied. They mostly consist of bones, which form the major part of the disinterment. This is due to the fact that, besides being mortal remains of animals, they are also human food remnants. Animals which are co-residents of human society, have the privilege to share and enter into his routine life. They are his companions in his effort to produce food, share his burden of physical complex and also provide him with food from their own body flesh. It is no wonder that such a benign companion, became the object of domestication. Reymond Chaplin has stated "Animal husbandry methods to a great extent reflect the social structure and technological achievements of the community—the first consideration must be to identify and describe the animals from the point of view of size, weight, and health—the principal aim has been to put life and flesh into these bones to think in terms of animals, of flocks and herds, and not of them as mortal remains".

With this end in view, the faunal remains excavated from the following centres, from different states, were collected processed and studied.

Mysore state .. Sangankallu, Hallur, Kolar (Gold mines undertaking),
Terdal, T.Narsipur.

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Andhra Pradesh	..	Utnoor, Piklihal, Yelleswarum, Palovy, Peddabankur.
Maharashtra state	..	Newassa.
Gujarath state	..	Malawa, Navdatoli.
Rajasthan	..	Bagor.
Madhya Pradesh	..	Kayatha, Raisen-Sehore.
Uttar Pradesh	..	Pratapgarh.

Previous studies and recapitulation

My predecessors in the field have done excellent work, and contributed valuable information to the subject.

- In 1886, 'The fauna of Karnul caves' by Lyddekar.
 .. 1931, 'Zoological remains in Mohenjodaro' by Sewell, R.B.S.
 .. 1936, 'Animal remains of Harappa' by Prasad, B.
 .. 1952-53, 'Identification of the bones of chalcolithic layers in the excavations at Mahaeshwar' Navdatoli by George, J.C.
 .. 1954-56, 'A report on the animal remains of Newassa excavation' by Eapen, J.
 .. 1957-59, 'Animal remains from the excavations at Navadatoli' by Shaha, D.R.
 .. 1961, 'Animal remains of prehistoric India and their affinities with those of the western Asiatic countries' by Nath, B.
 .. 1961, 'Animal remains from Utnoor' by Shrinivasan, P.
 .. 1966, 'Animal fossils in early stone age tools of Godavari river' by Joshi, R.V.
 .. 1966, 'Pleistocene mammalian fossils of the Narmada valley and other horizons' by Khatri, A.P.
 .. 1967, 'Animal remains from Adamgarh rock shelter' by Nath, B.
 .. 1967, 'Animal remains in Pleistocene deposits of Narmada valley' by Rao, V. V.
 .. 1968, 'Are mummals immigrants to India' by Khan, E.
 .. 1969, 'Animal remains from Alamgirpur' by Nath, B., and Biswas, M. K.
 .. 1969, 'Animal remains from the stone age hill dwellers of Tekkalkota' by Shirole, B. G.

Under an award granted to me, by the University Grants commission New Delhi, a scheme of the study of 'Palaeontology of Indian cattle' was undertaken at the Dharwar Campus of the University of Agricultural Sciences, Mysore state. Animal remains from 17 excavations, spread over the whole of India, were collected and studied. The following technical reports are published and others are in different stages of publication.

1. *Animal remains from Sangankallu* in 'Excavations at Sangankallu 1964-65', published by the Deccan College P.G. Research Institute, Poona, pp 29 to 38, 1969.

2. *Palaeontology of Indian cattle*, published by the U.P. Agricultural University, Pantnagar, 1970.

3. *Skeletal remains (vertebrata)* in 'Protohistoric Cultures of Tungabhadra Valley, published by M. S. Nagaraja Rao, Museum of Art and Archaeology, Karnatak University, Dharwar, pp 107 to 124, 1971.

4. *A report on the animal remains from T. Narsipur* in 'Report on the Excavations at T. Narsipur', published by the Director of Archaeology, Mysore state, pp 99 to 104, 1971.

5. *Archaeological animal remains, their significance and interpretation* in 'Studies in Indian History and Culture', published by Karnatak Education Board, Dharwar, pp. 31 to 37, 1971.

