Faunal Remains from Shikarpur, a Harappan Site in Gujarat, India

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This paper deals with the preliminary observations of the analysis conducted on the faunal remains unearthed at the site of Shikarpur. A single trench ES4 was selected as a research sample from the excavation conducted by the Department of Archaeology and Ancient History; M.S. University of Baroda, Gujarat State, India in 2007-08. A total of 6250 skeletal fragments were analysed of which only 3219 (51.50%) could be identified. All the skeletal elements were carefully observed for signatures of bone modifications done by natural as well as human agencies. The analysis revealed a large number of animal species including domestic mammals, wild mammals, reptiles, birds and molluscs. In addition, a few skeletal fragments of fish and crab were also recovered.

Keywords: *Shikarpur, Archaeozoology, Faunal Ramain, Domestic, Wild, Skeletal*

Introduction

The ancient site of Shikarpur (23˚ 14' 15" N; 70˚ 40' 39" E), locally known as *Valamiyo Timbo,* is situated at a distance of 5 km southwest of the present village of the same name in Bhachau taluka, district Kachchh, Gujarat (fig. 1). The site is small (about 3.4 ha). This site was first excavated during 1987-1990 by Gujarat State Department of Archaeology under the supervision of M.H. Raval, and brought to light both Mature and Early Harappan cultural material at the site. Very little was published regarding the results of this excavation other than that which is available in the form of reports in Ghosh (1967). The faunal remains of this excavation have been studied (Thomas et al. 1995).

It was against this background that the Department of Archaeology and Ancient History, M.S. University of Baroda started fresh excavations at the site from 2007-08 onwards. This recent excavation did not reveal any Early Harappan deposit. On the other hand, it brought to light a total of 6.40 m deposit showing a three-fold sequence in the Harappan occupation at the site. The early phase (Phase I), entirely belonging to the Classical Harappan, is represented by about 3 m of cultural deposit. This phase showed the occurrence of classical Harappan ceramics along with Anarta pottery. Several sherds of the Harappan black slipped jars, perforated jars, basins, 'S'-shaped jars and dishes-on-stand and reserved slip ware form part of this assemblage. This phase is followed by Phase II, distinguished by the preponderance of the Sorath Harappan pottery. The total thickness of this habitation deposit is approximately 1.40-1.60 m. Phase II at the top is followed by Phase III deposit representing the last phase of the Harappan occupation at the site. Habitation debris of this phase is thin, patchy and generally confined to the top 10-20 cm from the surface, as well as in ashy pits. This phase is marked by Late Harappan material (personal communication, Dr. Ajithprasad).

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Methods

The animal skeletal remains collected during the course of excavation are housed at the M.S. University, Baroda (Gujarat State, India). This analysis was done at Baroda during a visit in 2008, with a view to obtaining a preliminary picture of the animal-based economy at Shikarpur. A single trench ES4 was selected for the analysis. The cultural deposit was divided into 20 layers representing all three cultural phases at the site (Layers 1 to 4: Phase III; layers 5 to 9: Phase II; and, layers 10 to 20: Phase I). Layers 2 to 4 yielded very few skeletal fragments in highly fragmented condition. Therefore, these were not included in the analysis.

Securely identifying a skeletal fragment is vital for archaeozoological interpretations. The most secure approach for identifying specimens relies on comprehensive collection of reference skeletal material. For species identification, the basic distinguishing markers were derived from the reference collection of animal skeletons housed at

the Archaeozoology Laboratory, Deccan College, Pune and the Osteology Laboratory, M.S. University Baroda. When necessary, help was taken from the published distinguishing keys, e.g. Schmid (1972) and Hillson (1992) for general identification; Joglekar et al. (1994) for finer differentiation among the cattle, buffalo and nilgai; Prummel and Frisch (1986) for identification of bones of sheep and goat; and Pawankar and Thomas (2001) for identification of the blackbuck (*Antilope cervicapra*). In addition, help was also taken from Miguad (1989), Gupta et al. (1987, 1990) and Higham (1975). For molluscan shell identification, help came from the published works of Subba Rao (1989) and Apte (1998).

Though large mammalian bones could be easily identified, in the case of closely related species like cattle (*Bos indicus*) and buffalo (*Bubalus bubalis*); goat (*Capra hircus*) and sheep (*Ovis aries*) it is difficult to assign to a particular species if the bone is highly fragmented, or the distinguishing markers are absent. Therefore, broad-level groups like *Bos/Bubalus*, and *Capra/Ovis* were created. Another category, "small mammal," was created to define the bones belonging to the hare-sized mammal that could not be identified up to the species level.

