Somnath Revisited: Results of the Recent Archaeological Excavation of an Early Historic Coastal Settlement at Somnath, District Gir Somnath, Gujarat

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***Abstract**: Somnath, located to the south east of Veraval port on the Saurashtra coast of Gujarat is identified from textual sources as a major Hindu pilgrimage centre and a port settlement since the medieval times. However very little is known about its cultural history prior to this period although a Chalcolithic settlement was unearthed on the bank of the river Hiran. 4 kms inland, the recent archaeological explorations and excavation revealed the presence of an Early Historic settlement at Somnath close to its river mouth. Here are discussed the excavation findings which included ceramics, terracotta objects, arecanut, stone and glass beads. The recovered bioarchaeological remains (animal bones, molluscan shells, phytoliths and diatoms) have helped in reconstructing the faunal economy, shell working and the local environment during the Early Historic period.*

Keywords: Early Historic, Excavation, Somnath, Miliolite, Marine Estuarine, Molluscs, Phytolith

Introduction

Somnath, a densely inhabited coastal town located to the south east of Veraval port on the Saurashtra coast of Gujarat is famous for its iconic Shiv temple and a popular tourist destination (Rajyagor 1975) (Figure 1). Commonly referred to as SomanthPatan/ Prabhas Patan, it is identified from textual sources as a major Hindu pilgrimage centre and a port settlement since the Medieval period (Thapar 2004). It has achieved major historical prominence due to its invasions by Sultan Mohammad Gazni in 1026 AD which destroyed its shore temple. Archaeologically the coastal region in and around Somnath has yielded structural remnants of temples, mosques, sculptures, step wells,

numismatic and inscriptional evidences which are datable to the early to late Medieval period (Thapar 2004). The ancient Shiv temple at Somanth over which the new one was built in the 1950's is not earlier than the tenth century AD. The overall evidence thereby suggests that much of Somnath's past cultural history is of the medieval period. However discovery of a pre-Harappan phase in the 1970's excavation carried out on the banks of the river Hiran fairly inland indicates the considerable antiquity for the first agricultural settlements in this region.

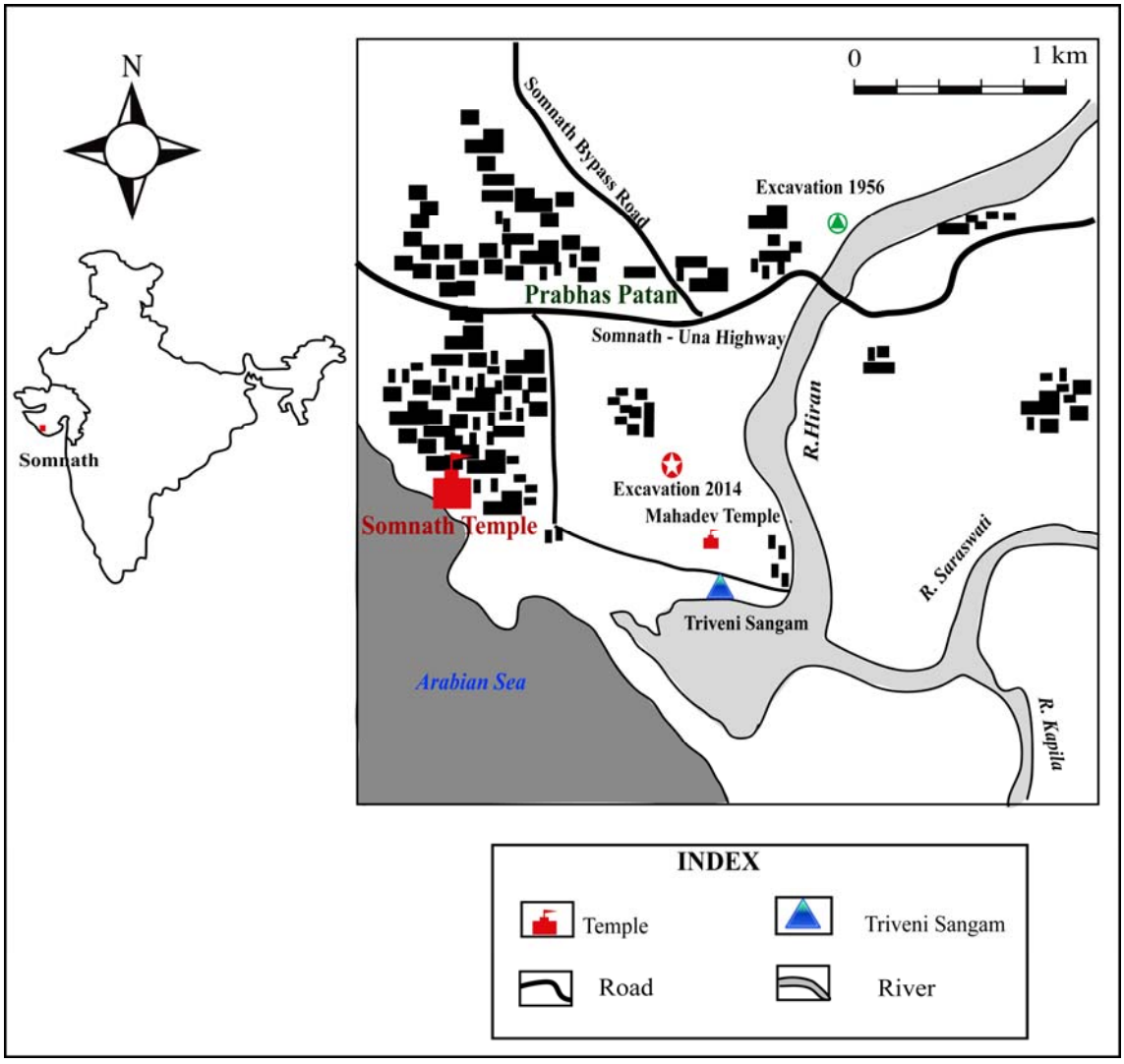

Figure 1: Map of Somnath Showing Location of Recent and Old Excavated Site

Hence in order to learn more about Somnath's past cultural history, the coastal region in and around Somanth was surveyed and a small scale excavation was carried out. (Deshpande-Mukherjee 2011; Deshpande-Mukehrjee and Deo 2013; IAR 2010-11, 11-12, 12-13). The main objectives were 1. To look for archaeological evidence predating the medieval period, 2. Its documentation from surface, and in stratigraphic context, 3. To recover bioarchaeological remains for environmental reconstruction and 4. To determine the chronology for the excavated finds using AMS dating. The excavations

revealed the presence of an Early Historic settlement at Somnath and here are discussed its findings which include ceramics, terracotta objects, beads, and shell bangles. In addition the recovered animal bones, molluscan shells, phytoliths and diatoms, have helped reconstruct the faunal economy, shell working and to a certain extent the local coastal environment during the Early Historic period.