Note : The difference between the previous works and the present studies is, that the former was a pure zoological approach, dealing mostly with the identification of the species, their classification and their placement in the animal world. Presently, in addition to their contribution, other aspects as study of evolutionary phases, its added advantages to secondary dating, origin and metamorphosis of dentition, the prevalence of hunting or pastoral culture, horns as breed characters, deciphering of the food habits of the dwellers, animals and animal diseases and their connotation, are being studied, as can be seen from the subsequent part of the report.

EVOLUTION OF THE MANUS ; AND ITS SIGNIFICANCE

All vertebrates are genetically provided with a manus which has full five digits (fingers). McFydean states that "In the typical mammalian manus five metacarpal bones are present, one for each digit, as is the case with the human hand or the forefoot of the dog and named from the most medial to the most lateral, the first, second, third, fourth and the fifth metacarpal bones."

"In the adult ox, this region comprises of two bones, viz. a large and lateral small metacarpal bone. The large metacarpal presents some resemblance to the same bone of the horse. It presents the combined third and fourth metacarpals of the human hand—the medullary canal of the bone is divided lengthways by a bony septum whose edges correspond to the before mentioned furrows. The furrows and the bony septum indicate the line of fusion of the original separate bones."

"The metacarpals of the horse, however, exhibit a marked departure of the typical plan. Two of the five metacarpal bones, the first and the fifth, with their digits are entirely suppressed. Of the remaining three, only one, the third, is present in a fully developed condition and carries a digit, the second and the fourth being small slender bones unprovided with digits and placed on each side of the main bone."

The evolution of the manus, which originally had five metacarpals, into a single one as in horse (perissodactyla) and two in cattle (artiodactyla), raises many problems, not only regarding its process, but also about its phases of disappearance.

It is interesting that though the changes are divergent in different species, yet are uniform amongst a class of animals all over the world. Besides, simultaneity in the process of reduction, is another point of advantage to fix the period of recession. Along with the suppression of the metacarpal bones, there will be structural changes, both in the composition of the carpus (wrist) bones which articulate with others; and also in their interior which contain a medullary cavity, which is a stable character of all long bones. In the 'Anatomy of Ox' it is mentioned "Long bone.—these are elongated more in one direction than in the other—the middle constricted portion is called the shaft, which has a thick covering of compact tissue. Centrally, there is a medullary cavity which contains the yellow marrow."

As these bones do not disappear over night, they are characterised by a process of regression which extends over several thousands of years. Writing about horse in 'Anatomy of Ox', it is stated "As regards their distribution in time, a number of forms of 'fossil equidae' have been discovered, many of which are of special interest as showing an almost a perfect series of gradations, between a foot with complete set of toes and a foot with only one complete digit".

So an endeavour was made to study to fix the dates of manal recession, from the collections available to me. As the material does not belong to a period prior to neolithic phase, I could not recover a recessional metacarpal, but have been able to trace the vestigial remnant of the third maticarpal in the form of an additional medullary cavity, in cattle (Specimen collection No. 5 from Sanganakallu). (Plate I) This finding is repeated in the bone collections from Utnoor (Specimen No. 33/I). (Plate II).

In the cattle, which has still now maintained the traces of its double origin, is slowly marking changes of its conversion to a monodactylus foot, as evinced in the collections from T. Narsipur. In plate No. III, you will see the cross section of three metacarpals, of which the lower most indicates a strong compact structure with well dispersed cancellated tissue. The union of the two bones is marked by a deep depression on its upper and lower surfaces. In the middle one, the cancellated tissue has disappeared, but the fragile partition is complete. In the upper one which is a modern specimen, the oval cavity is tending to be rounded and a small vestigial septum is seen, extending to only 1/4th of the cavity. This is a clear illustration to affirm that the bi-dactylus ox is heading towards monodactylus condition.

Deduction from the evolution of the Manus

From the study of the evolutionary phases of the Manus, one is lead to infer that the third metacarpal has degenerated in ox, a few thousand years before the neolithic phase. On an average, it takes about 8 to 10 thousand years for one full metacarpus to disappear and about 4 to 5 thousand years for the intervening septum to lose its identity. Other details regarding volumetric and structural changes and their period, are still to be worked out.