Measurements were carried out of all measurable bones following von den Driesch's (1976) standard method. Each fragment was described and those bearing marks of natural/human actions were given a serial number. After the study was over, the faunal material were restored back to their respective packets so that the observations and inferences stand verifiable at any future time point.

The Faunal Material

The present report is based on the faunal material recovered from Trench ES4. The contexts (layer and trench) marked on the packets were used and reported in this preliminary report. Any revisions of the stratigraphy and the cultural identification of the layers shall be incorporated in the final report.

A total of 6250 skeletal fragments were analyzed, of which only 3219 (51.50%) could be identified (Table.1).A total of 3031 fragments could not be identified. These were labelled as unidentified fragments (UF) and recorded as small (< 2 cm), medium (2-5 cm) and large (> 5 cm), since these can also throw valuable light on the site formation

Cultural Association	Phase I	Phase II	Phase III	Total
Number of Identified Specimens (NISP)	1827	1375	17	3219
Unidentified Fragments (UF)	1907	1066	58	3031
Total Fragments (TF)	3734	2441	75	6250
NISP%	48.92	56.32	22.66	51.50

Table. 1: *Summary of faunal identification at Shikarpur*

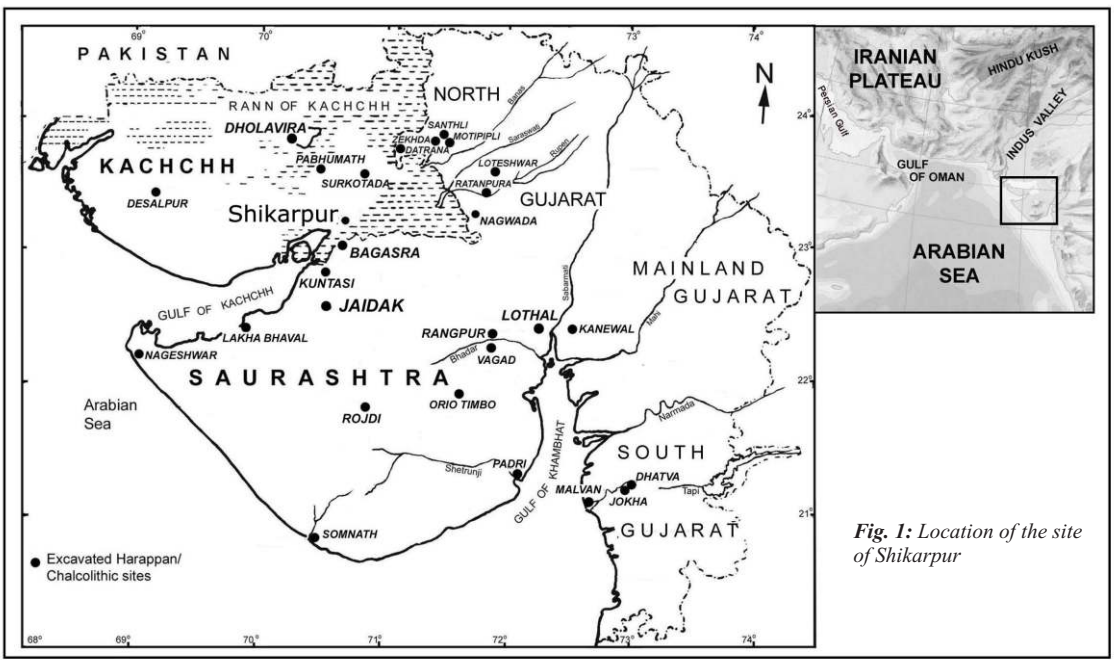


Fig. 1: *Location of the site of Shikarpur*

processes. The level of identification (51.50%) is less, yet adequate enough to comment on the nature of faunal diversity at Shikarpur. It is clear from the distribution of unidentified fragments that their occurrence is not uniform in all the phases (Table. 1; fig. 2). Phase II revealed the highest number of

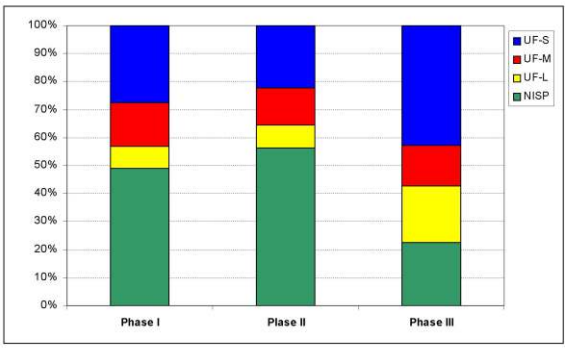


Fig. 2: *Proportion of identified and unidentified fragments*

identified specimens (56.32%), while Phase III had the least number (22.66%). However, one has to keep in mind that among all the phases in the trench, the last phase yielded less skeletal fragments than the other two phases.