Previous Archaeological Research

The earliest accounts of the archaeological remains from in and around Somnath were given by Burgess in 1869 and Henry Cousens (1926 & 1931) of the monuments like the sun temple on the banks of the Hiranya at SomnathPatan and Sutrapada. It was HiranandaSastri's explorations conducted in the1930's which for the first time helped recover pottery at Prabhaspatan, MulDwarka, and Sutrapada (Sastri 1936; 1938). One of the first excavation carried out at Somnath was in 1950 by B.K. Thapar from the Archaeological Survey of India to reconstruct the various phases of rebuilding the old temple that underwent since the tenth century AD (Munshi 1951 and Shastri 1974). The excavation was done very close to where the modern temple stands today and besides architectural evidence it had also yielded inscriptions in Brahmi and ceramics of the red polished ware (Munshi 1951). Apart from this excavation no detailed exploration or excavations were undertaken at Somnath since then.

It was Shastri's discovery of pottery at Prabhaspatan in the 1930's which prompted both Subba Rao and P.P. Pandya to carry out excavations in 1956 at PrabhasPatan (20° 45′ N 70° 29′E) on the right bank of river Hiran around 4 km inland from the present day Somnath Patan town (IAR 1955-56) (Figure 1). Excavations were resumed here in 1957 by the government of Bombay with which the state had merged. The excavation revealed 5 cultural periods of which identification of the Chalcolithic period was of considerable significance (Nanavati et.al. 1971).

PrabhasPatan was once again excavated between 1971-77 by M.K. Dhavalikar and Z.D. Ansari from Deccan College, PGRI, Pune with the Gujarat State department (IAR 1972, 1976 &1977). The three seasons of excavations (1972, 1975 and 1976) also yielded 5 periods of occupation of which identification of a Pre Harappan phase was a major discovery (Dhavalikar and Posshel 1992). Till date on this particular coast this is the only major excavated Chalcolthic/Harappan site. Unfortunately in the absence of a published excavation report, very little information regarding the excavations and its finds is available Besides these archaeological explorations in the areas around Somanth were also carried out to look for protohistoric sites (Rao *et.al* 1992; Gaur and Tripati 2006; Ajitprasad et.al 2011). Underwater explorations carried out by the National Institute of Oceananagraphyin front of the shore temple revealed medieval stone anchors (Gaur *et.al* 2008).

Archaeological Explorations and Excavation at Somnath

In recent times rapid developmental activities within Somnath town due to construction, tourism, etc. are exposing ancient pottery, shell debitage, etc. In 2009

these activities helped expose a long sand dune section on the Somnath beach below the modern temple and a few exposed sections within the town. Since the dune section could not be excavated, section scraping revealed a deposit of the medieval period with ceramics and considerable amount of animal remains. Ceramics comprised Red ware, Coarse Black ware and Medieval glazed ware. Animal remains belonged to cattle, pig, marine fish and molluscs. Soil phosphate analysis and fluorine dating of the bones indicated a late Holocene period. (Deshpande-Mukherjee and Deo 2013). Explorations carried out in the vacant land behind the Somnath trust office, parking lot and Rudraeshwar temple yielded a good amount of Red polished ware sherds (Figure 2), shell bangle fragments, sawn shell fragments of *Turbinellapyrum*, marine shells (Figure 3), terracotta figurine, stone net sinkers and a few fragments of Chinese porcelain. A piece of lustrous red ware was also found on the surface (V.S. Shinde personal communication) (IAR 2012-13). Although no structural evidences for an ancient port was found, others such as temples, step wells, sculptures, stone and copper plate inscription indicated the existence of a medieval coastal settlement.

Figure 2: Red Polishesd Ware Sherds Found on Surface Close to the Excavated Site

As it was not possible to excavate close to the modern temple due to security reasons and the densely inhabited area, the site selected for excavation was at an elevation of 22m (at GPS location N 20° 53'.432 min and E 070° 24.677min) overlooking the ancient miliolite quarry around 2 km inland from the coast. Here a fairly well preserved habitation deposit of nearly 2.5 m was available for excavation (Figure 4).

Figure 3: Shell Debitage of *Turbinellapyrum* from Surface Close to Excavated Site

Figure 4: Site Location on the Miliolite Outcrop at Somnath

The entire surrounding area belonging to the Somnath Temple trust is covered mostly with acacia shrubs, not inhabited and no agricultural activities are carried out. The river Hiran runs roughly at right angles to the excavated site about 2 km away. Local quarrying of the miliolite which forms the basal rock in the region during the late

medieval times has given rise to an undulating landscape. It is here that surface surveys carried out in 2011 and 12 revealed red polished ware sherds, shell bangle fragments, etc. on top of the undulating mounds and in the areas below between the quarried rocks. These were transported from the overlying miliolite surface due to erosion. The surface survey revealed that an appreciable habitation deposit had overlain the miliolite in most of the area.