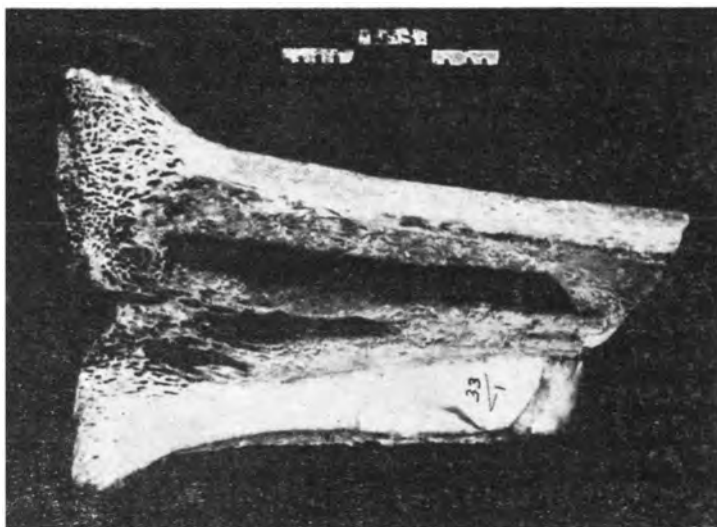


PLATE II



PLATE I

PREVALENCE OF WILD HUNTING AND PASTORAL CULTURES

This is a vital study, the answers of which find clues in the deciphering of the social structure prevalent on a location, at the point of study. In the pleistocene period, animals were roaming wild in all situations. Later, their hunting for human food, drove them deep into the secluded interior. P. F. Zeuner states that "Ever since the man assumed the habit, at least 10,000 years ago, of living on more or