The Species

The faunal material analyzed from the site of Shikarpur revealed a large number of animal species (Table. 2) that includes domestic mammals (fig. 3-5), wild mammals (fig. 6-7), reptiles, birds, crabs (fig. 8) and molluscan species (fig. 9). It was possible to identify 39 species. There are seven domestic mammals: cattle, buffalo, sheep, goat, pig, dog and cat. Twelve wild mammalian species were identified: nilgai, wild pig, antelopes (Blackbuck and Chinkara), deer (Sambar and Chital), elephant, Hyena, an equid species, porcupine, hare and rodents (house rat).

The faunal material recovered from Shikarpur has a large number of non-mammalian animal remains. The non-mammals include two species of birds (domestic fowl and common crane) and reptiles (Chitra turtle and soft shell turtle). In addition, sixteen species of molluscan shells have been identified (Table. 2). Also, a few fragments of other non-mammals like crabs and fishes were also recovered. However, it was not possible to identify many such skeletal elements up to the genus or species level. Therefore, these fragments have been identified up to general level such as large-sized fish

Mammals	Reptiles	Birds	Molluscs
Bos indicus	*Chitra indica*	*Grus grus*	*Zootecus insularis*
Bualus bubalis	*Trionyx gangeticus*	*Gallus domesticus*	*Turbinella pyrum*
Capra hircus	---	---	*Paphia gallus*
Ovis aries	---	---	*Anadara rhombea*
Sus domesticus	---	---	*Anadara scapha*
Canis familiaris	---	---	*Chicoreus ramosus*
Felis catus	---	---	*Pugilina buchephala*
Boselaphus tragocamelus	---	---	*Indoplanorbis exustus*
Cervus unicolor	---	---	*Fasciolaria trapezium*
Axis axis	---	---	*Marcia recens*
Antilope cervicapra	---	---	*Dentalium* sp.
Gazella bennetti	---	---	*Anadara* sp.
Equus sp.	---	---	*Lamellidens* sp.
Hyaena hyaena	---	---	*Viviparus* sp.
Elaphus maximus	---	---	*Conus* sp.
Sus scrofa	---	---	*Corbicula* sp.
Hystrix indica	---	---	---
Lepus nigricollis	---	---	---
Rattus rattus	---	---	---

