The Neolithic Archaeology of the South west of the Kingdom of Saudi Arabia

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CHAPTER 3: THE NEOLITHIC SEQUENCES OF THE NEAR EAST AND THE KINGDOM OF SAUDI ARABIA AND A REVIEW OF THE HISTORY OF ARCHAEOLOGICAL RESEARCH IN ARABIA

3.1 INTRODUCTION

Having defined the geography of the Near East and the Kingdom of Saudi Arabia in Chapter 2, the aim of this chapter is to define a number of the core Neolithic sequences of the Near East and the Kingdom of Saudi Arabia and to critically evaluate the development of the discipline of archaeology within the Kingdom. Before commencing, however, it is first necessary to discuss some of the key models advanced to define the term Neolithic, and explain its development, within the Near East. The models range from Childe's oasis theory of 1936 and Binford's (1968) population expansion model based on post-Pleistocene adaptations, to Hodder's (2000) focus on the way in which individual communities categorised plants and animals. As a Marxist, the first of these scholars was to attempt to roughly align the concept of archaeological 'ages' with that of the economic 'stages'. He was also the first scholar to publically advocate the concept of a Neolithic 'Revolution' (Childe 1936:325), but this term has been criticised by several scholars (Helbaek, 1969), who believed that the change from food gathering to food production was largely evolutionary. Despite these criticisms, Childe was rather more flexible and held that the earliest domesticated animals and plants did not appear in one particular area, or at one point in time, but rather in different areas at different times and he warned that "The word 'revolution' must not be taken as denoting a sudden violent catastrophe, it is here used for the culmination of a progressive change in the economic structure and social organisation of communities that caused, or was accompanied by, a dramatic increase in the population affected – an increase that would appear as an obvious bend in the population graph were vital statistics available" (Childe 1950: 345). Accordingly, Childe suggested that a progressive desiccation in the Near East during the early Holocene led to the concentration of grasses, grass-eating animals, and humans around springs and oases and that this led to closer and closer relationship – resulting in domestication (Childe 1936: 77-78).

This model, also known as the Propinquity theory, was subsequently criticised by a number of scholars for the lack of supporting environmental data, including Robert Braidwood (1960). Braidwood also disliked the terms ‘Mesolithic’ and ‘Neolithic’ because of the apparent confusion in differentiating between them and preferred to distinguish between an era of ‘food gathering’ and one of ‘food producing’ (1960). He advocated that the end of the food gathering phases was marked by a ‘terminal food-gathering phase’ and that the succeeding food producing stage was divisible into many eras and phases like the ‘incipient agriculture and domestication phase’ and successive eras of ‘primary village efficiency’, ‘established village efficiency’ in an era of ‘incipient urbanisation’ (Braidwood 1960). This model of cultural evolution sought to explain the emergence of highly specialised food-collecting adapted to certain highly specialised environments and, in turn, semi-permanent and permanent sedentary communities (Braidwood 1960). Being broadly descriptive in nature, however, Braidwood's model may have considered environmental data but failed in its turn to provide a clear driver or explanation for change.

Such a driver was provided by Lewis Binford in 1968 when he argued that prehistoric populations developed until the food requirements of the group began to exceed the availability of unaltered standing crops in the local habitat. As no population could ever achieve a stable adaptation as it was continually expanding, its members would always be under strong selective pressure to develop new means of procuring food (Binford 1968). Binford thus suggested that the Neolithic arose through two main drivers; firstly, changes in the physical environment of a population, reducing the biotic mass of the region and thus the amounts of available food; or, secondly, the reduction of the biotic mass through population growth. In either of these events, the previous balance between population and standing unaltered crop was upset, and a more efficient extractive means would be favoured. Binford further suggested that if a population in the core zone of the natural distribution of particular crops and animals were forced into the edge zone with those species, adaptation or rather domestication would occur (Binford 1968: 331). For Binford, as with Childe before him, it was clear that such pressures would lead to the emergence of the Neolithic: “it is the context of such situations of strain in environment with plants and animals amenable to manipulation that we would expect to find conditions favouring the development of plant and animal domestication" (Binford 1968: 328). Further advancing these models, Colin Renfrew later adapted a model from geneticists (Cavelli Sforva 1960) in which this expanding population spread outwards from the ancient Near East through a process of adaptation and demic diffusion at a speed of 1 kilometre per year carrying with them the Neolithic and Indo-European languages (Renfrew 1987).

In reaction to such processual models, Ian Hodder sought to shift the focus away from traditional studies of changes in terms of population growth, economic pressures and social competition, and attempted to focus instead on the enormous expansion of symbolic evidence from the home, settlements, and burials which had accompanied the spread of the Neolithic and began to ask why figurines, decorated ceramic, elaborate houses, and burial rituals appeared, and what their significance was (Hodder 1990)? In this way, Hodder argued that it was not just animals and plants that were domesticated, but human communities also as they adopted a collection of new concepts central to the origins of farming and the settled mode of life. In his view, these concepts related to the place of house and home, the 'domus', and that they provided both a metaphor and mechanism for social and economic transformation. In particular he argued that as:

"economic change occurred larger Neolithic social groups were formed in order to produce more significant scales of domination and social prestige. Such arguments are facilitated by the fact that material culture is not only abstract structure, it is also practice thus the construction of major monuments involves real increases in labour input and the scale or intensity of social dependences."
(Hodder 1990: 310).

Stressing that the domestication of plants and animals involved a delayed return for one's labour, and the need for longer-term social structure and the protection of one's interests, Hodder also anticipated this involved practical defence and warring as well as the need for social and structural change to provide everyday function (Hodder 1990). However disparate these models for the development of the Neolithic may appear, all appear to acknowledge that the Neolithic is a definable period within the archaeological sequences of the Near East and that this period may be recognised through key innovations such as the introduction of domesticated plants and animals, sedentary settlement and ground stone tools.

3.2 THE NEOLITHIC SEQUENCES OF THE NEAR EAST

Having thus introduced a review of some of the core explanations and definitions of the Neolithic in the Near East, this section will examine the nature and character of the some of the earliest Neolithic sequences in the Near East, as this region was one of the earliest to experience these social and economic changes and is assumed to have played a key role in the transfer of such changes to the Kingdom of Saudi Arabia.

3.2.1 IRAQ

Over fifty years of sustained archaeological exploration of northern Iraq has provided much information as to the character and nature of the people who lived in this area and the presence of humans in the Kurdistan Mountains can now be traced back before 40,000 BC. It has been suggested that farming and animal husbandry developed in this area c. 8000 BC and that at c. 7250 BC communities moved down to the plains as illustrated by Jarmo and Al-Magzaliya (Braidwood 1950). These populations spread over the next millennia and colonised large areas of Iraq, including Hassouna and Samarra (Redman 1978). By 6000 BC clay utensils and vessels were manufactured and archaeologists can distinguish the various cultures and traditions in central and northern Iraq, for example Hassouna and Samarra, Halaf, Ubaid, Al-Warka, and Ninevite 5, of which, the Ubaid of southern Iraq were to have a considerable influence on Neolithic communities of Saudi Arabia.

The first farming villages established in the plain that lies to the south of the Kurdistan Mountains were subject to a lower level of rainfall compared to the mountain area, which encouraged its population to develop irrigation. By the first half of the seventh millennium BC, the sites of Umm Dabaghiyyah, Soto, Kul Tepe and Yarem Tepe north of Baghdad suggest that although farming was important, hunting still played a leading role (Matthews 2000). In addition, excavations at Tulul Al-Thalathat and Kashkashok have traced 'Proto-Hassuna' settlement back to 6000 BC, defined as it is by small villages with houses built from clay (in so-called tauf) with straight walls. It was noted that there were some indicators of houses built under the earth's surface. At Umm Dabaghiyyah houses were built from clay and used rudimentary arches to help roof buildings of a new style which included small areas in parallel rows split by a corridor. These small rooms might have been used as stores, and had an upper floor that was used for living and is similar to the Corridor Buildings of Al-Baida and Ain Ghazal in Jordan (Kirkbride 1975). Between 5750 and 5250 BC, three major cultural groupings are apparent, Halaf in the north, Hassuna in the centre, and Samarra in the south and although these cultures coexisted, Hassuna is the oldest (Merpert 1987).

Although the above sequence illustrates the cultural development of northern Iraq, the absence of a similar sequence to the south of Baghdad should be noted. Only inhabited from the very earliest phases of the Ubaid, some archaeologists attribute this absence before 6,000 BC to the fact that this area was flooded by the waters of the Persian Gulf. One of the earliest known sites in southern Iraq is Tell el-Oueli and includes evidence of permanent settlement between the sixth to the fourth millennium BC (Huot 1991). The earliest house dates back to 5000 BC and was a tripartite structure with mud brick foundations and a roof supported by two rows of posts and outer walls decorated with plasters. The inhabitants lived in permanent settlements and raised cattle, sheep, and goats, and planted cereals and made ceramic including beads, sickles and amulets (Huot 1992). As noted above, the discovery of the Ubaid ceramic tradition, which has been commonly found in the southern part of Iraq from 5000 B.C. is a key archaeological indicator and has now been identified as well in the eastern province of the Kingdom of Saudi Arabia and in the western coast of the Gulf and may be divided into four stages: Ubaid 1 5500-5000 B.C, Ubaid 2 and 3 5000-4500 B.C and Ubaid 4 4500-4000 BC (Redman 1978). This has raised a number of questions about trade or colonisation, which will be returned to later with reference to the Neolithic of eastern Arabia.

3.2.2 THE LEVANT

Palestine was one of the first regions in the Near East where early food-producing cultures were discovered and the first settlers at Jericho were hunter-gatherers, followed by people who had a settled, rather than a nomadic, way of life. There is evidence of the manufacture of arrowheads and other tools, and of trade with other communities in Anatolia and the next stage, the Pre-Ceramic Neolithic, yielded evidence of two-roomed mud-brick houses and well-developed obsidian, flint and bone industries. The expanded settlement was also augmented with a defensive system, suggesting a town of about 32 acres by c. 8000 BC (Mellaart 1975).