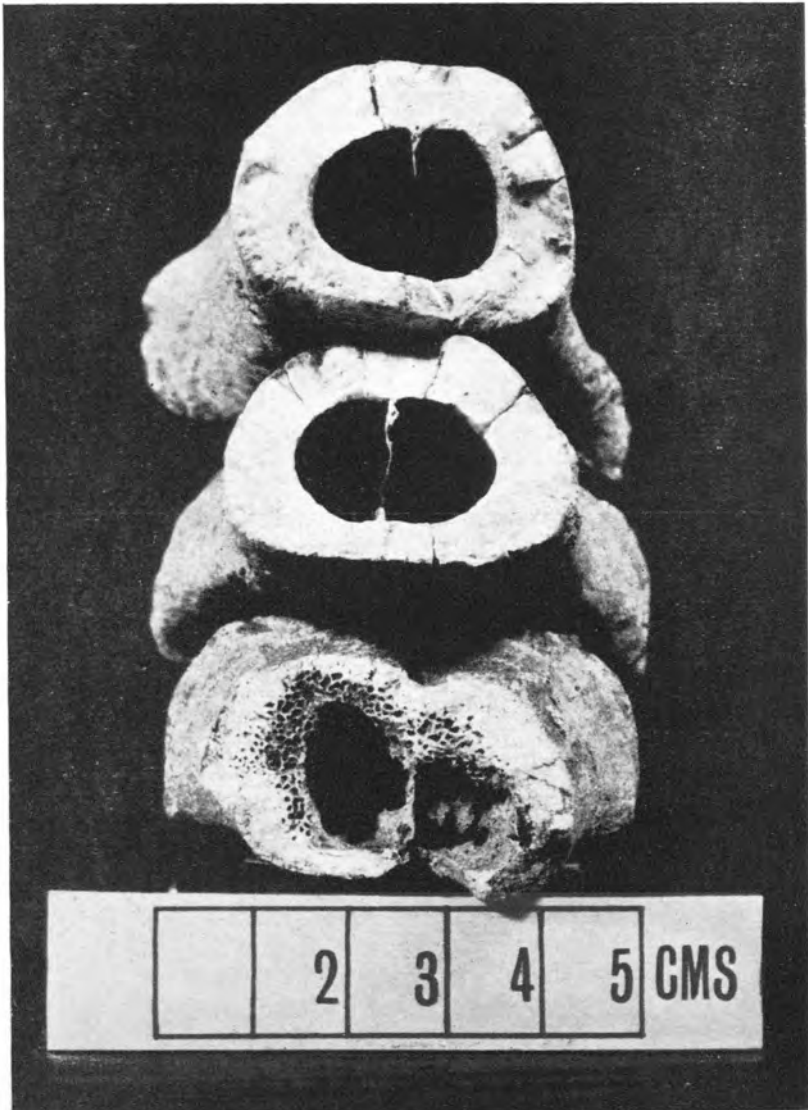


PLATE III

less permanent settlement his relationship to animal world has undergone changes. As a hunter and food collector he felt himself essentially a part of nature. But once the permanent settlement has become his rule, his attitude to animals was profoundly changed. The outcome of this process was the domestication of certain species, with most of which we are familiar at the present day".

In addition to the information available from pottery and other sources, to identify the nature of culture prevalent on site, the study on the recovered bones was undertaken to find further evidences.

(1) With the aid of statistical anatomy, the first attempt was to reconstruct an entire animal from fragmental parts. Statistical processes as F, Snedecor's test and meanal measurements were employed for this.

(2) The next attempt was to put blood and flesh into these reconstructed animals, by adopting the same procedure.

(3) The height, weight and size, were the considerations to fix the breed. This process was highly facilitated by the 'Cornual study' (study of horns). Horns are always true to breed and vary in a slight margin, depending on their size. This approach has been (Plate IV) elaborated in the report sent on the animal remains from Hallur and Navadatoli.



PLATE IV

(4) In a general way, if in a collection there are higher percentage of immature bones, then pastoral culture is said to have been prevailing there. The reverse would indicate the existence of hunting culture. Figure, as low as 25% is said to be enough, in case of immature bones, as many other bones in the body are matured, while a few are immature.

This is based on the fact that, in pastoral culture, the residents would not allow their food animals to become over mature, at the time of their destruction. This criteria alone is not enough to decide the nature of the society.

Bones of the wild fauna, are physically larger, structurally more compact and carry processes and eminences which have longer range of articulation. A comparative statement of measurements both of volumetric and dimensional, will reveal the nature of fauna.

To this, if study of 'Pedosis' is added, a confirmatory evidence will emerge. Pedal studies are made on the metacarpophalangeal bones which are first placed *in situ*, and then their measurements are taken at each joint to cover their range which is a precursor to their leap. The pedal angle, which is the summation of all the articular segments, is the relative expression of the locomotory action, possible in an animal. Wild fauna are in constant danger of either being preyed or hunted. So they develop an agility which is translated on their pedal bones. Hence 'Pedosis' is a valuable contribution to the deciphering of the state of the animal, as to whether it is wild or domesticated. This was tried for the first time in the bone collections from Kayatha (Plate V) in which report it is stated that "A special study of the 'Pedosis' of the third phalanx was undertaken to know from their angle of inclination and pointing of the toe, whether the animals were free grazers, wild wanderers or were actually used for agricultural operations".

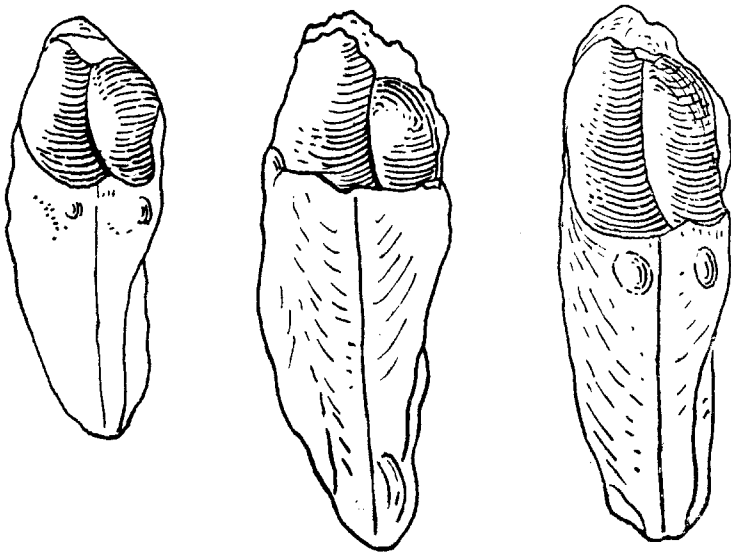


PLATE V

Note : This study is held up for want of precision instruments to take measurements under a magnified field.