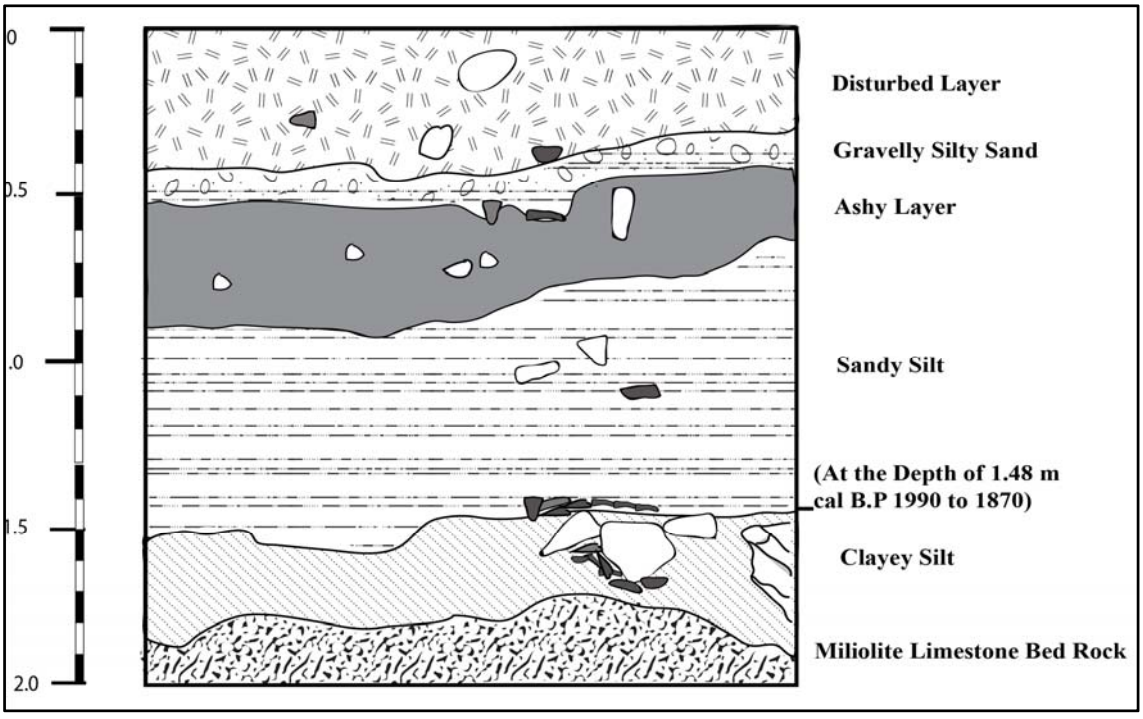

Figure 5: East Facing Section in the Excavated Trench SMT 1 at Somanth

A 2 x 2m trench designated as SMT 1 was laid out, initially mostly pottery fragments, calcrete nodules, pebbles, burnt brick fragments and root lets were recovered. The soil was mostly coarse sand greyish in colour containing marine shell fragments. At a depth of 113 cm an ashy patch was seen in the SW and SE corners, while in the NE corner a lime plastered floor was observed (Figure 5). An intact circular pot with a lid having a spout in the centre was found at the northwest corner at a depth of 137cm. A wall of dressed miliolite blocks going from NW to SE quadrant was exposed at a depth of 158cm having black soil as the binding material. Miliolite is a commonly occurring rock type in the region. A hearth containing ash made of three flat standing rectangular fired mud bricks having a size of 26x20x10 cm was found placed next to the wall (Figure 6). These bricks have semi concentric lines on their surface. Digging continued and the wall was traced further down. At a depth of 200 cm the miliolite bed rock was encountered following which digging was stopped. A black and red ware sherd was recovered from below the wall in the final dig.

From the excavation, antiquities, pottery fragments, animal bones, molluscan shells, charcoal, soil samples, were recovered from all the digs. The analysis of pottery, animal

bones and shells was carried out at Deccan College, Pune. One charcoal sample was submitted to Beta laboratory, Florida for AMS dating. While a study of botanical remains is in progress, the extraction and analysis of Phytoliths and diatoms was done with the help of the Phytolith Research Institute, Pune.

Figure 6: Exposed Miliolite Wall and Hearth in the Excavated Trench SMT 1

Chronology

Thechronology for the excavated trench SMT 1 was based on the following considerations:

1. Stratigraphy
2. Typology of the ceramics and antiquities
3. AMS dating of charcoal sample

Stratigraphy

Based on the stratigraphy of the deposit excavated , it is a single culture deposit belonging to the Early Historic period overlying an iron age level since a black and red ware sherd was found in the lowest level at a depth of 200cm.

Typology of the Ceramics and Antiquities

The major ceramic type found in the excavated pottery assemblage is that of Red slipped ware, while very few Red ware and Black-and-red ware sherds were found in

the lowermost level of the deposit. A comparative study with the ceramics from Nanavati et.al's 1971 report broadly confirms c. 1st century BCE to 2nd century CE period for the ceramic assemblage of this excavation. In addition the areca nut beads found in the excavation and polished red ware sherds from surface also suggests an Early historic period for the site.

AMS **Dating of Charcoal Sample**

A charcoal sample from dig 14, depth 148 cm was dated by AMS dating, a date of 1970 +/- 30 BP (Cal BC 40 to AD 80 (Cal BP 1990 to 1870) was obtained. Based on these the habitation deposit at SMT1 is identified as belonging to the Early Historic period.

Antiquities

A total of 36 objects made of terracotta, shell, stone, bone and glass were recovered (Table 1).

Table 1: Depth wise distribution of various objects found in trench SMT 1

Dig	Depth in cm.	Shell bangles	Areca nut Bead TC	Toy cart wheel TC	Stone object	Bead glass	Glass	Stone bead	Tc figurine Object	Bone point	Iron	total
1	0-20	5	_	_	_	_	_	_	_	_	_	5
2	20-28	_	_	_	_	_	_	_	_	_	1	1
3	28-45	3	_	_	_	_	_	_	_	1	_	4
4	45-53	1	_	_	_	_	_	_	_	_	_	1
5	53-62	_	_	_	_	_	_	_	1	_	_	1
6	62-72	2	_	_	_	_	1	_	_	_	_	3
7	72-86	2	1	_	_	1	_	1	1	_	_	6
8	86-92	1	1	_	1	_	_	_	_	_	_	3
9	92-106	_	_	1	_	1	_	_	_	_	_	2
10	106-113	2	_	_	_	1	_	_	_	_	_	3
11	113-125	_	1	_	_	_	_	_	_	_	_	1
12	125-130	1	_	_	_	_	_	_	_	_	_	1
13	130-137	_	_	_	_	_	_	_	_	_	_	_
14	137-148	_	_	_	_	_	_	_	_	_	_	_
15	148-158	_	_	_	_	_	_	_	_	_	_	_
16	158-164	_	_	_	_	_	_	_	_	_	_	_
17	164-174	2	1	_	_	_	_	_	_	_	_	3
18	174-186	_	_	_	1	_	_	_	_	_	_	1
19	186-195	_	_	_	_	_	_	_	_	_	_	_
20	195-198	_	_	_	_	_	_	_	_	_	_	_
_	_	20	4	1	1	3	1	1	2	1	1	36

Terracotta Objects

a. A torso of an animal figurine probably a bull with head and limbs missing was found in dig. 7, depth 72-86 cm.

b. A terracotta cart wheel from dig 9, depth 92-106 cm quite similar to the one found at Nagara Type 1(a well-made wheel with one concave or flat side and the other side is convex. On this side the hub is well worked with the hole carrying the axle was perforated in wet clay (Mehta 1968) (Figure 7).

Figure 7: Terracota Wheel Found in Excavated Trench SMT 1 at Somanth

Beads

Eight beads made from glass (3), terracotta (3) and stone (2) were recovered from the excavated trench.

Glass: (1).Dig 7 – A deep cobalt blue colour glass bead, rectangular in shape with a line etched on its centre. It has 4 rectangle sides and the corners have facets. Total 16 facets are seen on the bead. The 8 facets on both the sides makes a square base with a cylindrical drill hole in the centre. The bead is similar to (bead type I, by Deo: 2000). (2).