In general, archaeological investigations in the Levant indicate that the region was extensively inhabited during the period between 6000 and 3500 BC. Taking into consideration the various differences between one area and another, most of the larger settlements found in the southern Levant were abandoned around c. 5900 BC, while others, like Ain Ghazal and Wadi Shoaib in Jordan, remained inhabited. This situation remained until between 5600 - 5500 BC when additional towns appeared, however, the situation in the northern Levant, Anatolia and northern Iraq differed, as none of the sites were abandoned and new towns and villages appeared, such as Catal Huyuk. These towns and villages are distinguished by their wide dispersal and social systems, and the development of new industries such as ceramics during the seventh millennium BC (Kafafi 2005). The first farming towns in the northern Levant continued to be inhabited without any interruption between 6000 and 5660 BC during the period known as Pre-Pottery Neolithic (Moore 1987). Archaeological excavations of sites from this period in the south are rare, and are concentrated at two main sites, Ain Ghazal and Wadi Shoaib in Jordan (Rollefson 1997). This discussion of the Levant will now be strictly limited to two areas: the northern part (Syria and Lebanon), and the southern part (Jordan and Palestine). Ras Shamra on the Mediterranean in the north, and Ain Ghazal in the south are the most important sites during this stage and hosted continuous habitation from the seventh to the sixth millennium BC and Shaar (Al-Qahwanah), where the Yarmuk meets the Jordan River, is considered the best example in the south Levant . In addition to the latter, the sites of Jbail, Al-Munhatta, Wadi Shoaib, and Al-Tharra are also key sites for understanding the transformation from the Pre-Ceramic to Ceramic Era and the most ancient ceramic discovered in south Anatolia may be dated to 6700 BC (Rollefson 1997).

3.2.2.1 THE EPIPALAEOLITHIC AND NEOLITHIC OF JORDAN

Of the numerous Neolithic sites excavated in Jordan, the following five have been chosen for discussion: Ain Ghazal, Wadi Shueib, Basta, es-Sifaya, Wadi Feynan and 'Ain Jammam. These sites were heavily occupied at the end of the seventh millennium B.C. Results of excavations show continuous occupation from LPPNB to PPNC for the above sites. There were many Neolithic sites established close to perennial water sources and these sites, Ain Ghazal and Wadi Shueib, continued to be occupied through the LPPNB to the PPNC. Others, such as Ba~~i~~sta, Es-Sifiya. Ain Jammam and Ghwair, were continuously occupied from the LPPNB to the PPNC.

In the Jordan Badia, several sites of the seventh and sixth millennium B.C, such as Jilat, Dhuweila, Jebel Naja and Burqu, have been excavated or surveyed. The site of Ain Ghazal has been continuously occupied from ca. 7,250 to 4,500 B.C. and reached its peak by the end of the seventh century B.C. A study of archaeological data belonging to the end of the 7^{th} millennium and the beginning of the 6^{th} is now presented in order to provide a comparison with the lesser known classes of site in Saudi Arabia. During the past ten years intensive study has produced more understanding of the PPNB and PPNC periods. This information was mostly obtained from sites in the highland area of Jordan. The excavators of the site 'Ain Ghazal recognized the early 6^{th} PPNC of Central and Southern Levant. They saw it as a continuation from the 7^{th} to the 6^{th} century (Kafafi 1989). At 15 hectares, Ain Ghazal's position is one of the largest known prehistoric settlements in the Near East. More than 150 clay animal figurines have been recovered from middle PPNB deposits, the majority cattle, but cattle bones from the same period show no evidence of domestication except in the case of some calves. A ceremonial burial of at least twenty-five human statues and busts made of lime plaster was excavated in 1983, and another cache of seven damaged pieces of statuary in 1985. Excavations in 1995 and 1996 revealed a structure which appears to have been a temple or walled sanctuary containing a raised altar and screen (Kafafi 1989).

The Azraq Basin is a depression extending for 12,000 sq km , stretching from the Jebel Druze area of southern Syria to the Saudi Arabia frontier and west to within 20 km of Amman. It is part of a longer depression, the Wadi es-Sirhan, which extends to El Jawf in Saudi Arabia. Both depressions were formed by block faulting in the late Cretaceous but the faulting has occurred at different rates (Garrard 1985).

Wadi el Jilat: the site consists of concentrations of upright stones including some stone structures which may be pre-historic. There are also some recent bedouin graves. Most tools collected (20 %) were prepared from flakes, whereas the cores were mainly used for blade and bladelet production. The platforms on the tools are mainly plain and punctiform, and over half the tools are retouched flakes and blades**.** There are smaller numbers of notches, denticulates, microlithcs and retouched bladelets as well as a few burin scrapers and borers. Although two projectile points were collected, these are Byblos and El Khiam types which are representative of the Levant. In summary, the site belongs to the Pre-pottery Neolithic B but may have been occupied earlier.

Wadi el-Jilat 21: On the north side of Wadi el-Jilat three concentrations of artefacts were observed and 1 m. radius circles were collected from each one. Isolated artefacts brought the total up to 500. The cores were mainly for blade and bladelet production, the tools mainly made on blades and the platforms mainly plain followed by punctiform. The tools are mainly retouched blades and flakes. Notches and denticulates are common and there are few other classes of tools. Fragments of bifacial pieces and a bifacial piece on tabular flint were isolated finds the site dated to the pre-Pottery Neolithic (Garrard 1985).

Wadi el-Jilat 22: The surface of this site is densely covered with flint with some bone eroded from the cultural deposits. The cores are of flake manufacture, several of them on flakes. The platforms are mainly plain, but punctiform and faceted types are also present. The tools are mainly retouched blades and flakes, but notches, denticulates and end scrapers are also present. Two bifacially retouched tangs and a tile scraper were collected as isolated artifacts. The site dated to the pre-Pottery Neolithic .

Azraq 31: 400 artifacts were found on this site, cores for blade and bladelet production, tools mainly made on blades, platforms both plain and punctiform. There were also collections of isolated finds with retouched flakes and blades common. Several projectile points are present, including Amuq, Byblos and Jericho. Some of the points have tangs. Oval axes and tile knives were also found. The site probably dates to the later pre-Pottery Neolithic B – 7,000 to 6,000 B.C (Garrard 1985).

Burin Sites : Seven of the sites found during the 1982 survey can be classed as Burin sites Three were in Wadi el-Jumlat and four in the north-east Azraq lake region. All the sites were surveyed using circular collection units. At all seven sites except Azraq 27 artefacts collected were mainly tools. Blades and bladelets were more common as tool blanks than flakes. Apart from Wadi el-Jilat 14, tools assemblages are mainly burins. Truncations, denticulates are also common. At Wadi el-Jilat 15, oval axes, bifacially retouched pieces and tile knives indicated early Neolithic occupation. Burins were also the commonest tool class at Wadi el-Jilat 13. Other aspects of the flint assemblage suggested a pre-Pottery Neolithic date for this and the other burin sites (Garrard 1985).

The Wadi el Jilat area was the focus of survey work in 1982 and soundings in 1984. In 1985 a detailed survey was made of the alluvial geomorphology of the and of the sedimentation in each of the excavated sites and they are thought to postdate the Pre-Pottery Neolithic era. Surveys revealed five alluvial terraces on the valley floor. The earliest terrace (fifth) was lithified and contained Levallois material as did the fourth and third terraces. Terraces two and one contained levallois material and blade material; and the first also contained bladelets probably dating to the Upper Paleolithic. It is likely that the gradational and erosional stages represent climatic phases. The second site, Jilat 24, contained a stone circle built from lithified sediment slabs. A trench was excavated and revealed that the outer ring of stones backed by a low platform of flat slabs packed in by stones. The only trace of occupancy was a scatter of flint artefacts (Garrard1985).

Uwaynid 14 and 18: These sites lie at the confluence between Wadi-el-Janab and Wadi Uwaynid south west of the Roman fort of Qasr Uwaynid and it is possible that they are the remains of a spread of occupation debris. A freshwater spring was possibly the focus for this settlement. Soundings at both sites revealed occupational material contained in soil profiles with aeolian silts suggesting greater humidity than today and continuous vegetational cover. The contrast between the assemblages in the middle and upper phase at Trench 1 Uwaynid is similar to that between the same phases at Jilat 6. Trench 1 at Uwaynid 18 yielded little occupational material, but Trench 2 produced several hearths containing basalt pebbles which may have been used for cooking. The industry produced narrow bladelets from single platform cores and these bladelets are usually truncated by the microburin technique. Small numbers of retouched pieces, end scrapers, truncations, pointed back bladelets and edge damaged pieces were also found the site dated to the pre-Pottery Neolithic (Garrard1985).

Azraq 18: Only the lithics in square 1 have been studied. Primary elements are common and microburins are rare. Cores are generally small and are of three types, (a) single platform blade (b) opposed platform blade and (c) flake. Tools are mainly produced on bladelets. The microburin technique was only used occasionally in the truncation of bladelets. The tool assemblage consists mainly of lunates, modified by Helwan, bipolar and abrupt retouch. There are also a small number of Helwan retouched bladelets. The industry from this site has much in common with the Palestinian Natufian and with that found at the basalt desert site of 14/7 and this suggests a late Epipalaeolithic date (Garrard1985).

Azraq 31: Most tools on this site had been prepared on blades some of which had been struck from cores and some from lightly prepared single platform cores. Arrowheads were of Pre-pottery Neolithic B forms, and pressure flaked arrowheads of Beidha type. There were also some late Neolithic forms. Burins constitute about 20% of tools. Bifacial pieces, typically 'tile knives' account for 11% of tools found. Bifacial pieces occur occasionally on pre-Pottery Neolthic B sites in eastern Jordan but more commonly on 'Burin sites'. Sickles rarely occur, but those found were un-retouched or backed and denticulated. Sickles from Azraq 31 are on finely pressure-flaked curving bifacial knives and may have been used to cut reeds(Garrard1985).

Wadi el Jilat 8 (Waechtner's Site E2). Of the 15,000 plus flint artefacts obtained from this site, 11.67% were made into tools. The tool kit largely consists of backed bladelets some of which are truncated at one end. The high proportion of broken items and the fact that there is a reasonable number of double and single truncated pieces suggests that the same-sized breakage was not accidental. There are also La Mouillah points and curved, pointed arch-backed bladelets in moderate quantities with trapezes and triangles appearing from time to time. Among the non-microlithic tools end scrapers occur most frequently, accounting for 15% of the tools, while retouched pieces and burins appear in small quantities. It seems that the microburin technique was used to segment backed bladelets in preparation for the manufacturing process the site dated Epipaleolithic (Garrard 1984).