STUDY ON THE FOOD HABITS OF ANCIENT INDIAN DWELLERS

It is reasonable to assume that human beings are forced to fall back upon the natural resources for their food supplement, till they made permanent settlement and learned to produce their food requirement. In this, I am not dealing with the behaviour of the prehistoric race. As the material available to me is from the neolithic period onwards, the subsequent observations also refer to the same phase.

The food habits of the ancient Indian dwellers, has been a controversial issue as to whether they were vegetarians or nonvegetarians. Regarding the latter, there have been umpteen evidences to support it.

The dentine structure of the neolithic man was not such as to tear and swallow raw flesh from the animal's body, as carnivorous animals do. So, evidences have to be traced regarding the means and methods of hunting, euthanasia of the prey, skinning and its wherewithal, dismembering of the body and lastly roasting.

Animals were cornered at suitable bushy centres and held at bay till they surrendered, appeared possible. The strong early man dominated these animals by force. At close quarters, they were hunted by the discharge of sharp stone splinters from a bow-like arrangement. Evidence of this approach is available from the collections from T. Narsipur, in which the scapula (bone) had a dent on its exterior. The nature of wound indicated that it is not a long range missile. Hence, the theory of first cornering the animal and then hunting, is propounded.

Mere hunting, would not instantaneously take life of the animal. The euthanasia has to be practised, to put out the captured animal. For this, artificial pneumo-thorax appears to have been practised. The evidence for this is available in the collections from Pochampada, where the distal end of the rib has been slashed by a sharp edge of the splinter. (Plate VI).

Whether the carcass was dressed by skinning or roasted as a whole, is a matter surmise.

Roasting and chopping, which are the final acts, find abundant traces in almost all the bone collections. The roasting, which was on open fire, clogged its soot into the surface pores of the bones and penetrated its haversian system. This is a common finding observed and mentioned, by my predecessors too. Now, this idea finds extension in the recognition of chopping marks, on the bones, which are intended to dislodge the adhered flesh. A few of them are superficial while others are deep enough to cut through the bone. A specimen from Hallur is enclosed to illustrate the phenomenon. (Plate VII).

They were also aware of the edible marrow contained in the long bones. Holes either rounded or rectangular, were made on long bones, through which the impounded marrow was sucked. A specimen from Utnoor illustrates this point. (Plate VIII).