Table. 2: *Animal taxa (Genus level) identified at Shikarpur*



Fig. 3: *Bos indicus* mandible

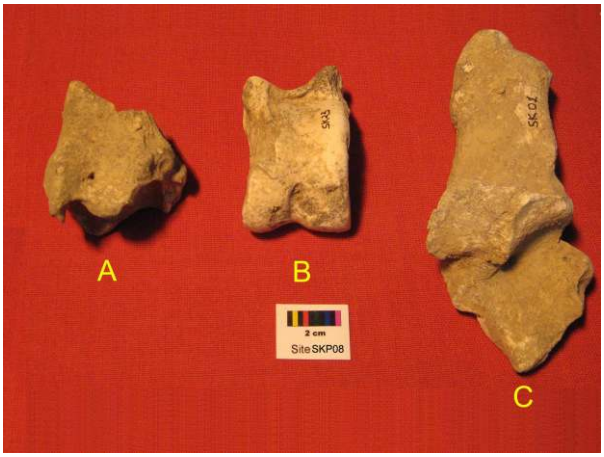


Fig. 4: *Tibia, astragalus and calcaneum of Bos indicus*

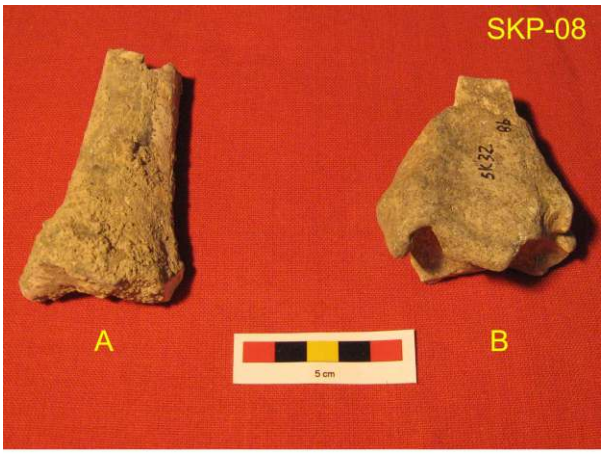


Fig. 5: *Metacarpal and tibia of Bubalus bubalis*

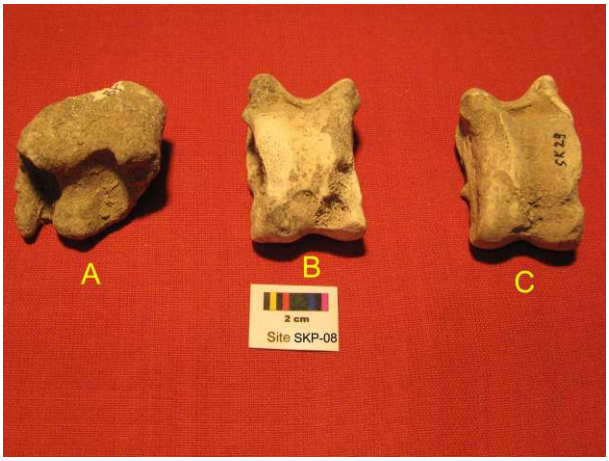


Fig. 6: *A: Tibia and astragalus of Boselaphus tragocamelus*

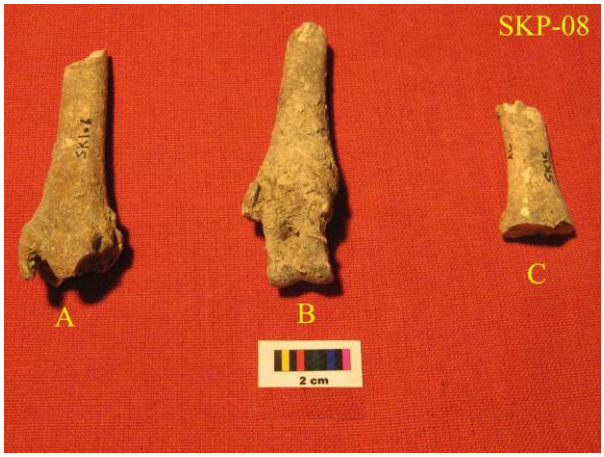


Fig. 7: *Bones of Antilope cervicarpa*



Fig. 8*: Columella and cut whorl portions of Turbinella pyrum*



Fig. 9: *Crab remains*

and general crab, and kept aside for future examination.

Taphonomic Observations

The detailed study of bone modifications on archaeological bones has an important place in archaeozoological analysis, which includes archaeological and palaeoanthropological applications for investigating taphonomic issues including ritual behaviours, the evolution of social and economic patterns and site formation process (Fisher 1995: 7-8). Therefore, all the bone fragments were carefully examined for signatures of bone modifications that occurred due to various human and non-human agents such as natural factors and scavengers.

Bones belonging to the layers located deep in the trench were impregnated and encrusted with minerals, the effects of which varied noticeably from fragment to fragment, but almost all fragments were affected to some degree. However, in general, the bones were well preserved. None of the bones seem to have undergone any physical movement in the present assemblage. However, a few cases of trampling, all of which belonged to Phase I, were noticed. These trampled fragments show the inward crushing or displacement of bone cortex into the

spongy bone space within, as described by White (1992: 138). There was also evidence of recent breakages that occurred either during excavation or transportation. For example, the distal end of a tibia of *Antilope cerviapra* recovered from the Phase II (layer 9) showed evidence of modern breaking. Similarly, a skeletal fragment belonging to the radius of *Capra/Ovis* (layer 8) was broken into two fragments. The bone fragments were also studied for any pathological conditions. However, no such case was noticed in any of the fragments. None of the fragments showed any signature of fractures owing to accidents or diseases. A common observation in many proto-historic sites is the presence of rat burrows, where skeletal elements of these later rats get mixed in the archaeological bones of earlier periods. Two cases of such later intrusion were noticed in the present assemblage.