The characteristic type of flint of the first assemblage from the earliest phase of settlement are thin blades struck from a narrow core. These blades differ from those of the middle phase at Jilat 8 by being shorter and thinner. There are many examples of microburins. As the number of possible truncations does not equal the number of microburins it seems that this was the primary technique used in segmenting blanks for Neolithic tools. Over 80% of the tool assemblage is microlithic (Garrard 1984). The assemblage in the latest phase is mostly composed of geometric backed bladelets with triangles as the dominant form plus some lunates and microgravettes. The characteristic feature of the middle phase is the large non-geometric monolith, the La Moillah point being the most prominent, The earlier phases consists almost entirely of a microlithic tool assemblage, largely made up of thin, curved pointed arch backed pieces showing fine craftsmanship. In all three phases the number of microburins is high although in the upper and lower phases the microburin technique seems to be the only method employed to break platelets. As well as stone tools, marine shells beads occurred frequently in all three levels, and a small quantity of bone points and a bone pendant were also present (Garrard 1984).

Dhuweila is a small prehistoric hunting camp on a low basalt ridge just north of the Trans-Arabian pipeline track on the south west side of the Jordanian sector of the Black Desert in eastern Jordan (Betts 1988). The site was first discovered in 1983. There have been two stages of occupation of the site. Stage One: Late pre-pottery Neolithic period; Stage Two: Late Neolithic probably 6th to 5th millennia B.C. The main part of the site consists of a pile of tumbled rock, 20 m long and 12 m. wide. The site was divided into quadrants, each quadrant sub-divided into 4 x 4 m. squares and soil samples were taken (Betts 1988).

In stage one the flint industry was blade based. Blanks were made mainly from bipolar cores mostly made on blocks of tabular flint. Some knapping was carried out on site. The material used was mostly grey chert which must have been brought to the site from at least 20 km. away. Arrowheads and burins are prominent; scrapers, borers and tools are found in small numbers; sickle blades are rare. Arrowheads are mainly of Beidha and Byblos type with one variant, a point on a broad blade with little modification at the tip and a tang formed by inverse touch. The burin class includes dihedral and truncation forms. In stage two (Neolithic) the industry is less blade based and blanks are smaller. Core trimming elements are rare. In addition to chert there is some use of chalcedony. Arrowheads are common in the toolkit, mainly small bifacial forms typical of the Late Neolithic in Syria/Palestine. Some are tanged and others leaf-shaped and fall into two groups, one with distinct tangs and the other with triangular or trapezoidal plans. Other tools include Scrapers, knives, burins, borers and a few sickle blades (Betts 1988) .

3.2.2.2 THE NEOLITHIC OF THE SYRIAN DESERT

Although Syria does not border directly on to Saudi Arabia, a brief note of some key Syrian sites is appropriate. The high tell at El Kowm is the tallest pre-classical site in central Syria but there is more to the site than the tell which stands at the south west corner of the site. In the lower tell excavation yielded evidence of portions of two rooms both faced with plaster and the filling was grey soil mixed with grey and black ash. In the centre there is a horizontal line which represents a plaster floor with ash on it. The floor seems to belong to a room. (Dornemann 1986).

Excavation of the step trench yielded 1117 pottery sherds, eight-eight per cent Neolithic occurring in two different wares which dated to 5675 BC. Normal Ware: The surface colour ranges from light grey and light tan to medium red orange and a brown caste and brown. Chaff temper is found in medium to heavy inclusion and stone inclusion is found in light to medium amounts. Vessels range from coarse and heavy to well-made, fine, decorated ware, these being by far the minority. Unslipped sherds form the next most numerous group and those with a brown surface form the third most numerous group. Horizontal burnishing is found on the outside of jars and the outside and inside of bowls (Dornemann 1986). Hard Ware: this ware is harder and more compact than the normal ware. The forms of this ware are finer, thinner and more elaborate than those found in normal wares. The surface colour ranges from medium orange to light brown, but vessels covered by a coloured slip range from dark red-orange to medium purplish red or medium brown. Pottery Shapes: the number of rim sherds in proportion to body sherds is good for the Neolithic material but low for the later sherds (Dornemann 1986).

11,276 flint pieces were found in the stratified layers under the uppermost surface disturbance layer at el Kowm. Flake tools are most common (49%), blades (45%), and cores (5%). Scrapers, burins, tanged pieces and perforators were also found but represent less than 0.1% of the total number of flints. The major changes noted in the layers of the sounding are from pre-ceramic layers at the bottom of the tell to early white ware vessels and early ceramic materials beginning at step VIII. There is a dramatic shift in the white ware vessel type between steps IV and III and the occurrence of only the 'burnt plaster' pieces below step V. The most important development in the el Kowm flint industry seems to be from the predominance of blade tools in the earliest ceramic layers to the gradual predominance of flake tools in Neolithic pottery layers of Phase D. The amount of flint in the lowest layers is small, in contrast to the large quantities found in the lower layers of Phase B. 52% of blade tools and 44% flake tools were found. In Phase B the percentages change to 48% and 47% but in Phase C blade tools are predominant again – 51% blades to 43% flakes. Only 0.3% of the total blade tool pieces are of obsidian, 4.4% of cherty flint and 4.7% are pieces less than 4 cm in length and therefore of minor importance. Cherty flint may have been a by-product of the flaking process. Cortex left on a large number of pieces may have been in order to produce a consistent dark colour. The flint is mainly dark in colour, grading from black to dark brown with some darker and lighter browns (Dornemann 1986).

3.3 THE NEOLITHIC SEQUENCES OF THE YEMEN

Yemen, bordering Saudi Arabia on its SW side, is very important for an understanding of the Neolithic sites of the Jizan region. A number of lithic industries from both the Pleistocene and Holocene have been found in Yemen. The sites are usually revealed through erosional processes or exposed in sections and road cuts. In recent years the discovery of Holocene sites has more than doubled the information of known prehistoric stratigraphies in Yemen. These early Holocene sites are all located in the Hadramawt of eastern Yemen. These sites, such as Manayzah [28], HDOR 410 and HDOR 419 [26,29], Khuzmum [23,46] and GBS [23,57], are all located in the Hadramawt of eastern Yemen (Crassard 2009). Manayzah, discovered during the 2004 campaign of the RASA Project in the province of Hadramawt, Yemen, Manayzah is an Early to Mid-Holocene . The lithic types are worked obsidian, bifacial arrowheads and numerous other tool types. The fluting technique appears in stratigraphy and is now dated to the 7th millennium BP (Crassard 2009). Further discussion on key artefact types in relation to the sequence from SW Saudi Arabia follows in the discussion.

The Khawlan district has revealed a number of aceramic sites in the Wadi Dhanah drainage. Two industries, (a) the Qutran and (b) the Thayyilian, show different phases of the highland Neolithic. The Qutran includes bifacial foliates, stemmed bifacial points, trihedral rods, end scrapers, burins and other light stone tools, and heavy adzes and gouges. This industry occurs most frequently in the Hada area. (b) The Thayyilian also includes bifacial elements plus flake tools, grinding stones and hammer stones. It is probably older than the Qutran and may have formed the basis for the lithic industries of the Bronze Age. This industry is more common in the Khawlan. Both industries occur on sites with small oval 'huts'. Site GQ contained a block of stone with five carved pairs of ovicaprid horns. On Site NABiii a Neolithic level was exposed under a Bronze Age settlement. On Site THWiii two Neolithic levels may overlie an early Neolithic Mesolithic occupation. Site (Edens 1998).

Wadi Thayyilah iii (WTHiii): here apsidal rooms sometimes with stone flooring, hearths and stone benches were found. Variations in material culture and fauna identify open-air activity areas. Occupation is associated with a paleosol. A stone bracelet can be compared with Neolithic and Levantine material of the 5th millennium. Pits with stone clusters, shallow postholes, stone scatters, manuports and animal bones were associated with a grey unit below the paleosol. A figurine in unbaked clay can possibly be dated to between the eighth and tenth millennia B.P (Edens 1989). Elsewhere in the Highlands of Yemen aceramic sites are frequently associated with a Holocene paleosol. Rock shelters near Sada(c) featured rock art, hearths, chipped stone and fauna carbon dated to the eighth century B.P (Edens 1998).

Aceramic midden and lithic scatters are prominent on the prehistoric sites of the Tihama. Middens usually lie inland from the present shore near channels where coral reefs, sandy littoral, mangrove swamps and tidal meadows provided a suitable environment for hunter-gatherers. Scatters are often found in areas close to freshwater sources. Molluscs from the middens suggest association with mangrove habitats and sandy, rocky coastlines. The associated lithic industry contains backed points and microlithic lunates plus net weights made from sandstone pebbles plus grinding stones and axes. Ostrich shell fragments occur on coastal sites. Pottery is virtually absent across the southern Arabian peninsula until the fifth millennium B.P. Site SRD-1 on the north bank of the Wadi Surdud contains several patches of deflation lag each representing a single compound. The blocks contain shell, artefacts, fire-hardened clay. Surface materials reveal a bead workshop, rock crystal waste, ostrich fragments and possibly a hide-working area. Carbon dating shows that the site was developed over more than a millennium (Edens 1998).

3.4 THE NEOLITHIC SEQUENCES OF OMAN

The first stratified Stone Age sites excavated in Oman were the shell middens of Ra's al-Hamra near Muscat most of which were occupied between ca. 6000 and 3000 BC. The twelve prehistoric shell middens of the Ra's al Hamra cape, were discovered in the early 1970's. This headland is a limestone terrace leading towards the sea. The mangrove swamp of Qur'm, located within its two main channels, is an area rich in raw materials for the manufacture of chipped and other stone tools. Wadi Aday is the main water source in the area and at the point where it meets the sea there is a well preserved mangrove swamp. This area is characterised by its ecological diversity. The shell middens already mentioned are on the cliffs of Ra's al-Hamra and were first excavated by an Italian mission under the direction of Maurizio Tosi. Four of these middens have been partly excavated.

The twelve prehistoric shell middens of the Ra's al Hamra cape, west of Muscat were discovered in the early 1970's. This headland is a limestone terrace leading towards the sea. The mangrove swamp of Qur'm, located within its two main channels, is an area rich in raw materials for the manufacture of chipped and other stone tools. Four of these middens have been partly excavated:

Wadi Wutayya is known for its prehistoric rock art on the wadi bottom. Soundings in 1983 revealed stone age layers over 1 m. thick in the wadi gravels. Several fireplaces were found and were carbon dated, indicating that the youngest flint layers of the Wadi Wutayya sequence must have been formed about 9230 BP. The sequence comprises 8 vertical stratigraphic units which yielded 6058 chipped stone artefacts. A series of fireplaces excavated in the Wadi Wutayya (Oman) suggest post-Paleolithic human occupation in the early 9th or even late 10th millennium BC (Uerpmann 1992).