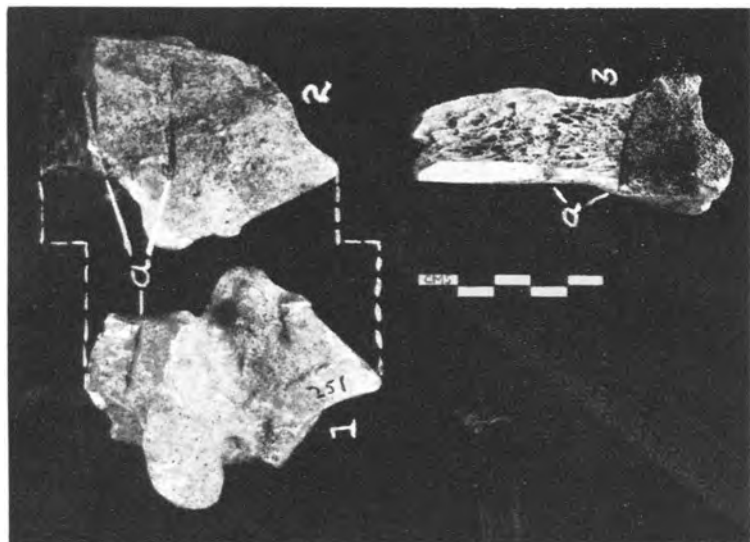


PLATE VII



PLATE VI

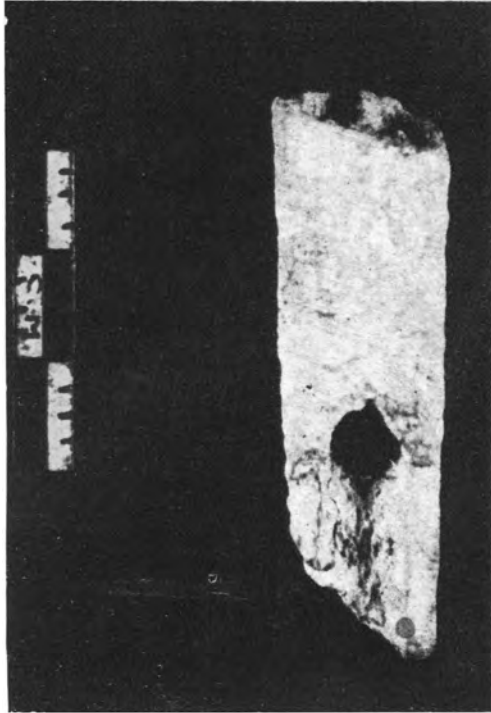


PLATE VIII

Various forms of bone tools were employed to dislodge the cut and adhered flesh bones. Some of them are used when the flesh is still in fire. These develop a dark sooty surface. Others which are used when out of fire, are not discoloured. Making bone tools is an art, and the selection of suitable material is a discretion. They are of various shapes and forms; and the study of their use and utility is very interesting. I am herewith enclosing a few from Navadatoli, Peddabankur and terdal excavations. (Plates IX, X and XI).

Deductions

Blood letting, which is a present day method both of euthanasia and flesh preservation, was replaced by the practice of artificial pneumo-thorax, by the neolithic people.

Short range missiles were used in hunting.

Roasting is a visible symptom, and it's extent can be known by making hard ground sections of bone tissue, involved. This condition should be distinguished from other conditions as accidental fire, or subterranean autocombustion.

Chopping and cut marks should be distinguished from fragmentation and incision, due to superlying debris.

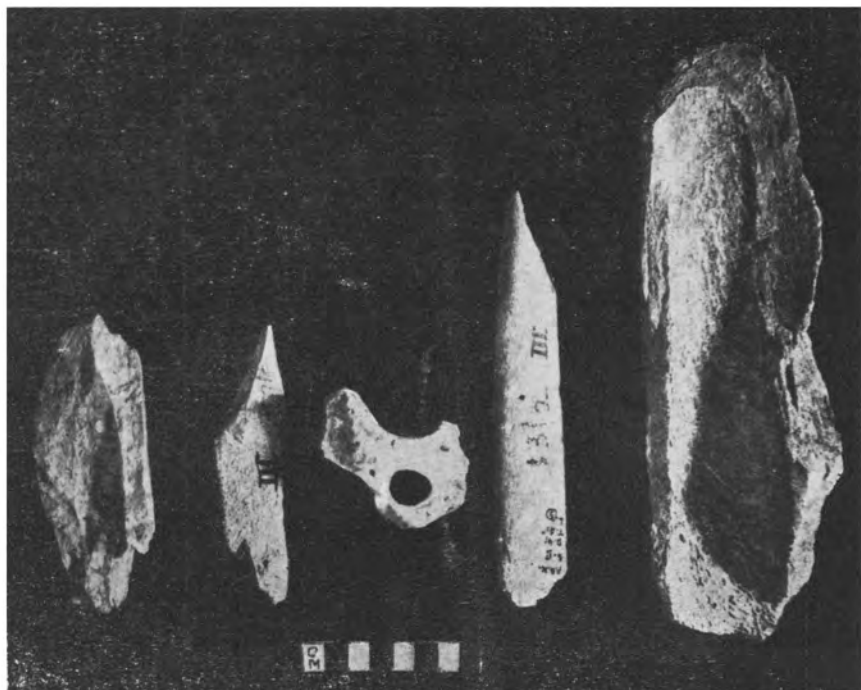


PLATE IX



PLATE X



PLATE XI

OCCUPATIONAL USE OF ANIMALS IN PASTORAL CULTURE

After deducing the nature of culture prevalent from the study of the fragmental bones, the next attempt should be to trace the occupational use of animals.