Dig 9 - Black round glass bead and (3).Dig 10 - Deep cobalt blue colour glass bead, rectangular in shape (Deo: 2000, 69) with two wavy lines etched on the centre of the bead (bead type I, Deo: 2000, 18). The bead has 4 rectangle sides and the corners have facets. The 8 facets on both sides makes a square base with a cylindrical drill hole in the centre.

Terracotta:(1) Dig 11 - Terracotta Arecanut bead with a squat shape and slightly truncated at the top (Figure 8), (2) Dig 11 - Terracotta Arecanut bead with one incised line on the belly of the bead. It has Barrel shape top and flat base and (3) Dig 17 - Terracotta Arecanut bead with two incised lines on the belly of the bead with flat base and barrel shape at the top.

Stone: (1) Dig - a small circular stone bead of chalcedony and (2) Dig 7 – a tubular carnelian bead.

Figure 8: Arecanut Beads Found in Excavated Trench SMT 1 at Somanth

Bone Point

A double ended point was found at a depth of 28-45cm.

Shell Bangles

15 bangle fragments made from *Turbinellapyrum*, mostly plain lacking decorations were recovered (Figure 9).

Pottery

The pottery predominantly consists of red ware and red-slipped ware. Both kind of fabrics, fine and coarse, appear to have been used for making pottery. Majority of the assemblage is well fired. Burnishing and polishing treatments are not that frequently observed as rim sherds without any treatment are often registered more than 90

percent in different digs. The available pottery forms at the site include bowl, basin, pots, storage jars and lids. Some of the frequently occurring types are illustrated in (Figure 10). Red ware 'V' shaped bowls, a characteristic feature of Early Historic period, were recovered in good number from the trench (Figure 11). Bowls featuring convex or straight sides and thickened internally in upper part with simple round rim (Figure 10. 1) were also commonly found. This form is reported in Nanavati*etal*.'s 1971 report in Period IV, dated from beginning of Christian era to 6 century CE. Another important type, (Figure 10.7), is one of the diagnostic type of 1st and 2nd century CE in Maharashtra. Findings of this type at Somnath has important chronological implications.

Figure 9: Shell Bangles Found in Excavated Trench SMT 1 at Somanth

Black-and-red ware was found only from the lowermost levels - below 1.86 m of the trench (Fig. 10: 13), (Figure 12). Total five sherds were recovered, one of which is a rim sherd of a bowl, a form regularly recovered in this ware. This ware is reported from approximately middle of the last millennium BCE to the beginning of Christian era (Nanavati *et*. *al*. 1971: 56-57; IAR 1971-72: 13).

Faunal Remains

A total of n=2119 animal skeletal elements were recovered from trench SMT1 comprising bones, teeth, horn core and molluscan shells. These were recovered during excavations by handpicking and sieving at the end of every dig showing good preservation but externally encrusted with calcrete. The Faunal analysis at the

Archaeolozoology laboratory, Deccan College, Pune, involved cleaning, recording, identification and taphonomic observations. Both the vertebrate and invertebrate remains were studied separately. Bone identification to species level was attempted through comparison with the modern reference skeletal collection housed in the laboratory as well by referring to Schimd (1972). Shell identification was carried out by referring to Deshpande (1995) and Apte (1998).

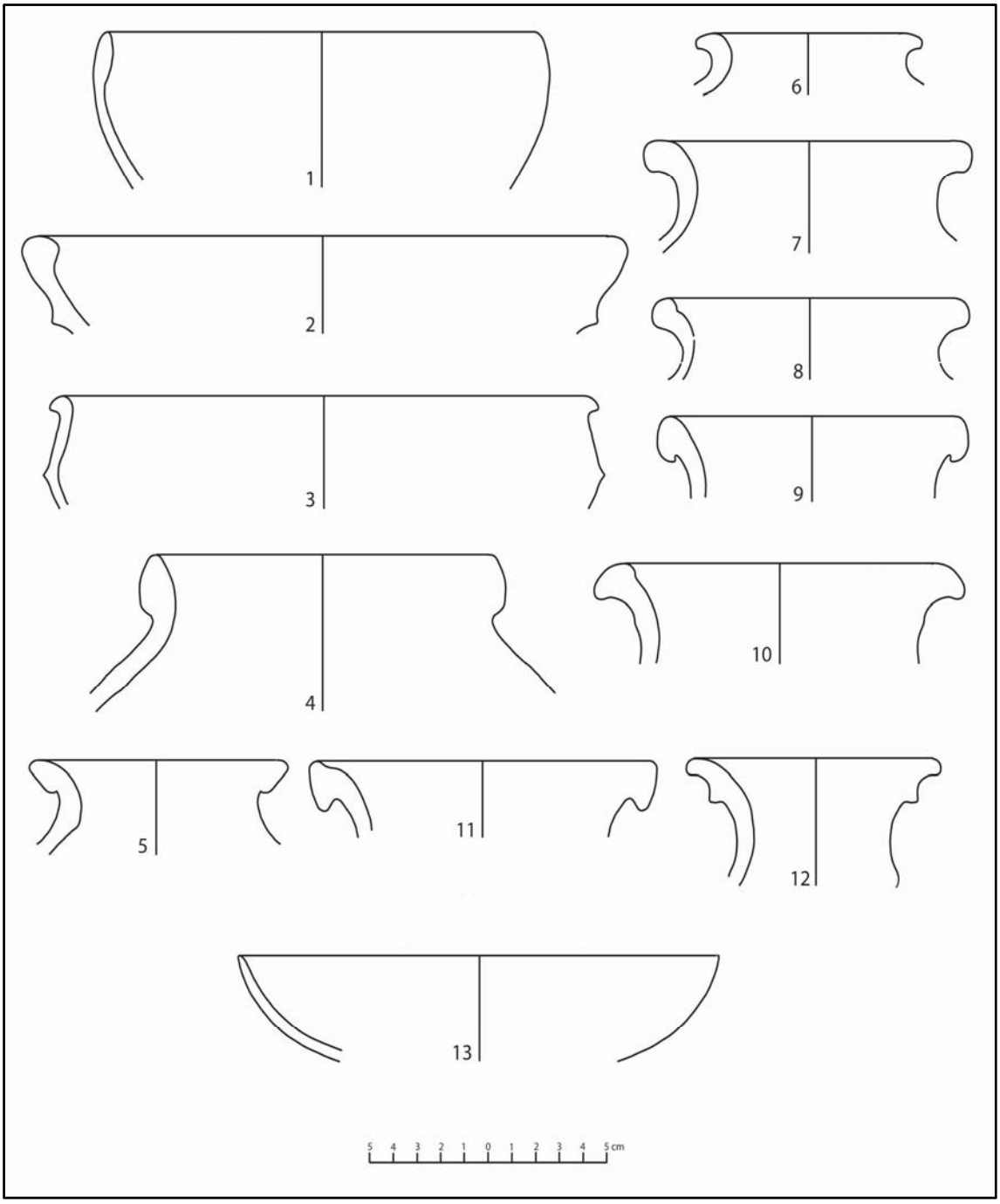

Figure 10: Plain Red Ware and Black and Red Ware Found in Excavated Trench SMT 1 at Somanth