The site of Saruq was located on the summit of a limestone hill south of the village of Saruq. Both the site and the village were destroyed when the area was given over to the embassy quarter of the new capital of the Sultanate of Oman. The original surface was covered with mollusc shells. Among these shell 6892 flints were collected in 1983 but no early prehistoric layers were found. Nevertheless the finds from this site can be treated as a unit. The size and number of flint artefacts found here make this an important site.

The second area in which lithic industries were studied is situated around the town of Quriyat about 80 km southeast of Muscat. At one site in the Khor Milh complex, 4522 flint artifacts were collected (Uerpmann 1992) and shell midden layers, about 1 meter thick, were also found. There was no indication of cultural changes during the occupation of the site. Pieces of jewelry made of shell or soft stone show parallels to finds from Ra’s al-Hamra in the Capital area. Oyster shells from both sites have been dated by radiocarbon assay to 5250 BP. Khor Milkh 2 is situated in a dune field about 500 m further south and consists of several shell and artefact scatters, mainly in the valleys but also on top of some dunes. Two radiocarbondates made on oyster shell from widely separated shell concentrates are only 55 years apart and can be combined into a date of 4925 BP (Uerpmann 1992).

Other significant sites include Ra's al-Khabbah, A multi-layered site partly dating back to the fifth millennium BC. There were five main phases of occupation separated by semi-sterile layers. The structures of Phase 1 are enclosed by a narrow ditch excavated into the bedrock. Phases 2-3 consist of c-shaped ditches, and Phase 4 yielded one circular stone foundation. Suwayh: This site, located on the coast of Ja' – lan in eastern Oman is multi-layered with cultural deposits 2.1m thick. It revealed a cemetery and two semi-circular hut foundations 2.3m in diameter surrounded by stone boulders. Wadi Shab lies on the left terrace of Wadi Shab north west of Tiwi (to the east of Muscat). Surface collection yielded a chipped stone assemblage characterised by specific tools punches, wedges, chisels and drills which had probably been used in the manufacture of soapstone earrings (Biagi 2006). Soil samples revealed three subsequent settlement phases and a cemetery. Several structures, believed to be the remains of C-shaped hut foundations were retrieved from the lowest settlement while large, well constructed fireplaces are typical of the upper deposit, and semi-circular wind shelters with simple fireplaces were found in the middle layer. The site also yielded a flat assemblage rich in microlithic borers used in the manufacture of stone and shell beads. Further evidence of handicraft activities included soap stone earrings and shell hooks (Biagi 2006). .

3.5 THE NEOLITHIC SEQUENCES OF THE UAE

Archaeological surveys conducted since the 1970s have revealed a number of Neolithic sites and more recently the Historic Environment Department of the Abu Dhabi Authority for Culture and Heritage has carried out surveys and excavations in different parts of the UAE Among the many Neolithic sites discovered in different parts of the UAE, the following are particularly relevant to this thesis:

Sharjah (UEA): Excavations are currently being undertaken at FAY-NEO1, a rock shelter near the northeastern end of Jabal Faya. Flint sources with traces of extraction have been located close to the site. The upper levels contain copper or bronze artefacts, as well as Iron Age ceramics and fireplaces from the Maleiha period. Below this were Neolithic artefacts including Fasad points on blades. These are a simple concept of projectiles and are significant because they represent a very early phase of lithic point in the Arabian Peninsula (Uerpmann 2009).

Jebel Buhais 18 :This site is located in the interior of the Oman peninsula 60 km west of the Arabian Gulf at the eastern foot of Jebel Buhais. The first flint artefacts found there belong to the Arabian Bifacial Tradition. There is no evidence of habitation on the site but fire pits were found throughout the area dating back from 5,100 to 4,300 BC (Kiesewetter 2003).

3.6 CONCLUSION

From the above summary, it is clear that the countries surrounding the Kingdom of Saudi Arabia exhibit a wide range of classes of Neolithic settlement, many of which are also found within Saudi Arabia itself. It may be reiterated that the earliest village farming communities in the Near East made the transition from food gathering to food producing at the beginning of the ninth millennium B.C. However, it is very clear that the nature of the regional Neolithic is very different and even the individual characteristics of the Neolithic differ from site to site. With such a background, it is clear why many archaeologists expressed rather different views about the causes of agricultural origins and its very definition. From these very different dates and collections of material culture, Neolithic communities of people, animals and plants are thought to have diffused outwards through demic diffusion. It is also very clear that substantial archaeological survey and excavation has already been carried out with large areas of Turkey, Iran, Iraq, the Levant and neighbouring parts of Arabia, unlike the situation of Saudi Arabia, as will be demonstrated in the following part of this chapter.

3.7 A REVIEW OF THE HISTORY OF ARCHAEOLOGICAL RESEARCH IN THE KINGDOM OF SAUDI ARABIA

3.7.1 INTRODUCTION

Having introduced a number of the key Neolithic sequences of the Near East, the aim of the remainder of this chapter is to introduce the history of archaeological research in the Kingdom of Saudi Arabia and outline our current understanding of the Neolithic era of Saudi Arabia. It should be noted that archaeology is generally considered a new field of science in comparison to other fields such as history in the Arabian Peninsula, which has led to a serious neglect of the subject. Furthermore, there has also been a lack of interest in the region due to the greater abundance, and accessibility of archaeological sites for excavation and evaluation in other parts of the Near East. The following sections will introduce and evaluate the developmental sequence for the emergence of archaeology as a discipline in the Kingdom of Saudi Arabia over the last hundred and forty years.

3.7.2 EARLY ANTIQUARIAN STUDIES 1870-1930

Some of the earliest descriptions of the antiquities and history of the region occupied by the Kingdom of Saudi Arabia were generated by occasional European travellers such as Carsten Niebour, who sailed along the Red Sea in 1770 and spent a year or more in Yemen (Al-Sharekh 2004) and Burkhardt, whose 1815 report paved the way for others

(Milha 2002). These pioneers were to be followed by many European travellers in the mid-nineteenth century when inquisitiveness, such as visits to the holy cities of Mecca and Medina and geopolitical mapping were combined (Al-Ansary 2003). As non-Muslims, a number of travellers such as Philby (1890) were prohibited from entering these cities; however, those who had learned Arabic and other eastern languages were more willing to improvise and thus Burton used Pashto and a smattering of Arabic to avoid detection and completed his 'Secret Pilgrimage' (Rashed 2004). Orientalist scholars were also driven by their interest in investigating Biblical writings about the Arabian Peninsula, the Kingdom of Sheba and the people of Midian, Thamud, and Nabataea, as well as the opportunity to confirm classical commentaries on the incense trail (Milha 2002). Although the travellers and Orientalists who came to Arabia were many, for the purposes of this study, we shall only discuss those which contain descriptions of archaeological sites (Salihi 2004).

Returning to Burton, in addition to completing his Hajj, he also successfully identified and described the Nabataean graves of Shuaib and began to attract attention to the old mines in the area of Medina (Milha 2002). He was followed by a series of scholars, such as G. R. Wellsted, who copied some of the inscriptions as well as William Palgrave who came to the region in 1865 and published some of his observations of the archaeological sites in the area of Najd. An exemplar in this early period of exploration, Charles Doughty visited a number of archaeological sites in the north-western part of Saudi Arabia, in the area of Al-Hijr (Madain Salih), al Ula and Al Khuraibah between 1876 and 1877 as well as Tayma, Taif and Wadi Fatima (Salihi 2004). Recording numerous Thamudic, Nabataean and Lehyanite texts, his surveys were meticulously recorded in his book *Travels in Arabia Deserta* (Al-Sharekh 2004) . In addition to the prominent role of Doughty and those who preceded him, Charles Hobber conducted the study of the archaeology and epigraphy of several sites in the north of the Arabian Peninsula and its centre during his trips between 1878 and 1882 and again between 1883 and 1884 (1884; 1891). One of his associates on the expedition to Al-Hijr (Madain Salih), Al Ula and Al Khuraibah, Julius Euting, also published reports on Nabataen and Thamudic inscriptions in 1895 (Salihi 2004) and more generally about the archaeology of the Arabian Peninsula, in 1896 and 1914. The beginning of the twentieth century was also to see the beginning of more systematic research as illustrated by the work of Musil, who conducted a series of surveys during a period of 20 years from the year 1896 to 1915 (Milha 2002). During the time that Musil was conducting his research in the northern parts of the Arabian Peninsula, archaeologists Jaussen and Savignac were also present in the area, which is now the south of the Kingdom of Saudi Arabia. They contributed to the publication and translation of a large number of Thamudic, Lehyanite and Nabataean texts. Jaussen and Savignac also studied some of the archaeological material in Al Hijir (Madain Saleh) and Al Khuraibah and Tayma, where they made accurate copies of texts and published their work in three volumes between 1909 and 1920 (Salihi 2004). Their studies are still considered to be the foundation for all later archaeological studies in the north-western parts of the Arabian Peninsula, such as Cramer, Contino and Fritz Caskel (Al-Sharekh 2004) and their studies of the civilizations of the Lehyan, as well as Van Den Brandon, who focused on the Thamudic civilization (Al-Moaeghl 2003). Another archaeological pioneer whose studies have helped in the development of the study of the prehistory of Arabia is Bertram Thomas, who conducted expeditions in the south of Najd. Drawing maps of the area and conducting geological and archaeological investigations, his studies were a great help to many researchers who came to the area after him including St. John Philby and Shaeger (Al-Moaeghl 2003). However helpful these individual studies may have been, it is clear that the overall profile of research was haphazard driven by individual agendas and profiles and, in many cases, very poorly reported (Al-Ansari 2006).

3.7.3 THE PETROLEUM REVOLUTION 1930-1970

The destruction and dismemberment of the Ottoman Empire at the end of the First World War paved the way for increased European attention in the Gulf region, with most of Mesopotamia and eastern Arabia being designated areas of direct British control or influence from as early as the 1916 Sykes-Picot Agreement (Milha 2002). Additionally, the decision to change the Royal Navy reliance on coal for fuel to oil during the War meant that the security of oil supplies became a matter of the security of the British Empire. Initially Iran was the main source of Euro-American oil supplies, but increasing discoveries of oil reserves in the 1930s shifted the focus firmly to the Gulf region and the Kingdom of Saudi Arabia as it was the biggest Gulf state and had the largest oil reserves in the world. The 'black gold' under Saudi soil saw great competition among the winners of the First World War as their companies attempted to gain the biggest share in the exploration and production of this source of energy. Among the most successful companies were American companies, whose expatriates included a great number of experts in different fields (Al-Mamary 2004). Frequently, these experts had other interests in addition to their field of petrol exploration, including sociology, anthropology, geography as well as those interested in collecting artefacts and finding the locations of archaeological sites. Helping the exploration of the region, they also had a key role in encouraging other researchers and archaeologists by their publications and most of this group did not require any reward from their research other than their discoveries, as illustrated by the discovery of the site of Al Fau which was the first site excavated in the Kingdom of Saudi Arabia (Milha 2002).