Root etching was noticed on some bones, in the form of shallow lines etched on the bone surface. These lines were etched on the bone surface due to the acids associated with plant roots that grew against the bones (Andrews 1990). The surface of some rib fragments was polished having a gloss or sheen. This was perhaps due to compacting and smearing of the bone surface and could have occurred before, during or after the deposition. Evidence of gnawing marks in the present material is very flimsy; only five cases have been found in the entire assemblage. A complete calcaneum of nilgai (SK30) and distal portion of a tibia of antelope (SK106) from Phase II were found with several horizontal gnawing marks left by carnivores. Similarly, the Phase I assemblage revealed a complete first phalanx of *buffalo* (SK219) and a shaft fragment of tibia of *Bos/Bubalus* (SK276) gnawed by carnivores. Phase I also revealed a rib fragment belonging to large mammals (SK277), which seem to be gnawed by rodents. This bone fragment had fine parallel striation marks, a characteristic feature of rodent gnawing.

Only one case of embryonic bone associated in the archaeological assemblage has been found. It was an embryonic radius of *Capra/Ovis* unearthed from the Phase I. It is not known whether a pregnant female was culled or it represents accidental incorporation of an aborted embryo into the habitation deposit. Phase I also revealed a number of skeletal fragments that were porous in nature. Many of these were broken due to the post-depositional physical pressure within the sediments, and were in extremely fragile condition. Out of 1827 bone fragments identified from this phase, 35 were porous in nature. It seems that these were in a water-logged condition for a long time. The other cultural phases did not reveal any porous skeletal fragments. Layer 5 and 6 (Phase II) revealed a number of skeletal fragments in which flaking of the outer crust was seen. This can be attributed to their exposure to sunlight or heat for a long period of time. No evidence of bone tool making was noted in the sample that was studied. A single fragment of debitage (a long bone fragment of *Bos/Bubalus* from Phase I) perhaps indicates that tools were made at Shiakrpur. However, this fragment did not have any use-wear marks.

Butchering and carcass-processing activities leave many marks on bone fragments and evidence for these activities was fairly represented at the site. Animal carcasses offer many useful products to satisfy human needs both for nutrition (such as meat, bone marrow, blood and more), and raw material (for implements, clothing, ornaments and tools). Several skeletal fragments, predominantly of large animals at Shikarpur, have been found to contain cutting and butchering marks (fig. 10). Important places for butchering were the proximal and distal ends of long bones. Some vertebrae and ribs also revealed these marks and were dismembered by sharp edged implements. Such marks on bones of cattle and buffalo outnumber those recorded on other taxa. The bones of other taxa with these marks were *Antilope cervicapra*, *Gazella bennetti*, *Sus scrofa*, *Lepus nigricollis*, and caprovines. Phase I revealed the largest number of the skeletal fragments with these marks, while Phase III has the least.

Charring (moderate as well as severe) was one of the most significant pieces of evidence of the food economy at Shikarpur. Faunal material from all the phases has a number of charred bones. The degree of charring could be used to separate fragments as slightly charred, completely charred and charred and calcified. The relative proportion of charred bones was more in Phase I than the other two phases. It is



Fig. 10: *Bone with two parallel cut marks*

interesting to note that the same phase also revealed a large number of unidentified fragments having marks of charring and exhaustive exposure to firing. Skeletal elements belonging to *Bos indicus*, *Bubalus bubalis*, *Capra hircus*, *Bos/Bubalus*, *Capra/Ovis*, and bovids predominantly bear charring marks. Some peculiar bone fragments charred at the anterior end only were noticed at the Harappan sites of Kanmer (Goyal and Joglekar 2008) and Jaidak (Joglekar and Goyal 2010). However, no such fragments were noticed at the site of Shikarpur.

Food Economy

Phase I

The bulk of the faunal material examined from the trench under study belong to Phase I. A total of 1827 fragments (48.92%) were identified, out of 3734 fragments recovered from this phase (Table. 1). The contribution of domestic animals in the total assemblage is very large. The major share of the skeletal elements comes from the cattle and buffalo as together these two important food species contributed 71.37% of the NISP. Cattle were the predominant animals in this phase. However, the paucity of identifiable criteria rendered the precise identification difficult and as a result, out of 1827 identifiable bones (NISP), 108 NISP could be assigned definitely to this species, while 1183 NISP were classified as *Bos/Bubalus*. The skeletal assemblage of cattle revealed both meat bearing and non-meat bearing parts suggesting that carcass processing activities were carried out within the site from time to time. The butchering activities noticed on skeletal fragments of cattle suggest that both beef and bone marrow were utilized by the inhabitants of this phase. Buffalo was represented only in the form of 13 skeletal fragments, maxillary isolated teeth, first and second phalanges and fragments of long bones. The marks on the bones suggest that buffalo may also have been part of the diet.