Figure 11: Plain Red Ware Bowl

The detailed faunal analysis revealed a variety of animals belonging to the following classes mammals (n=253), birds (n=3), reptiles (n=1), fish (n=24), reptile (n=1), and Molluscs (n=1303) (Table 2) (Neha 2015). As compared to vertebrate remains, molluscan shells are found in large number accounting for 82% of the total assemblage. Among vertebrate remains, from n=816 bones, only 325 bones were identifiable indicating the high degree of fragmentation. A majority of the bones display ancient breakages, cut marks which were due to human related activities in the past. Appreciable number of bones were obtained from the middle depths (125-186cm) while maximum number of bones were recovered from the depth of 130-137cm. (n=40). In the total assemblage **(**n=253) ie 16%belonged to Mammals of which n=223 ie. 81% belonged to domestic and n=16, ie. 6% belonged to wild.

Domestic Mammalsidentified are cow/oxen (*Bosindicus*), buffalo (*Bubalusbubalis*), Goat (*Capra hircus*), pig (*Susdomesticus*) and dog (*Canisfamiliaris*). A majority of the bones were collectively identified as cattle *(Bosindicus/ Bubalusbubalis)* (B/B). n=64 as their separation was not possible due to the loss of their skeletal markers because of

fragmentation. These comprised mostly ribs, long bone shafts and a few vertebrae. The cow/oxen *(Bosindicus)* n= 63 could be identified for almost all its skeletal parts. A proximal femur head has a deep cut mark (Figure 13). A second phalanx has a clear cut mark which indicates butchering activity. A few unfused bones of ulna and radius were found indicating a young individual. The height at withers calculated using the medial length of astragalus measurement (Zalkin1960) (dig 14 depth 137-148 cm) was 100.63cm. The presence of buffalo *(Bubalusbubalis) (n=6)* was identified from parts ofulna, vertebrae, femur, patella and an astragalus.

The domestic goat *(Capra hircus) (n*= 13) was identified however about (n=74) bone fragments had to be collectively identified as *(Capra hircus/Ovisaries)* due to their similarity in morphological characters and size. The high rate of fragmentation made it difficult to separate to the species level. Similarly certain bone fragments were further grouped as small ruminants n=44. These comprised M1/M2, parts of mandible, scapula, humerus, vertebrae, ribs, pelvis, tibia and long bones. Besides these a few bones of the domestic pig *(Susdomesticus) (n*=05) and one atlas vertebra of dog *(Canisfamiliaris)*– were also recorded.

Table 2: NISP List of Animal Taxon Identified in Trench SMT 1 at Somnath

Common name	**Species**	**Abriv.**	**Family**	**NISP**
Cattle/Buffalo	*Bosindicus/Bublusbublis*	B/B	Bovidae	64
Cow/ox	*Bosindicus*	BI	Bovidae	63
Buffalo	*Bubalusbubalis*	BB	Bovidae	6
Goat/Sheep	*Capra hircus/Ovisaries*	C/O	Bovidae	74
Goat	*Capra hircus*	CH	Bovidae	10
Small ruminant	_	_	_	44
Pig	*Susdomesticus*	SD	Suidae	5
Dog	*Canisfamiliaris*	CF	Canidae	1
Chital	*Axis axis*	Aa	Cervidae	5
Black buck	*Antelope cervicapra*	Ac	Bovidae	2
Four horned Antelope	*Tetracerousquadricornis*	Tq	Bovidae	2
Wild pig	*Susscrofa*	Ss	Suidae	3
Gaur	*Bosgaurus*	Bg	Bovidae	2
Nilgai	*Boselaphustragocamelus*	Bt	Bovidae	6
Sambar	*Cervus unicolor*	Cu	Cervidae	1
Rodents	_	_	_	9
Birds	_	_	_	2
Peacock	*Pavocristatus*	Pc	Phasianidae	1
Reptile	Unidentified	_	_	1
Fish	Unidentified	_	_	24
Unidentified bones	_	_	_	491
Molluscs	_	_	_	1303
_	_	_	**Total**	2119

Figure 12:Black and Red Ware Sherd

Figure 13: Animal Remains (top row proximal cattle femur with cut mark, mandible of domestic pig and atlas vertebra of dog: bottom row: left –right astragalus of Nilgai, deer antler, distal humerus of chital)

Wild Mammalsidentified are the wild herbivores such as gaur (*Bosgaurus*), nilgai (*Boselaphastragocamelus*), black buck (*Antelope cervicapra*), chital (*axis axis*), wild pig (*Susscrofa*), four horned antelope (*Tetracerusquadricornis*), sambar (*Cervus unicolo*r) and afew rodent bones (Fig.13). All these were found mostly in the mid and lower levels in the trench, almost negligible in the upper levels. Similar animals were reported by Thomas (1977) from the Chalcolithic levels in the 1970's excavations at Prabhaspatan. However some like *Gazella gazelle, Cervusduvauceli* and *Hystrixindica* were not identified at SMT1.

Birds:A proximal part of humerus of peacock (*Pavocristatus)* was obtainedfrom a depth of 130-137cmalong with two other bone fragments which are unidentified (Figure 14).

Reptile: One cervical vertebra whose species could not be determined was found at a depth of 137=148cm.

Fish:A total n=24 tiny skeletal parts comprising spines, cranium and vertebrae were recovered which are yet to be identified. These are mostly charred and of marine origin.

Figure 14: Top row, left to right proximal humerus of peacock, fish cranium, *Meretrixmeretrix* and *Cypraea* sp. bottom row: left to right *Turbo* sp., *Conus* sp. and*Crassostreacucullata*

Table 3: NISP List of Molluscan Taxa Identified in Trench SMT 1 at Somnath

Species	Family		M/Fw/T	NISP
*Cypraea*sp.	Cypraeidae	G	M	78
Crassostreacucullata .	Ostreoidea	BV	M	269
Cerithidaecingulata	Potamididae	G	M	494
Melaniastriatella .	melaniidae	G	FW	96
Unidentified Gastropod	_	G	M	8
Turbo sp.	Turbininae	G	M	12
*Nerita*sp.	Neritidae	G	M	25
Ellobiumaurisjudae	Ellobidae	G	M	1
Zootecusinsularis .	Land snails	G	T	108
Umboniumvestarium	Trochidae	G	M	18
Land snail unidentified	Camaenidae	G	T	9
*Trochus*sp.	Trochidae	G	M	1
Acantho cardia lata	Veneridae	BV	M	2
Paphiagallus	Veneridae	BV	M	1
*Dosnia*sp.	Veneridae	BV	M	4
MeretrixMeretrix	Veneridae	BV	M	3
Conus sp.	Conidae	G	M	5
Telescopium telescopium	Potamidae	G	M	3
Thais sp.	Muricidae	G	M	2
Limpet sp.	Patellidae	G	M	1
Marine Bivalve unidentified fragments	_	_	_	49
Placuna placenta	Anomidae	BV	M	1
Unidentified shellfrg.	_	_	_	113
_	_	_	Total	1303