It is necessary, however, to balance this positive evaluation against many of the reports of those experts who illegally recovered and exported material. In particular, Paul Nance, a former American employee of Aramco, is brought to mind as he established a museum in the US to display his archaeological exhibits from the Kingdom of Saudi Arabia. In doing so, he was following the example of a number of other, earlier respected experts such as Julius Euting who visited Saudi Arabia between 1930 and 1970. Sadly, the list of stolen artefacts is long, but perhaps the most famous among them is the basket of Tayma, which is in the Louvre Museum in France (Al-Ansary 2003). Despite these negative aspects, we cannot deny the impact of these foreign researchers and explorers as their pioneering work encouraged more specialized academic explorations, which itself initiated the evolution of a national interest in the archaeology of Saudi Arabia. These professional scholars still tended to be more historically oriented and amongst the first were Roth Stahl and Albert Jamme, who visited the region between 1963 and 1968, copying inscriptions in the north-west of the Kingdom (Milha 2004). Another early professional was Bennet who undertook a survey of Hail in 1967 and published the results in 1973 in the American University of Beirut (Al-Ansary 2004). These tentative starts were soon to develop into a number of larger systematic missions in the late 1960s in different parts of the country (Al-Ansari 2006). These included a Danish mission in the eastern province of Saudi Arabia (Al-Ansary 2003), one from the Institute of Archaeology at the University of London (Parr et al. 1978) and one from the Smithsonian Institution, USA, in the south. Disparately funded, their approach was to lead to the beginning of an awareness of the importance of heritage and culture amongst nationals of the Kingdom of Saudi Arabia and represent the beginnings of modern archaeology in the Kingdom (Al -Ansary 2003).

3.7.4 AN ERA OF NATIONAL AWARENESS 1970 TO 2006

The efforts made by earlier archaeologists in the exploration of archaeological sites in the Kingdom of Saudi Arabia had a major impact in creating awareness of the importance of safeguarding the heritage of their country and the potential benefit of better understanding their culture and environment amongst Saudi citizens and policy makers. However, this only formally began in 1970 when the Government signed the World Heritage Convention with UNESCO. A short time after this in 1972, King Faisal Bin Abdulaziz issued a decree ordering the ratification of a comprehensive plan for archaeology, including the foundation of a Higher Council to oversee the affairs of archaeology in the Kingdom and a Department within the Ministry of Education (Al-Ansary 2003). The latter Department is known as the Deputy Ministry of Antiquities and Museums and is now under the auspices of the Higher Commission for Tourism. King Faisal continued his support for archaeology, and the agencies that took care of it, and this policy was followed by King Fahd (Abdulaziz 2003).

3.7.4.1 DEPUTY MINISTRY OF ANTIQUITIES AND MUSEUMS

One of the most important programmes undertaken by the Higher Commission for Archaeology and the Deputy Ministry of Antiquities and Museums was the planning of an archaeological survey of the northern parts of the Kingdom. The aim of this programme was to record and classify archaeological sites by 1975 and resulted in the listing and recording of some ten thousand archaeological sites. The survey, and its documentation, was completed by field teams consisting of both foreign and Saudi

Arabian archaeologists, together with team members from other Arab states. They were also tasked with the responsibility of preparing maps to assist with further planning and future field studies and explorations, and well as for the protection of the artefacts and antiquities in the area from vandalism and theft. The Commission and Ministry also required the results of the survey and mapping to be publish promptly in a new journal named *Atlal* (Al-Mamary 2004). This was a tremendous endeavour which has facilitated the work of archaeologists across the Kingdom in a substantial way and provided a foundation for all subsequent work, and it is worth noting that archaeologists to date are drawing benefits from the outcome of that work which was undertaken more than three decades ago. The Deputy Ministry of Antiquities and Museums synthesised some of the results of the survey in 1975 and the resultant book , "An Introduction to the Archaeology of the Kingdom", was seen as a first step in creating an awareness of the importance of archaeology in Saudi Arabia. Published quarterly, *Atlal*, continues to be a core resource for researchers but was augmented by the Ministry's *Series of the Antiquities in Saudi Arabia*. This series of 13, each of which is dedicated to one of the administrative regions of the Kingdom covers the geography, landmarks and climate of the region followed by a presentation of the region's antiquities (Al-Moaeghl 2003). Augmenting the publication strategy, a new National Museum was built in 1975 with national museums in the cities of Mecca and Medina, six branch museums in the main cities of Saudi Arabia and five local museums in Albaha, Abha, Najran, Alqassem and Tabuk (Al-Ansary 2004).

The Ministry has also sponsored more recent archaeological survey, exploration, and restoration (Al-Ansary 2004). For example, exploration of sites in the central region was begun by four teams after completing the delineation and recording of sites. One example was the excavation of a site in Tayma in 1979 under the supervision of Dr. Hamid Abu Darak, followed by excavations in the sites of Dawmat Al Jandal, the graves of Dhahran Al-Jonoub, Al Hajar (Madain Salih), Wadi Fatima, Safaqqah in Dawadmi and Al Shuwaihitiya in Sakaka (Milha 2004). Additionally, between 2000 and 2008 a number of surveys and excavations have been conducted in Qassim, Medina, Al Munawarah Area, Juba site, Al Shuwaimis, al Bulaidah, al Hijir (Madain Salih), Tayma excavations and the Eastern Area (Al-Ansary 2006). In addition to the systematic archaeological surveys, excavations, building of central and branch museums, and special publications, the Deputy Ministry of Antiquities and Museums has also developed a strategy for the conservation and protection of artefacts and archaeological sites from vandalism and theft. Preventing the smuggling of archaeological materials outside the country, the Ministry has also purchased archaeological antiquities and artefacts to preserve them for the state (Zaid 2005).

3.7.4.2 A REVIEW OF SURVEY CAMPAIGNS IN THE KINGDOM OF SAUDI ARABIA

As noted above, one of the roles of the Agency for Archaeological Museums was the documentation of the extant archaeological resources of the Kingdom as recorded by the Comprehensive Survey of Saudi Arabia which was begun in 1976. The first phase of this survey was supervised by Robert Adams of the University of Chicago and focused on a field survey of the northern area. Several sites belonging to the Neolithic Era were recorded in the area between Salt City and Eastern Turaif desert and an analysis of the settlement data indicated a population history extending back to at least 6000 BC. Several sites were also discovered at Um Wael mountain, (Doqareya) and around volcano craters that existed along both sides of a small valley, where several stone tools were found. Additional sites associated with stone circles were discovered in Um Waal, some being simple, others were complex with various sizes between 10 to 25 metres in diameter. The survey teams suggested that such sites could be compared to the foundations of modern nomadic tents utilising slopes for protection against the wind and were of the opinion that they could be attributed to the Neolithic (Adams et al 1977: 21). The survey was extended in 1977 under the supervision of Peter Parr and limited evidence of sites found in the northern areas, including site 205-1, 206-16 and 207-2 where stone tools were recovered as well as cemeteries and stone monuments. On reflection, the teams identified the presence of five distinct types of site (Parr et al. 1978: 31). In the fifth year of the comprehensive survey program, an exploratory survey of the Red Sea coastal plains was undertaken as well as the north-western area valleys (Parr et al. 1978). It is of significance that Michael Ingraham's team discovered eight sites of the Neolithic era, three of which were found in the coastal valleys with a further five in the

Tabuk basin. Artefact similarities were apparent between material recovered from these sites and those from Jordan (Ingraham et al. 1981). The final stage of surveying the northern and north-western Areas was conducted in 1981 by dispatching a survey team under the supervision of Michael Ingraham (Ingraham et al. 1981). Stone tools were discovered at two sites attributed to the pre-ceramic Neolithic in the Al-Sham area and one of these sites, Kalwa site (200-134), yielded a number of arrowheads, blades, ground stone fragments, axes, and other delicate flint tools. In addition, large numbers of low stone circles were discovered in the surrounding area. The second site, Hathlool site no. 102-4, also yielded a large set of stone tools, ground stones and small stone circles (Al-Amin 2003).

3.7.4.3 THE DEPARTMENT OF ARCHAEOLOGY, KING SAUD UNIVERSITY

As noted above, in addition to state agency infrastructure, it was acknowledged that academic endeavour was also critical for the development of a national strategy and archaeology was introduced at the University of King Saud through the Department of History and the formation of the Society for History and Archaeology, and a museum (Al-Ansary 2005). In 1978 the Department of Archaeology and Museums was formally recognised as a specialized section for academic studies and research in the field of archaeology and later the museum transferred from the Department of History to this new section. Dr. Abdulrahman Al Tayib Al-Ansary, one of the founders of the Society for History and Archaeology, was responsible for this transformation and aimed to develop a national capacity for the study of archaeological sites, ancient writings and inscriptions in Saudi Arabia (Al-Ansary 2004). In addition to the above, the Department performs a key role in the teaching and training of Saudi students in methods of archaeological practice and policy (Al-Moaeghl 2003). The Department of Archaeology and Museums also launched 26 seasons of research excavations at the site of Qaryat Al Fau for the students of ancient archaeology and the Al Rabadhah site for students of Islamic archaeology, resulting in the research publications of *Qaryat Al Fau, a Portrait of Arab Civilization Before Islam* and *The Darb Zubaida* (Al-Ansary 2006). From these beginnings, the Department has now extended its research focus to Al Khuraibah for students of ancient archaeology and Mabbiyat for Islamic Archaeology (Al-Thinian 2004).