In terms of ratio, sheep and goat (19.37 %) come next only to cattle and buffalo. As was the case with cattle and buffalo, the lack of morphological criteria

rendered the precise identification and as a result only 8 fragments of goat could be identified, while 343 fragments were classified as of *Capra/Ovis*. A total of three bones could definitely be assigned to sheep, based on the characters suggested by Prummel and Frisch (1986). Skeletal evidence points to the significance of these animals entirely for food. The skeletal assemblage of *Capra/Ovis* brought to light a mixed collection and suggest that these animals were brought to the site alive and culled for food. The contribution of domestic pig was almost negligible, as only two bone fragments (one cranial fragment and one distal portion of tibia) of this animal were found. No butchering and charring marks were observed on the pig remains excavated from this phase. However, looking at previous cases at other Harappan sites, it is certain that domestic pigs were used for dietary purposes. The other domestic animals include dog and cat, which were not included in the diet of the people.

The relative proportion of wild mammals is small when compared to the domestic mammals used for food. Only a handful of fragments of wild mammals has been found in the sample. The wild animals represented in this phase include nilgai, antelopes, deer, wild pig, hyanea, Indian hare and other small mammals (4.14 %). Of these, the most numerous were fragments of nilgai (*Boselaphus tragocamelus*), blackbuck (*Antilope cervicapra*) and Indian hare (*Lepus nigricollis)* forming 1.32 % of the NISP (Table. 3). Nilgai showed its presence in the assemblage in the form of 8 skeletal fragments that include three first phalanges, one second phalanx, two mandibular fragments, one isolated mandibular molar and one isolated maxillary molar. The bones of *Antilope cervicapra* were also 8 in number - an antler, one cetrotarsal, two fragments of radius, three mandibular fragments and one scapula. The gazelle was represented by a solitary bone, a distal fragment of tibia, which was completely charred. One deer species, Sambar (*Cervus unicolor*) was represented in the form of one fragment only in the form of an antler. The hare was represented by both meat bearing and non-meat bearing parts. Looking at the skeletal elements of these animals, it may be suggested that some of the hare were slaughtered outside the habitation area.

Reptiles were identified by only four bones, two representing *Trionyx gangeticus,* one representing *Chitra indica;* one could not be identified up to the species level and is identified as general snake. Bird was represented in the assemblage by one bone only belonging to *Grus grus.* No human activity is noticed on this lone fragment of bird and perhaps its inclusion in the assemblage is due to some reason other than consumption. Crabs, forming 1.92% of the total assemblage, also seem to have played a major role in the subsistence economy of the people during this phase.

Phase II

A total of 2441 bones have been recovered from this phase, of which 1375 (56.32%) could be identified. The faunal collection from this phase is well represented by different species. The contribution of domestic animals in the total assemblage is very large. The domestic animal contributed 85.67% of which a major part comes from the cattle and buffalo (73.45%), followed by goat/sheep (11.93%). As was the case in Phase I, cattle dominate the assemblage in this phase. Out of 1375 identifiable bones, 153 NISP could be assigned definitely to this species, while 830 NISP have been classified as *Bos/Bubalus*. Buffalo bones are much less than those of cattle. Only 23 skeletal fragments have been securely identified as those of buffalo. These include both mandibular and maxillary teeth, proximal and distal fragments of long bones and ilium portion of a pelvic bone. Along with these bones, all three phalanges, calcaneum and metapodials have also been identified. In the case of goat/sheep, 3 fragments (one complete first phalanx, an isolated maxillary tooth and a proximal portion of a radius) have been identified as goat, while 161 have been classified as *Capra/Ovis*. As in the first phase, the contribution of domestic pig was negligible, represented only by four fragments (two canines, one cranial fragment and proximal portion of a tibia). The skeletal elements of cattle, buffalo and goat reveal that these animals were culled at the site itself. Dog and cat, which were present in the first phase, were absent in this phase.