G: gastropod, BV: bivalve, M: marine, FW: freshwater, T: terrestrial

Molluscs: Molluscan shells (n=1303) showing good preservation were recovered from all depths excepting the last dig 20 (Table 3). Most of the shells range in size from small to medium and in general show no traces of human modification such as perforations, abrasion, charring etc. These belonged to terrestrial, freshwater and marine habitats. The following molluscs were identified terrestrial gastropod (2), freshwater gastropods (1), marine gastropods (14) and marine bivalves (7). It is observed that in the total assemblage 66.30% comprise marine gastropods, 23% marine bivalves and the rest were fresh water and terrestrial gastropods.

Terristrial/Land Gastropods: A total number n=108 shells of *Zootecusinsularis* were identified of which (n=92) were recovered from dig 18. These land snails are small in size having thin shells. 9 complete shells were found but have yet to be identified.

Freshwater Gastropods: The only fresh water molluscs identified are the small gastropod shells of *Melaniastriatella*(- 96) which were found at all depths.

Marine Estuarine Molluscs: Majority of the molluscs are of marine estuarine origin. Gastropods are most common as compared to the bivalves. The maximum occurrence is that of the small gastropod *Cerithidaecingulata (*n= 494) commonly found in intertidal mudflats which were found throughout the deposit. The other commonly occurring gastropods are *Cypraea*sp. (n=78), *Nerita* sp. (n=25), *Turbo* sp. (n=12), *Umboniumvestarium* (n=18), *Conus* sp. (n=5). A few bivalves were identified belonging to *Meretrixmertetrix, Crassostreacucullata, Acanthocardialata, Paphiagallus*, etc. (Figure 14).

Phytoliths and Microfossils (Diatoms)

Phytoliths are microscopic silica bodies that precipitate in and around cells in many plants. When plant tissue decompose, the silica is deposited in the soil, forming a record of past vegetation. Analysis of phytolith assemblages in soils has shown to be excellent tools for reconstructing overall vegetation type (e.g., forest vs. grassland) (Piperno 2006).

While Diatoms are photosynthesising algae, having a siliceous skeleton (frustule) and are found in almost every aquatic environment including fresh and marine waters, and soils, Being autotrophic they are restricted to the photic zone (water depths down to about 200m depending on clarity). Both benthic and planktic forms exist. Diatoms are commonly between 20-200 microns in diameter or length, although sometimes they can be up to 2 millimeters long. These may occur in such large numbers and be well preserved enough to form sediments composed almost entirely of diatom frustules (diatomites). Diatoms are differentiated between forms that are centric, i.e. circular, and pennate, i.e. having bilateral form.

An attempt was made to extract phytoliths and microfossils (diatoms) from soil samples taken from section facing east (Table 4). One soil sample was also taken from the brick enclosure (hearth) in dig 18, depth 174-186cm.

Basic Methodology

The extraction of phytoliths was undertaken in the laboratory at the Phytolith Research Institute, Pune by using standard methods with removal of carbonates and nitrates followed by heavy density separation (Piperno 1988). Slight modifications were required at times depending on the nature of the sediment type. Up-to 200 Phytoliths from each sample were observed and counted so as to generate a quantified data. Observations were also made on the physical character of phytoliths at times so as to get an idea about its general preservation condition.

The classification used for phytolith analysis is a combination of – phytolith shape, anatomical origin and classification based on grass families. This is a common practice of classification used by most scholars. Diatoms were also observed along with Phytoliths under,, Olympus‟ research microscope and photomicrographs were taken under 45 x magnifications.

Table 4. Identification of Phytoliths and Microfossils inTrench SMT1 at Somnath

Sample No	Depth	Level	Description
1	**110-115**	**Upper**	Panicoid dumbbells are reduced in number in this upper level. Chloridoid and Festucoidphytoliths (Gramineae) increase in number as compared to Lower and Middle level. Trichomes are indicated with a prominent rise and sudden low frequency in the upper levels. While elongate and Trichomephytoliths increase in frequency. Diatoms are found intact (un-fragmented) in large numbers. Phytoliths were slightly occluded in nature and well preserved.
2	**125-130**	**Middle**	The middle level is predominated with a sharp peak of trichomes (Panicoid/ Andropogonoid/ Triticum) and Elongates, with a decrease in panioidPhytolithmorphotypes (Gramineae), however there is an increase in chloridoidphytoliths (Gramineae) as compared to lower level. Frequency of dicotyledonous woody elements decrease in this zone. Diatoms start appearing from this zone which are preserved as fragments. Phytoliths are mostly well preserved.
3	**150-155**	**Lower**	Multiform phytoliths were observed in the lower level of SMT site. This level indicates a sharp peak of short Panicoid dumbbell (Gramineae/ Panicum) type phytoliths, Festucoidphytoliths of small square and rectangular types also show a prominent peak. The concentration of Trichome (Panicoid/ Andropogonoid), bulliform rectangular types (Euphorbiaceae) and silicified woody elements are also dominantly present. In this zone Diatoms are low as compared to other zones. Phytoliths are mostly well preserved and occasionally blotchy in appearance.
4	**Dig18, 174-186**	**Hearth Ash**	Multiform phytoliths were observed in this ash sample. This sample indicates a sharp peak of Bulliform (Gramineae/ Panicum) type phytoliths, Festucoid and Elongate phytoliths show a prominent peak. The concentration of Trichome (Panicoid/ Andropogonoid) is low. Bulliform rectangular types (Euphorbiaceae) and silicified woody elements are also dominantly present.

Different Phytolithmorphotypes were noted that included subtypes within each group and were grouped as follows:

- Panicoid (e.g. dumbbells)
- Chloridoid (e.g. saddles)
- Festucoid (e.g. spherical, square)
- Elongate (e.g. Rods and tracheids)
- Trichome (e.g. epidermal hairs)
- Bulliform (e.g. bulky phytoliths like fan shape)
- Silicified cells (e.g. w oody elements)

Other notable microfossils noted include:

- Diatoms

Phytoliths observed from each sample were compared with the in house Phytolith Database of Phytolitharium collection housed at the "Phytolith Research Institute" and other published reference. The phytolithmorphotypes based on their anatomical origin and structural character suggest the presence of the following vegetation in the observed samples(Table 5).