3.8 THE NEOLITHIC OF THE KINGDOM OF SAUDI ARABIA

3.8.1 INTRODUCTION

Having thus summarised the history of development of archaeological research in the Kingdom of Saudi Arabia, the aim of this present section is to assess the nature and character of the Neolithic of Saudi Arabia, as well as an understanding of the spread of Neolithic cultures through Arabia. It should be clear, however, from the above description that archaeology as a discipline in the Kingdom of Saudi Arabia is a relatively late development and has a very strong historic emphasis to it. As a result, our understanding of the temporal and spatial framework of the Peninsula's early and later Prehistory is quite limited. Indeed, most of the known sites have not been fully investigated, and consist only of find sites of stone tools and it is also clear that this group of 'Neolithic' sites ranges very broadly in date from the seventh to the second millennium BC, highlighting the difficulties of understanding the spread of this cultural and economic development across such a vast land mass. Our knowledge about the prehistoric period in Saudi Arabia is the also the result of a patchwork of efforts of individuals and scientific institutions active since the beginning of the twentieth century (Al-Amin 2003: 7-9).

3.8.2 THE DISTRIBUTION OF NEOLITHIC SITES IN THE KINGDOM OF SAUDI ARABIA

The Neolithic in Kingdom of Saudi Arabia may be defined as a period of prehistory characterised by the presence of a new stone tool technology, often polished (Abass 2001). It is also clear that there are strong external cultural links as apparent with reference to sites with ceramics affiliated to the Ubaid complex of lower Mesopotamia and the Persian Gulf. This latter complex may be broadly defined as a period of small, settled villages utilising farming between 6000 and 4000 BC and is associated with a flake-producing technology based on a hunting and food-gathering economy. The following review attempts to summarise the results of the comprehensive survey although it should be noted that it followed a methodology of reconnaissance by car with no GPS points and they reflect the regional schemes and numbering systems employed by the Comprehensive Survey (Fig 3.1).

3.8.2.1 THE SOUTH OF THE KINGDOM OF SAUDI ARABIA: THE EMPTY QUARTER

As noted in Chapter 2, the Empty Quarter covers an area of 25,000 km square kilometres and was subject to survey in 1979 where three main types of sites were identified, stone circles, stone tool cluster and the rough foundations of buildings. The most significant Neolithic sites discovered were Sites A, B, and C, which are all small and located in Al-Falag region, to west of the Empty Quarter. All were characterised by spreads of stone tools manufactured through pressure-flaking and surface material indicated a use of whitish, grey, yellow and orange chert and included a range of artefacts including double-edged tools and scrapers (Naeem 1995:159). Also of significance are the sites of Jalda-2, Sharora, Mutabattihat and Mundafin, particularly as archaeologist C. Edens (1982) conducted an analytical study of a set of stone tools collected from these sites. They were manufactured by sharpening both sides using pressure or a light hammer, a technique widely used in Arabia. Forms included double-edge sharpened pieces, arrowheads, single-face sharpened arrowheads, denticulates, arrowheads with sheaths, pointed arrowheads with three sections, leaf-shaped tools, spear-shaped tools, perforators and awls (Parr et al 1978: 31). Again, it is noted that the tools appear to represent a tradition in the Neolithic which incorporates the north-east of the Empty Quarter, the eastern area, Qatar and even the southern hills at the edge of the Empty Quarter (Al-Amin 2003:29). In a major article entitled ‘Towards a definition of the Empty Quarter Neolithic’, Edens indicated that the variety of these tools reflected different uses and suggested that Mundafin may had been a camp used by hunters between 6000 BC and 4000 BC, based on the dates derived from deposits in the paleolakes in the area . Animal bones suggested the presence of gazelles and goats, but it was considered that there was no evidence of domesticated animals or ceramic manufacture.

3.8.2.2 THE EASTERN AREA

Saudi Arabia's eastern boundary follows the Persian Gulf from Ras al Khafji to the peninsula of Qatar and Oman and the 1976 Comprehensive Survey recorded two main types of sites, stone circles and the foundations of buildings, and two main Neolithic artefact types, ceramics and lithics. In addition to survey, excavations were also carried at a limited number of sites, such as Abu Khamis, Dosariyya and Ain Ghanas, and all yielded artefacts of the Ubaid type (Fig 3.2). Strongly linked to Mesopotamia, however, in the context of Arabian prehistory many scholars have argued that they should be regarded as indicators of the Neolithic (Al-Masri 1975). Other key clusters include: Ain Al-Twerfi in Yebreen, which yielded Neolithic stone tools, sets of arrowheads, scrapers, knives, awls and spear points (Naeem 1995: 166); five Neolithic sites in Al-Qateef which yielded denticulate arrowheads, a large quantity of cores of quartz and other stone tools, most of which were made of flint (Naeem 1995: 166); sites on the Sabkha coast, Khwaisira, where flint arrowheads were recovered (Naeem 1995: 166); scatters in the Daeeran Mountains in Yebreen area, where a set of flint bifacials, grinders and scrapers made by irregular hammering of the surface was found (Naeem 1995: 166).

Al-Abeed proved to be one of the most important sites in the eastern region because it has provided Ubaid ceramics in association with the foundations of buildings (Al-Masri 1977: 79), although equally important are the few sites with radiocarbon dates, including Al-Dosariya whose ensemble of arrowheads, bayonets, blades and ceramics were dated to 6135 ± 325 BP (Al-Amin 2003: 27) and Abu Khamseen, north of Al-Dosariya, known for its ensemble of stone tools, Ubaid ceramics, coarse ceramics and gazelle, goat, sheep and fish bones dating back to c. 4000 BC (Al-Amin 2003: 27). Additional sites were located to the west of the Yebreen Oasis, including a cluster known as the Western Twairif Sites, whose surface finds included well-made flint arrowheads, scrapers, perforators, awls, knives, small blades and spearheads (Naeem 1995: 168).

Finally, reference must be made to Ain Qannas, also near the Yebreen Oasis, whose excavations provided evidence of flint, quartz and limestone arrowheads, hammers, blades, leaf scrapers, bladed arrows (Fig 3.3), rounded scrapers as well as sherds of ceramics (Al-Masri 1975). As noted by Al Masri, the key significance of this site is the number of Ubaid ceramics, which provide both an approximate date for the site as well as evidence of a link with southern Mesopotamia. Again it should be noted, however, that most scholars regard these sites as being of Arabian Neolithic type, in which Ubaid-type ceramics are recovered in addition to coarse plain wares, regarded to be of local manufacture.

3.8.2.3 THE NORTHERN AREA

To the north, Saudi Arabia is bounded by Jordan, Iraq, and Kuwait for almost 1,400 kilometres from the Gulf of Aqaba on the west to Ras al Khafji on the Persian Gulf. Along this boundary, the 1976 Comprehensive Survey again recorded two main types of sites, stone circles and the foundations of building along with Neolithic ceramics and lithics. Under the supervision of Peter Parr, the team found limited archaeological evidence of Neolithic settlement but no large urban clusters (Parr et al. 1978). The contents of some of these sites are similar to those of the sites of the same period in the Levant, in which there were tools such as scrapers, perforators and choppers. These sites are widely distributed in the area between the Wadi Sarhan to Hail and Kihaifiya and they are also found in the area to the north of the Nufud desert. Whilst such sites are estimated to date back to 4000 BC, Al-Sharekh suggests that some may be as late as 3000 BC. The Survey also recorded various types of stone constructions of square and rectangular shapes with statues, stone pillars and appended walls, but it is difficult to define their dates as they do not usually contain material or artefacts that can be dated. It may be anticipated that they cover long periods from the Chalcolithic up to a relatively recent date and although a few studies have been conducted on these constructions, they are still the source of scientific questions related to their functions and history (Al-Amin 2003: 30). Confirmed Neolithic sites include the Arar Valley, which stretches from south of Majma'a to the northwest of Skaka and whose plateau of limestone yielded surface collections of prismatic blades, chisels, and pyramidical pieces (ibid) and the Um Wa'al Mountain, 250 kilometres northwest of the Arar Valley, which yielded similar tools (Naeem 1995: 170).

3.8.2.4 THE CENTRAL AREA

The central plateau, the Najd, extends east to the Jabal Tuwayq and has again yielded ceramics and lithics of a Neolithic provenance. In 1978 the Comprehensive Survey identified bifacials, sharpened blades, sharpened fragments and scrapers similar to those artefacts found in the Empty Quarter, Eastern Area and Tuwaiq Mountain. The most significant sites included Al-Thumama, Site 372, which was 90 kilometres northwest of Riyadh and thought to have been inhabited in between c. 5000 and 1000 BC (Al-Amin 2003). The site's investigators suggest that its inhabitants were dependent on agriculture, animal breeding and hunting but did not make ceramics and recorded stone tools included scrapers, double-edge, perforators and blades. This first phase also yielded evidence of primitive construction, including stone circles and was followed by a phase of more intensive construction with circular and rectangular buildings built beside cemeteries (Al-Amin 2003: 29-30). Another Neolithic site, Al-Khamaseen in Wadi Al-Dawasir, provided evidence of blade tips, pointed tips, leaf-shaped tools (Naeem 1995: 174), whilst Site 207-102 yielded a small piece of slag, which may be considered an indication of the manufacture of copper. The presence of the copper and pieces of rough, red ceramics suggested to the researchers that the site may belong to the late Neolithic stage and date between c. 5000 and 2000 BC (Al-Amin 2003: 30). Finally, note should be made of the site of Wadi Al-Dawasir, where microlithic tools were recovered alongside blades, scrapers, arrowheads, spears and bifacial tools. In the Levant, such microlithic tools would be regarded as of an epi-Palaeolithic date, but because they occur in later Prehistoric contexts in Yemen, such an early date here in the Kingdom of Saudi Arabia cannot be confirmed (Al-Sharekh 2005).

3.8.2.5 NORTH WESTERN AREA

This region comprises a rocky plateau interspersed by small, sandy deserts and isolated mountain clumps and was surveyed in 1981 by Michael Ingraham. The survey of that year was concentrated in the areas that have never been explored by the earlier missions who had surveyed the northern and western area (Parr et al 1978). Stone tools were discovered at two sites. The first of these was the "Kalwa" site (200-134), where several stone tools spread on the surface were discovered, comprising a number of arrowheads, cut blades, grinders, axes, blade and other delicate flint tools. A large quantity of low stone circles, were discovered in the surrounding area. The other site was the Hathlool site, which has been registered at the Archaeological and Museum Agency as number 102-4, in which a large set of bifacial stone tools and small stone circles have been found, (Al-Sharekh 2005). Furthermore, other sites related to the late Neolithic era have been discovered; where a set of tools have been discovered at such sites, these included flint polished scrapers, delicate ground stone tools, hand querns, three sided forms, which might be transverse arrowheads, and threaded T shaped tools. Also, ceramic sherds have been discovered at three sites including 205-45, 205-56, 205-61, and hand-made ceramics with gray or black marble, mixed with chaff and large granules (Al-Amin 2003). Several issues can be mentioned in relation to the surveys mentioned above. These include gaps or voids in our knowledge of the details of the Neolithic era. Chronological problems arise from the few available C-14 dates and the lack of ceramic at many sites. Furthermore, there is a problem related to the stone buildings and structures located at the same place where other fossils have been found. This problem is found at many different sites in this part of the Kingdom attributed to the prehistoric period, which has remarkable importance in the early stage of human settlement. These sites cover all the Stone Age periods especially the Neolithic and the subsequent periods (Ingraham et al 1981).