The wild animals represented in this phase include nilgai, antelopes (blackbuck and gazelle), spotted deer, wild pig, hyena, elephant, porcupine and

Species	Phase			NISP	%NISP
	III	II	I		
Bos indicus	2	153	108	263	8.17
Bos/Bubalus	12	830	1183	2025	62.91
Bualus bubalis	2	27	13	42	1.30
Capra hircus	0	3	8	11	0.34
Ovis aries	0	0	3	3	0.09
Capra/Ovis	1	161	343	505	15.69
Sus domesticus	0	4	2	6	0.19
Canis familiaris	0	0	1	1	0.03
Felis catus	0	0	1	1	0.03
Boselaphus tragocamelus	0	13	8	21	0.65
Cervus unicolor	0	0	1	1	0.03
Axis axis	0	2	0	2	0.06
Antilope cervicapra	0	8	8	16	0.50
Gazella bennetti	0	4	1	5	0.16
Equus sp.	0	1	0	1	0.03
Hyaena hyaena	0	2	1	3	0.09
Elaphus maximus	0	2	0	2	0.06
Sus scrofa	0	3	7	10	0.31
Hystrix indica	0	1	0	1	0.03
Lepus nigricollis	0	1	8	9	0.28
Rattus rattus	0	0	3	3	0.09
Snall mammal	0	10	39	49	1.52
Chitra indica	0	0	1	1	0.03
Trionyx gangeticus	0	0	2	2	0.06
General snkae bone	0	0	1	1	0.03
Grus grus	0	0	1	1	0.03
Gallus domesticus	0	1	0	1	0.03
Crab general	0	1	35	36	1.12
Large sized fish	0	1	7	8	0.25
Zootecus insularis	0	16	1	17	0.53
Turbinella pyrum	0	13	4	17	0.53
Paphia gallus	0	72	25	97	3.01
Anadara rhombea	0	3	0	3	0.09
Anadara scapha	0	0	1	1	0.03
Chicoreus ramosus	0	8	0	8	0.25
Pugilina buchephala	0	4	5	9	0.28
Indoplanorbis exustus	0	1	0	1	0.03
Fasciolaria trapezium	0	3	0	3	0.09
Marcia recens	0	1	0	1	0.03
Dentalium sp.	0	2	0	2	0.06
Anadara sp.	0	5	1	6	0.19
Lamellidens sp.	0	8	1	9	0.28
Viviparus sp.	0	2	3	5	0.16
Conus sp.	0	2	0	2	0.06
Corbicula sp.	0	3	0	3	0.09
Land snail general	0	3	0	3	0.09
Freshwater Bivalve	0	1	1	2	0.06
Total	**17**	**1375**	**1827**	**3219**	**100.00**

Table. 3: *Number of identified specimens at Shikarpur*

Indian hare (3.36 %). In addition, the assemblage also revealed the presence of equids, in the form of a mandibular molar (SK25). The wear pattern of the enamel shows that it probably belonged to an adult animal. The material was too meagre to assign to any specific level. Nilgai appeared in the assemblage in the form of 13 skeletal fragments that include first phalanges, calcaneum, astragalus, tibia, both maxillary and mandibular teeth, premaxilla and a pelvic fragment. Both male and female nilgai were present in the assemblage. Evidence for human activity on these specimens was scanty, but nilgai was definitely part of the diet of the people.

Antelopes were present in the form of 8 skeletal fragments, all representing the non-meat bearing parts. The gazelle was also present in the form of 4 non-meat bearing parts. The bones of chital (*Axis axis*) are two in number; a first molar and ischium portion of a pelvis is in completely charred condition. Evidence of wild pig was in the form of two charred metapodia and a mandible fragment. These fragments were otherwise devoid of any other marks.

Elephant was represented in the collection by the presence of two fragments of ivory. Porcupine and Indian hare were represented in the form of one fragment each. Non-mammalian fauna was present in the form of one skeletal fragment of *Gallus domesticus* only. Whereas a large number of crab fragments have been recorded in the first phase, only one fragment of crab was discovered in this phase.

Phase III

A very small number (n =75) of animal skeletal

fragments was recovered from this phase, and only 17 (22.66 %) could be identified (Table. 1). The material that was identified belonged to the domestic mammals only. The cattle/buffalo dominated the assemblage and contributed 94.11% of the total assemblage recovered from this phase (Table. 3). Cattle numbered more than buffalo. The rest of the assemblage was represented by goat/sheep in the form of a single bone. In the absence of any distinguishing marker, it was difficult to identify this fragment as either goat or sheep. Therefore, this fragment was identified as of *Capra/Ovis*. The nature of the material shows that all the domestic mammals present in the assemblage, such as cattle, buffalo, sheep and goat, were used for food.

Molluscs at Shikarpur

One of the reasons generally put forward for the occupation of Gujarat by the Harappans is the availability of different kinds of raw material, shell being one of them. A large number of molluscan species has been reported from Harappan sites in Gujarat. Not only did shell working play an important part in a number of Harappan sites in Gujarat but also selected molluscs were used for dietary purposes (Deshpande-Mukherjee 1998: 63-80).