Table 5: Past Vegetation Identified in the Observed Soil Samples from SMT1

Phytolith Type	**Family/ Genus**	**Diagnostic Level**	**Classification/ Remarks**
Rods straight	Acanthaceae	Family	Elongate
Spherical/circular Plain	Amaranthaceae	Family	_
Pointed bulky	_	Family	Trichome
Long pointed hair	Burseraceae/ Fabaceae	Non diagnostic	Trichome
Solid bulky spherica	Cannaceae	Family	Festucoid
Square facetted	Chloranthaceae/ Gramineae	Family	Bulliform
Circular plain	Chrysobalanaceae	Family	Festucoid
Rectangular facetted	Euphorbiaceae	Family	Bulliform
Blunt points	Gramineae/ Triticum	Family	Trichome
short shaft dumbbel	Gramineae/ Panicum	Family	Panicoid
Saddle	Gramineae	Family	Chloridoid

It is observed that the phytolith preservation from SMT 1 show a multiform Phytolith distribution from the lower to upper levels of the profile. The Phytolith proxy infers that the vegetation was stable at lower levels; here the short grasses indicate cool and dry climate which was suitable for the growth of small shrubs and trees of dicotyledonous type as indicated by siliceous woody elements. From Middle level onwards we find a predominance of Festucoid short grasses as well as Trichomephytoliths indicating fluctuations of dry and cool climate dominated by

Panicoid/ Andropogonoid/ Triticum species. As compared to lower and Middle level, the Upper level indicates a comparatively low frequency of overall Phytolithmorphotypes indicating a reduction of vegetation coverage. However it should be noted that the presence of other microfossils such as pennate diatoms from fresh water appear from the middle level.

Phytoliths from the ash sample could be used as an "index" in future studies for mapping phytolith assemblage found in the SMT site and understand the man –land relations and the plants exploited.

Discussion

The identification of an Early Historic settlement at Somanth is significant since till date mainly evidence related to the Medieval period is available from this particular site. Also very few Early Historic sites excavated in Gujarat have provided absolute dates. Its comparison with the radiocarbon dates from Dwarka (1640+-90AD) (Mate and Ansari 1966) and Nagara (1945+-90) (Mehta 1968) suggests that these sites were more or less contemporary and probably had trade contacts with each other. This is reflected in the similarity in their cultural remains such as red ware, red polished ware, animal figurines, terracotta toy cart wheel, areca nut beads and shell bangles. The excavation revealed a habitation deposit close to the mouth of the river Hiran, in which a wall made using miliolite stone blocks and hearth made of fired bricks was exposed indicating an ancient habitation structure. The wall was laid out on the surface of the miliolite which formed the base of the habitation deposit. Unfortunately due to the small scale vertical excavation, the structures could not be further traced horizontally and it was difficult to estimate the size of the settlement. However from the recovered cultural material it was possible to infer some of the activities carried out by the site inhabitants such as domestic, animal exploitation, shell working and to a certain extent their local environment.

The occurrence of ceramics in different shapes suggests their use in domestic related activities for storage, serving, cooking, etc. Since botanical remains are yet to be analysed, it is not known what kind of plant foods were eaten or grown by the inhabitants. The faunal study however shows the exploitation of mostly domestic animals such as cattle, goats and pigs amongst which the use of Caprids (sheep/goats) was more. All these animals were utilised for food purpose as well as for obtaining secondary products like milk, dung, etc. Further the bones, antlers, horns discarded after meat extraction were modified into bone points. Butchering activity using sharp iron blades or knives for meat extraction is evident from the deep cut marks observed on some of their bones. Presence of the domestic dog is noted. Hunting of wild fauna such as gaur, nilgai, wild pig, spotted deer, sambar, etc. was also carried out probably from neighbouring areas such as the Gir forest located 48 km from Somnath. This was done for supplementing the food economy as well as for acquiring their antlers, horns, etc. Fewer bones of these animals as compared to cattle probably suggests that only partial skeletal parts were brought to the site post hunting.

In spite of Somnath's coastal location, limited evidence is available for the exploitation of aquatic resources such as fish and molluscs. Fish remains constituted only 2% of the total faunal assemblage indicating fishing to be a minor activity. The finding of an unbarbed iron fish hook in the Iron Age levels by Nanavati et.al (1971) has helped trace this activity to the early part of the first millennium in this region. Hence It is quite likely that by the Early Historic period both fishing in the river Hiran and sea was in practice. Incidentally large marine fish vertebra were recorded in the sand dune section on the beach belonging to the Medieval period. Similarly molluscs, although as many as 21 species are recorded only a few such as the rock oyster *Crassostreacucullata* and turban shell *Turbo* sp. were collected as food by the site inhabitants. Today these are found attached to rocks in the intertidal zone and are collected at low tide when the rocks get exposed along the Somanth- Dwarka coast (personal observation). Whereas the others were accidentally introduced due to either natural or anthropogenic factors.

At Somnath although no shell debitage was recovered from the excavation however shell working was revealed through the finding of many sawn shell fragments belonging to the large marine gastropod shell *Turbinellapyrum.* These were found on the surface around the site along with red polished ware sherds. During the Early Historic period, shell bangle manufacture was a commonly carried out craft activity as recorded at Nagara (Mehta 1968), Amreli (Rao 1966), Hathab (Pramanik 2004), BetDwarka (Gaur et.al 2005), etc. It was probably through contact with contemporary sites like Dwarka located close to the source area of *Turbinellapyrum*ie the Gulf of Kachchh that shells were procured. Previously shell working was also reported in the Nanavatiet.al's (1971) excavation however no detailed information is available.

A preliminary reconstruction of the local environmental conditions was attempted from the faunal, phytolith and diatom evidence recovered. Among the fauna, identification of wild herbivores such as spotted deer, sambar, wild pigs, indicate an open grassland type of landscape. This is supported by the phytolith evidence which shows that the vegetation was stable in the early levels, the climate being cool and dry was favourable for the growth of small shrubs and trees of dicotyledonous type. The occurrence of the land snail *zootecusinsularis* in the lower levels is also indicative of dry arid climate. Phytoliths from the middle levels have indicated fluctuation in cool and dry climate which was followed by their reduction in the upper levels. This is attributed to a decrease in vegetation cover. The diatoms of freshwater origin were absent in the lower levels but appear from the middle level onwards.