The Tabuk area represents a central point between the Gulf and Nile valley in the west and Yemen in the south. This area was of great importance for early man who is thought to have moved from Africa to Asia and vice versa as indicated by archaeological evidences. This made the area a crossroads for old civilizations and cultures (Al-Sharekh 2005). The fifth year of the survey program of the Kingdom in 1980 recorded several sites attributed to prehistory and to the Neolithic, including:

Azlem Valley: This valley is 3.5 kilometres to the east of Al-Azlem Fort in the Tabuk area on a low plateau at the intersection of Azlem Valley with one of its small branches. The site includes a lot of flints which cover an area of about 26x45 meters. There are also various sources of natural flint. Most of these flints have indications of polishing and trimming which may imply that this site had been a quarry and trimming site.

Areeq Mountain (north): In the coastal valleys of the Tabuk area two sites attributed to the Neolithic were found (204-62/47). The last of these sites has special importance and is located deep in the valleys of Sahrra and Arneb in an area covered with sands and alluvium at the junction of two streams. The site consists of several curved walls and some debris of cemeteries. Also various tools and flints were found on the surface. The tools include the following: blades, perforators, scrapers with one denticulate blade.

Wadi Al-Akhder: In this site a set of polished flakes was found in circular, oval and rectangular formations. The constructions in this site also include some circular surfaces, heaps and sheets of stone beside a small rectangular space.

Al-Raqban Section 2, 3: In the Dhum Valley to the northwest of Tabuk, two sites were found which included stone circle which seem to refer to the Neolithic. The set of stone tools including a polished flint, bifacials, scrapers, which probably place this site in the period between 7000 to 8000 BC (Al-Amin 2003).

Al-Oyaina: This is considered the most important Neolithic site in the Kingdom. It is located to the northwest of Tabuk area near Al-Oyaina village on a small hill. The site includes several broken walls in two parallel lines of stones. It seems that these walls had been built on a terrace of the hill. The lithic tools found in the site refer to an early period of the Neolithic, and include blades, crescent shapes, and bifacial tools. The surface collection includes grinders and blades which attribute this site to the Neolithic. A single radiocarbon assay from this site yielded a date of 9030 BP (Alasmry 2008) which is of similar age to the site of al-Majama (see Chapter 6).

Qariyya: This site is about 10 kilometres to the east of Oyaina site. Stone tools of the Neolithic were found in this site. During the first survey (Parr et al 1978: 241) some stone tools were found including chisels of flint. During the 1980 survey a large amount of well-made flint tools were found including bifacials, arrowhead and blades. The importance of these sites is that they related to pre-ceramic period, because no ceramic has been discovered. They are also close to the Levant.

Kalwa Site: This is to the northeast of Tabuk city and is located between some hills of sandstone. Abundant stone tools were found, such as blades, sharpened, blades, chisels (Al-Sharekh 2005).

3.8.2.6 WESTERN AREA

The western coastal escarpment can be considered as two mountain ranges separated by a gap in the vicinity of Mecca. The northern range in the Hijaz seldom exceeds 2,100 meters, and the elevation gradually decreases toward the south to about 600 meters around Mecca. The rugged mountain wall drops abruptly to the sea with only a few intermittent coastal plains. There are virtually no natural harbours along the Red Sea. The western slopes have been stripped of soil by the erosion of infrequent but turbulent rainfalls that have fertilized the plains to the west. The eastern slopes are less steep and are marked by dry river beds (wadis) that trace the courses of ancient rivers and continue to lead the rare rainfalls down to the plains. Scattered oases occur, drawing water from springs and wells in the vicinity of the wadis. There are two main types of artefacts that were recovered, ceramics and lithics tools. It was subject to survey in 1976.

The fifth year of the Comprehensive Archaeological Survey program focussed on the coastal plains along the Red Sea, as well as the North-Western valleys. Furthermore, surveys were conducted at several sites in the west of Sarhan and Wedian valley (Parr et al 1978). Ingraham's team discovered eight sites that related to the Neolithic era, three of which were on the coastal part of the valleys, while the remaining five were discovered in the Tabuk basin. Comparisons with similar materials from Jordan and other areas in the Kingdom have been utilized to identify several locations of significance (Ingraham et al. 1981). Through analysis of the stone tools found in the Western Area sites it was possible to work out a general picture for the prehistory of the western region. Most of the sites were concentrated in three geographical areas: Wadi Fatima, the hills overlooking Bahra area, Jeddah city and its surroundings. The Neolithic period in the Western Area is to some extent different from other areas outside Arabia because there was no evidence for the widespread use of ceramics, settlements, animal domestication or agriculture. One of the most prominent characteristics of the Stone Age in this region is the abundance of sites related to making small stone blades and the industries of the Neolithic were dominated by the use of flint and other silica stones which are easy to trim and form as per the requirements of the maker (Al-Rashid 2003: 80). Sites attributed to this period include Khulais Village, at the end of Khulais village hills about 85 kilometres north of

Jeddah city, which yielded surface finds of flint tools (Naeem 1995: 164) and a further nine sites in the area of Harrat and Khayber, which yielded blades, flat flint scrapers, double-surface tools and grinding stones (ibid: 183).

3.8.2.7 SOUTH-WEST AREA

The south-west area of the Kingdom of Saudi Arabia includes a number of mountains exceeding 2,400 metres in several places, with some peaks topping 3,000 metres, with a rugged escarpment face dropping steeply westwards to the coastal plain. This plain, also known as the Tihamah lowlands, has an average width of only sixty-five kilometres and comprises a salty tidal band of limited agricultural value, backed by rich alluvial plains. The relatively well-watered and fertile upper slopes, and the mountains behind, are extensively terraced to allow maximum land use and the Comprehensive Survey identified evidence of sites, stone tools and ceramics attributable to the Neolithic period in all three zones in 1981. In particular, the Antiquities and Museums Department discovered a number of sites with bifacial arrowheads and leaf-shaped tools that resemble finds in the Levant and Iraq area from a broad period between 5000 to 2500 BC and made from a variety of different types of stone, including white quartz, sandstone, obsidian and flint. The surveyors noted that whilst some were sourced locally, other must have been imported from some distance (Al-Amin 2003: 31). A major cluster of 18 Neolithic sites was recorded in the Aseer Hills, ranging in location from the highest peak Al Sawda Hill (Site 217-135/136) up to the low mountains west of Najran (Site 217-73/74/77). It is worth noting that the characteristics of this site are typical of the finds from Hima and the Tathlith Valley (see Chapter 7) with tools including flint arrowheads, blades, scrapers, and flakes, although a small portion were made of obsidian. A number of contemporary stone circles were also recorded, including Site 217-231, which is located on a high cliff overlooking the Tihama Mountains (Zarins 1981: 22) and Al-Asran, where a complex of more than 30 circular granite constructions was found, ranging from simple plans to ones more reminiscent of the typological style of north Arabia (ibid.: 22).

The survey also recognised Al Sihi (Site 217-107), some 40 kilometres from the Yemen border, to be the largest of all the Neolithic sites of the Tihama coastal belt. It is also one of the most extensively investigated sites as it was excavated first by Zarins in 1981 and then by al-Ghamdi in 2006. Although considered in more detail in Chapter 5, the site covers an area of about 1500 by 1500 metres and is about 60 metres from the shore. The site yielded flints of a red and orange colour and a large number of ceramics, including bowls and other vessels of different sizes, shapes, many of which were ornamented with wavy and dashed lines, vertical and horizontal strips and perforations. Other finds included grindstones, made of volcanic rock, sandstone and granite, soapstone, flints and other objects and also a number of degraded copper rings, needles, blades (Al Ghamdi 2006). The excavations suggested that the site was a seasonal settlement for groups of hunters, who made use of the marine resources and whilst finds were present up to a depth of 30 cm, there were no remains of architectural constructions. Radiocarbon dates of three samples of shell provided a date range of between c. 1540 and 1200 BC (Zarins 1981). It is notable that these dates indicate that the ceramic assemblage represents the earliest yet recovered from the south of the Kingdom of Saudi Arabia and studies of this ceramic and its ornamentation indicate that it is widespread within the Red Sea coast and amongst the Farasan Island. Beyond Arabia, Al Sihi ceramics may be compared with the ceramic of the Group (C) civilization in Nubia and Karma, which date to between 2200 and 1000 BC in northern Sudan, and some researchers consider this to be evidence that there was some interaction between Arabia and north-eastern Africa towards the end of the second millennium BC (Zarins 1981). Other sites included Al-Hussain (Site 217-101), at the foot of the Tihama Mountains, which yielded Neolithic scrapers, debitage, blades and flakes of dark chert as well as obsidian debitage, suggesting that this had been a centre for manufacturing obsidian and flint tools (Zarins 1981: 22). Finally, note should be made of several Neolithic sites in the narrow valleys and mountain slopes of the Tathlith Valley, where concentrations of flint and chert scrapers with finely-sharpened tip and side blades, a distinct group of pierced and unpierced chisels and cores of conical stones (Zarins, 1981: 21) and two sites at Hima (Sites 217-149/159), which yielded soapstone flints comparable to the set of Neolithic tools characterising the Empty Quarter (Zarins 1981: 21)(see Chapter 7).