A total of 16 different species of molluscs have been identified from the first two phases at Shikarpur (Table. 2). *Zootecus insularis, Indoplanorbis exustus and Corbicula* sp. were the chief freshwater shells that were exploited at the site. The marine bivalves present at the site include *Anadara rhombea, Anadara scapha, Paphia gallus* and *Marcia recens*. The marine gastropods that were identified include *Turbinella pyrum*, *Chicoreus ramosus*, *Pugilina buchephala*, *Fasciolaria trapezium* and *Dentalium sp*.

Turbinella pyrum, *Chicoreus ramosus, Pugilina buchephala* and *Fasciolaria trapezium* occur in colonies in the Gulf of Kachchh on the Gujarat coast. These large-sized shells are available continuously and thus were exploited in great numbers for industrial uses (Deshpande-Mukherjee 1998: 67). The same species was also the chief raw material at sites like Harappa and Mohenjo-Daro (Kenoyer 1983). This preliminary study indicates that shell working activity was going on at Shikarpur since shell waste, columellae and cut portions of body whorls were noticed during the analysis. Molluscs like *Paphia gallus*, *Anadara rhombea*, *Anadara scapha* and *Lamellidens* sp. were brought to the site specifically for food purpose. *Paphia gallus* was probably the most preferred food item as it not only outnumbers the other shells but also form a significant NISP (5.24 %) especially in Phase II.

Bone Measurements

Bone measurements are important for understanding the size of animals in the past. Particularly the estimates of size in terms of weight and the height at the withers are useful to compare animal stocks and the inter-relationships of sites (Joglekar 2000). The measurements recorded on a small sample like this may seem inadequate for intra-site comparisons, but these can be used further while comparing animal populations at a larger level. The measurements of all skeletal elements analysed from Shikarpur have not been given in this paper and shall be provided in the full faunal report.

It was possible to estimate the height of the cattle at the withers using the medial length of the astragalus using the formula biven by Zalkin (1960) in three cases (Table. 4). The estimates are 109.65 cm (SK199) of Phase I, 114.97 cm (SK29) and 118.50 cm (SK23) from Period II. Though these three estimates are not enough to comment on the stature of cattle at Shikarpur, they can be used in the future, once the entire faunal assemblage is analysed.

Concluding Remarks

The purpose of the study of faunal remains (only representative samples and not the entire collection) from Shikarpur was to get a picture of faunal diversity during the different phases of Harappan culture at the site. Though the sample analyzed was small, it has given sufficient insight into the exploitation of various animals throughout its occupation.

Faunal remains from Shikarpur have revealed a total of 23 species. In addition, 16 species of molluscs have also been identified. A large number of these species have contributed in one way or the

other to the food economy of the inhabitants. The faunal analysis revealed that occupation at the site was by and large uninterrupted and there were no major shifts in the dietary habits in different phases. In all phases, a more or less similar pattern of faunal exploitation is noticed. However, a minor difference has been noticed between Phase I and Phase II. The people of Phase II have consumed more crabs than those in Phase I.

It is important to note that other Harappan sites in Gujarat such as Rangpur (Nath 1962-63), Surkotada (Sharma 1990), Kuntasi (Thomas et al. 1996), Nageswar (Shah and Bhan 1992), Kanmer (Goyal and Joglekar 2008) and Jaidak (Joglekar and Goyal 2010) have revealed an increase in the exploitation of wild animals in the later phase of occupation. Hence, it will be interesting to see the material belonging to the last phase (Phase III) from some other trenches to see whether the same pattern is visible at Shikarpur or not.

Reg. No.	Context	Phase	Species	GLl	GLm	Bd	Dm	Dl
SK29	ES4 (5)	II	Nilgai	60.00	54.72	35.13	--	--
SK7	ES4 (5)	II	Cattle	64.67	60.83	39.6	31.2	33.37
SK14	ES4 (7)	II	Nilgai	57.26	54.06	35.21	30.39	29.6
SK23	ES4 (5)	II	Cattle	67.2	62.7	40.48	33.2	34.2
SK39	ES4 (5)	II	Nilgai	56.71	53.32	34.42	27.17	19.63
SK199	ES4 (11)	II	Cattle	65.65	58.02	40.05	33.91	34.35

Gl1: Lateral Length
GLm: Medial Length
Bd: Maximum distal width
Dl: Maximum Lateral thickness
Dm: Maximum medial thickness

Table. 4: *Measurements of astragalus (in mm)*

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