Animal commissioned to any type of work, will develop an adoptive body to fit into the circumstance. Those used for riding purpose, will have a dished back, while those used for traction, will develop an arched one. The apparatus involved in the process of harnessing is not recoverable, as it disintegrates. The bones of animals commissioned to such heavy work, show the marks of concussion on them, in the form of osseous deposits round about the points of pressure, which are the carpal and tarsal joints. This symptom is also seen in the modern animals which are subjected to heavy draft work. The recovery of such ankylosed bones is an indication that the animal having it, was harnessed to heavy work. This condition was reported from the bone collections from Hallur, Utnoor, T. Narsipur, Palovy, Yelleswarum etc.

Deduction

Animals, in natural state, have clean limbs.

Those commissioned to heavy labour, mark symptoms of their occupational use, in the form osseous growths, around the point of pressure.

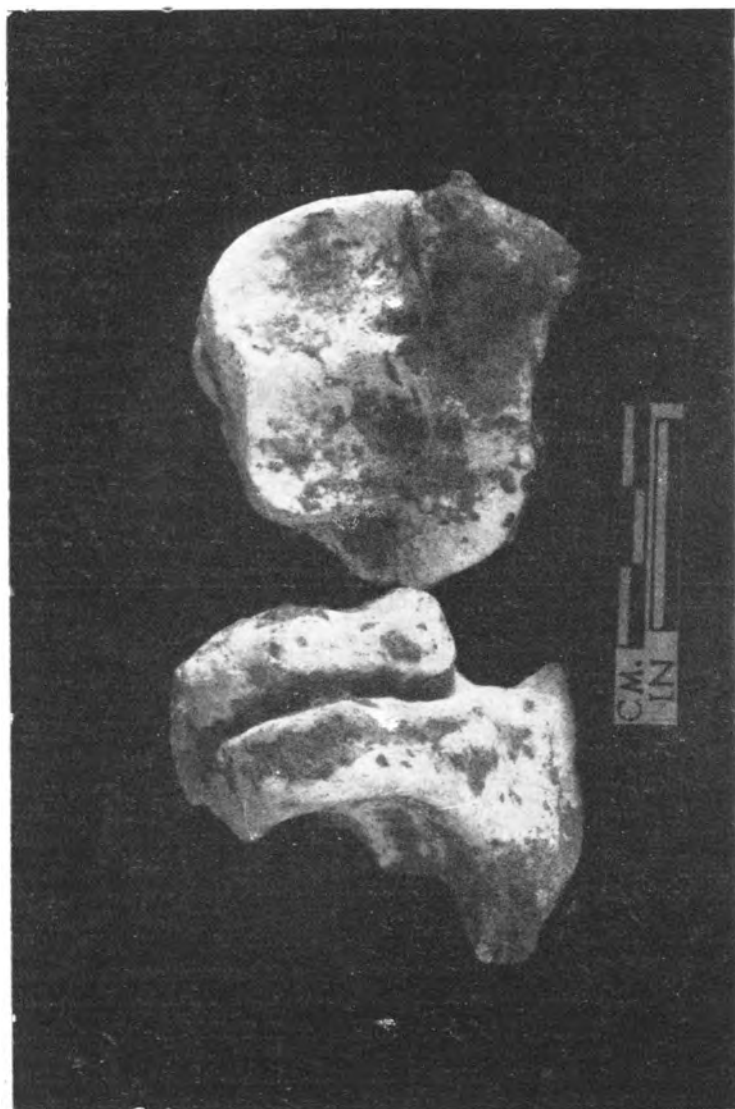


PLATE XII

It is safe to infer that when anchylosed, tarsal or pedal bones are traced, the animals on the location were commissioned to heavy labour.

SUMMARY

An approach was made to reconstruct an entire animal from recovered bone fragments. The breed characters of these reconstructed animals was deciphered from the cornual study. The evolutionary process involved in the change over from the hunting to pastoral culture and its recognition on the metamorphosed animal bones and inferential study on pedosis and occupational diseases were undertaken.

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