The molluscan shell remains helped in identifying the areas from where they were derived as well as the coastal environment. A majority were identified as marine estuarine in origin and were sourced from the rocky intertidal areas and mudflats. Rock dwelling molluscs such as *Turbo* sp., *Conus*sp, *Cypraea*sp, *Thais* sp., *Nerita* sp., *Crassoastreacuculata* were from open rocky intertidal areas along the coast where they are found even today. Whereas the bivalves *Paphiagallus*, *Meretrixmeretric*, and

gastropods*Cerithidaecingulata, telescopiumtelescopium, Elobiumaurisjudae* belonged to estuarine mudflats close to the river mouth,. Today the mouth of the river Hiran has been intentionally blocked to prevent the freshwater from flowing into the sea. Hence some of these molluscs are no longer found. However prior to this probably as late as the medieval period, the water in its lower reaches and at the mouth was brackish which helped support these molluscs. Past brackish conditions of the river Hiran near its mouth probably helps explain the near absence of freshwater molluscs at the settlement in spite of its proximity to it. A more detailed analysis in the near future of soil, molluscan shells andphytoliths is hoped to provide insights into the past coastal environment at Somanth.

To conclude the small scale excavation has shown the occupation of the coast at Somnath during the early part of the Christian era by a settlement engaged in cattle/sheep goat pastoralism, hunting, fishing, shell working and probably trade with other neighbouring early historic sites. It is from this period onwards that Somnath due to its coastal location, a fertile black cotton soil, trade and an agropastoral economy probably developed into an important port during the Early Medieval period.

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References

Ajithprasad, P., S.V. Rajesh and Bhanu Prakash 2011. Archaeological explorations in the Saurashtra coast of Junagad District, Gujarat. In Ocasional papers 10 Linguistics, Archaeology and the Human past (Toshiki Osada and AkinoriUesugi Eds.),pp. 27-70. Japan: Research Institute for Humanity and Research.

Ansari, Z.D. and M.S. Mate 1966. *Excavations at Dwarka 1963*. Deccan College, Pune.

Apte, D. 1998 *The Book of Indian Shells*. Bombay Natural History Society. Calcutta: Oxford University Press.

Burgess, J. 1869. *Notes on a visit to Somanath, Girnar and other places in Kathiawad*, Bombay.

Cousens, H. 1931. *Somnatha and other Medieval Temples in Kathiawar*, ASI , Vol. XIV. Calcutta.

Cousens, H. 1926. The *Architectural Antiquities of Western India*. The India Society, London.

Deshpande, A, 1995. Application of Molluscan Studies in Archaeology with Special Reference to Western India. Unpublished Ph.D dissertation, Pune University.

Deshpande-Mukherjee A. 2011. Archaeological investigations on the Somnath coast, district Junagad, Gujarat. Unpublished Report submitted to Nehru Trust, New Delhi.

Deshpande-Mukherjee, A andSushamaDeo. 2013. Archaeological Investigations on the Somnath coast, district Junagad, Gujarat: A Report (2010-11): Bulletin DCPRI. 72-73: 193-212 .

Dhavalikar, M.K. and G.L.Possehl 1992. The pre-Harappan period at PrabhasPatan and the Pre-Harappan Phase in Gujarat. *Man and Environment XVII (1)*:71-78.

Gaur, A.S. Sundaresh and VardhanPatanka 2005. Ancient shell industry at Bet Dwarka Island. Current science VOL. 89, NO. 6: 941-946.

Gaur, A.S., andSilaTripati 2006. Marine Archaeological Explorations on the South Western Coast of Saurashtra, India. *Journal of Indian Ocean Archaeology* 3: 81-89.

Gaur, A.S., Sundareshand K.H. Vora 2008. Underwater archaeology of DwarkaAndSomanth (1997-2002). New Delhi: Aryan Book International.

Gaur, A.S.,Sundaresh,SilaTripati, P. Gudigar and S.N. Bandodkar 2001-2002. Saurashtra Stone Anchors (Ring–Stones) from Dwarka and Somnath, West Coast of India. *Purattavva*32: 131-145.

IAR *Indian Archaeology a review* 1954-55

IAR *Indian Archaeology a review* 1955-56

IAR *Indian Archaeology a review 1956-57*

IAR *Indian Archaeology a review* 1971-72

IAR *Indian Archaeology a review* 1972-73

IAR *Indian Archaeology a review* 1975-76

IAR *Indian Archaeology a review* 1976-77

IAR *Indian Archaeology a review* 1977-78.

IAR *Indian Archaeology a review* 1983-84

IAR *Indian Archaeology a review* 1999-2000

IAR *Indian Archaeology a review* 2000-2001

Mehta, R. N. 1968. Excavations at Nagara. Maharaja Sayajirao University Archaeology Series No: 10. Baroda.

Munshi, KM. 1951. *Somnath the Shrine Eternal. Bombay.*

Nanavati, J.M., R.N. Mehta and S.N. Chowdhary 1971. *Somnath 1956.* Vadodara: Department of Archaeology, Gujarat State and the M.S. University.

Neha, V. 2015. A study of Early Historic coastal faunal exploitation at Somnath, district PrabhasPatan, Gujarat. Unpublished M.A Dissertation. Deccan College Post Garduate and Research Institute. Pune.

Piperno , D. R. 2006. Phytoliths. A Comprehensive Guide for Archaeologists and Paleoecologists. ix + 238 pp. Lanham, New York, Toronto, Oxford: AltaMira Press (Rowman& Littlefield).

Piperno D R 1988. *Phytolith Analysis- An archaeological and Geological* Perspective. Academic Press. New York.

Pramanik, S. 2004. Hathab: An Early Historical Port on the Gulf of Khambat. *Journal of Indian Ocean Archaeology* Vol. 1:133 -140.

Rajyagor, S.B. 1975. *Gujarat State Gazetteers Junagad District*. Ahmedabad.

Rao, S. R. 1966 *Excavations at Amreli: A Kshatrapa-Gupta Town*. Baroda: Baroda Museum and picturegallery. Special Number of the Bulletin, Baroda.

Rao, S.R., S. Tripati and A.S. Gaur 1992. A preliminary Exploration of Prabhasa-Somanth, *Journal of Marine Archaeology* 3:13-16.

Sastri, H. 1936. Annual Report of the Director of Archaeology, Baroda State 1934-35. Baroda state press. Baroda.

Sastri, H. 1938. Annual Report of the Director of Archaeology, Baroda State 1935-36. Baroda state press. Baroda.

Schmid, E. 1972. *Atlas of Animal Bones*. Elsevier: Amsterdam.

Thapar, R. 2004. *SomnathaThe Many Voices of a History*.Penguin Viking. New Delhi.

Thomas, P.K. 1977. Archaeozoological aspects of the prehistoric cultures of the Prehistoric Cultures of western India. Unpublished Ph.D Dissertation. University of Poona.

Zalkin, V. I. 1960. *DrevniejsijeDomasnijeZivotnijeVostocnojEurpy*. Moskva.