3.9 DIFFUSION, TRANSMISSION AND RECEPTION

All publications concerning the prehistoric archaeology of the Kingdom of Saudi Arabia make frequent references to the archaeological and cultural sequence of the Levant, and particularly to southern Jordan (Abass 2001). To an extent, this is to be expected as the northern part of the Kingdom, the Levant, southern Iraq, and the Persian Gulf form a distinct geographical area with recurring features such as hills, plains, rivers, deep valleys, deserts and semi deserts. This area had an important mix of cultural exchanges and networks from the prehistoric period onwards and a number of scholars have suggested that the subsequent arrival of the Epipalaeolithic and Neolithic communities led to an increase and dispersal of population as the economy changed from hunting and gathering to domestication and the establishment of sedentary settlement (Al-Amin 2003). As a result of this general background, a number of external scholars have continued to investigate the traces and pathways of the dispersal of such Neolithic communities into the Kingdom of Saudi Arabia as illustrated by the work of Drechsler (2007). Utilising a method pioneered by North European archaeologists, he has developed computer simulations of human dispersals which react to changes of environmental conditions during the Holocene and geographical features. Drechsler's simulation of the Neolithic through the Arabian Peninsula, was based on the impact of the quality of geographic space on dispersal routes, underpinned by the assumption that dispersal was dependent on the favourableness of the land and environmental conditions. In simulation experiments, these environmental conditions are represented by a spreading surface combining spatial environmental data sets and a "point cloud" to represent the dispersing populations. Several theories based on innovation diffusion research and ecology were incorporated into this model and the existence of an initial centre of domestication, from which dispersal started, was assumed in the Levant during the Late PPNB. The dispersal continued from this centre into the adjacent spatial periphery as it was likely that 'roaming herding groups' initially populated nearby places rather than places farther away. Humans were largely restricted by environmental conditions, particularly aridity, and these constraints increased if environmental conditions deteriorated. Because dispersal routes were the main focus of research, the model followed simple rules about population dynamics, assuming firstly, that as environmental conditions in a specific area become unfavourable, movement became faster and covered a wider area; secondly, that probable pathways of dispersal can be simulated by a stochastic procedure which represents environmental constraints on a particular area; and, finally, that freedom of human decisions is replaced by a random component and that the movement of human population groups is simulated as a time-discrete succession of random movements (Drechsler 2007).

Drechsler's resultant model is one in which the Neolithic clearly spread from the north to the south and even though his attempt was based on assumptions as yet unverified through the process of further archaeological surveys, it reflects an overwhelming assumption of southern diffusionism (Drechsler, 2007: 93-109). One core driver for the dispersal of Neolithic communities over the Arabian Peninsula was that a period of moister climatic conditions prevailed during the early and middle Holocene, as already discussed in Chapter 2. In southern Arabia it was generated by a northward shift of the Indian Ocean Monsoon and to understand the outcome of the simulation procedure, the model investigated artificial environments consisting of a number of patches with differing degrees of favourableness for the spread of populations. Spatial situations like 'bottlenecks' were also investigated, as well as use of the most favourable areas, whilst unfavourable areas were not populated. The model indicated two different branches developing from the point of origin, one branch developing southwards along the east coast of the Red Sea, and the other towards the south-east, entering the Qatar peninsula and dispersing further southwest. Two patterns of note are that there is a high simulated point density in the Eastern Province of the Kingdom of Saudi Arabia and, secondly, that the western branch towards the Red Sea corridor advances faster because less-favourable environmental conditions cause higher mobility. Importantly, these simulations indicate that the location of archaeological sites in Saudi Arabia and Qatar could have been the result of a dispersal process that was restricted and enforced by local environmental conditions, and point to a continuous dispersal beyond this area (Drechsler 2007).

Although not core to the aim of this thesis, the question of the 'Neolithic' peopling of Arabia is critical for understanding the genetic composition of modern Arabian populations and understanding the dynamics of Early Holocene population expansion into Arabia – it is also useful for understanding the Pleistocene expansion. Indeed, population continuity or replacement between the Pleistocene and Holocene in eastern Arabia cannot be proved but Uerpmann and colleagues have offered three hypotheses relating to the Neolithic expansion into Arabia. Firstly, that the peopling of eastern Arabia by PPNB-related settlers was the result of widespread climatic deterioration to the north of the Arabian peninsula around 6200 BC; secondly, that this peopling was the result of widespread population dispersal during the Early Holocene; thirdly, that the earliest settlement in south-eastern Arabia reflects the result of repopulation from South Arabia and/or north-eastern Africa (Uerpmann 2009). Most archaeologists tend to support the second possibility, because of the timing of the expansion amid a period of environmental improvement and, in their view, expansion into the desert was more likely triggered by a pulling, rather than pushing mechanism. They also concur that there is not yet enough evidence to assess the third possibility.

Fedele examined the Early Holocene occupation of the Yemeni Highlands and identified an Early Holocene 'Pre-Neolithic' habitation throughout the eastern Yemen Plateau. Describing Pre-Neolithic material from site WTH3 in Wadi at-Thayyilah (discussed above) as a microblade technology, he notes the similarities of the features of this industry with East Africa rather than the Fertile Crescent, leading the author to attribute the African terminology of 'LSA' (ibid.). Similarly, McCorriston and Martin examined the evidence for the development of Early Holocene pastoralist societies along the desert margins of southern Arabia and questioned the origin and date of the earliest domesticates. Concurring that domesticated taurine cattle could have arrived from the Levant, or possibly from Africa by the sixth millennium BC, Uerpmann and colleagues have suggested that there were multiple waves of expansion into Arabia, and that the data presented by McCorriston and Martin indicate that cattle were introduced into Arabia with differing human populations at different times, and that the earliest herd animals were probably introduced as a pioneering strategy among local hunters (Uerpmann et al. 2009).

Suggesting that the Holocene peopling of Arabia came from many sources and at different times, Uerpmann and Uerpmann (2009) conclude that it is wrong to speak of 'colonization' in the singular but that the peopling was likely to have been a process which may have involved hunters and gatherers coming from the south, followed by ceramic-using herders from the north-west using some variant of PPNB-related lithic technology. New populations may have come to this area by both land and sea. It is also necessary to emphasise Arabia's maritime position and the impact of new trade routes, which emerged in the region with the advent of seafaring technologies in the mid-Holocene (Uerpmann 2009). Indeed, the development of maritime subsistence, seafaring capabilities and trade activities on both the eastern and western sides of the peninsula occurred at roughly the same time, but each had unique characteristics. Boivin also suggests that the movement of zebu and other domesticates to Arabia, key crops between Africa and India from as early as the second millennium BC were the result of the activities of small-scale Arabian societies, rather than solely the work of the Bronze Age states as, as is often believed (Petraglia 2009). The question of dispersal and adaptation remains uppermost in people, including the spread of the Ubaid or different types of stones tools such arrowheads in east and north of Arabian Peninsula (Al-Masri 1977: 12) but there appear to be many reasons for supposing that the cultures which spread from the north to the south were rooted in the middle Holocene period. These include the oldest evidence of domestication being found in the Zagros mountains, in Anatolia, in the northern Levant and later in the southern Levant in addition to the suggestion that wild distribution of cow, sheep and goat lie outside the Kingdom.

Finally, some consideration should be given to the original Palaeolithic dispersals 'Out of Africa' and the role of Arabia as it is assumed that large groups of peoples crossed the borders of the African continent and moved into different parts of the Asian continent through either of two routes. Because such migrations occurred in the Palaeolithic, one must also allow for populations remaining in certain “refugia” within moister parts of the region, such as SW Arabia (Rose 2010).

The first route would entail the migration of people from the north of Africa, across Sinai towards Arabia and then to the other parts of the Asian continent (Bailey 2009). Such a route would account for the presence in the Kingdom of Saudi Arabia of the early site of Shwaihitiyya, which dates to 1.3 million years ago (Al-Sharekh 2005). The second route would entail, people crossing the Bab al-Mandeb into the south-west of Arabia, where the low sea levels that prevailed during the glacial phases together with the use of some primitive artefacts for crossing water may have helped them to cross to the opposite land (Rose 2004). Still hotly debated, other routes or variants of routes are suggested by Whalen (2004) and Zarins (1995) but only further systematic survey and excavation will help solve this question, but it is clear that the Arabian Peninsula has been subject to numerous introductions of people, plants, animals and technologies from many different sources at many different times (Al-Sharikh 2005: 110-121).

3.10 CONCLUSION

Having first defined the prehistoric sequence for the Near East as a whole, the second part of this chapter discussed the history of archaeological research in the Kingdom of Saudi Arabia and demonstrated that the Kingdom’s archaeological sites have not enjoyed the same research focus on its later Prehistory as its neighbours in the Near East. Indeed, the vast majority of foreign collaborative projects appear to have been mainly focused on historic and epigraphic research with little attention to the fundamental regional questions such as the development of domestication, the introduction of the Neolithic and the emergence of urban forms. Indeed, it would be true to state that much of the development of its archaeological sequences was haphazard in nature before the 1970s and the promotion of an awakening of national interest in heritage. Gradually since that time, the infrastructure for research and exploration has been established in both state agency level as well as within higher education and these solid foundations have vastly enhanced our experience and knowledge. The successful construction of this infrastructure now also allows the development of a more research-oriented agenda and this thesis represents a sustained attempt to extend this systematic approach to the south-west of the Kingdom.

It is also clear from this chapter, however, that the later prehistoric sequence of the Kingdom of Saudi Arabia is still in its formative stages in comparison with the robust Neolithic sequences of its neighbours with much of its temporal and spatial framework still to be constructed. Indeed, it is clear that although a number of Neolithic sites have been identified through exploration, and some by excavations as well, few have been fully analyzed and, when published, have only included the briefest of publications in Arabic with few finds illustrated. Similarly, there has been almost no detailed identification or analysis of fish, animal or even shell species and a rather loose 'Neolithic' label attributed to any find site which has yielded stone tools and no metal objects between 8000 and 2000 BC. It may be anticipated that this situation will not change until systematic surveys have been conducted within all regions of the Kingdom of Saudi Arabia and test excavations conducted in order to date, define and analyze the nature of the material culture in the different regions. Moreover, although the most abundant category of identified sites currently appears to belong to hunting and fishing communities, perhaps representing long-term trajectories of region-specific specialization adaptation, links between these specialized sites and other, more general sites have still not studied providing a very incomplete picture.

Finally, this thesis acknowledges that a number of key external and internal factors have greatly delayed the study of the later prehistoric period in Saudi Arabia. One of the most influential external factors has been the focus of international researchers and funding on the early urbanised and literate cores in the Levant, Mesopotamia and Nile Valleys leaving the Arabian Peninsula neglected. This concept of a largely uninhabited region with a marginal economic and social role in the development of key Old World chronologies has combined with the physical and political difficulties of international researchers to travel freely within the land mass to further isolate scholars in the Kingdom from the development of new techniques and methodologies. As a result of these earlier factors, the research capacity of the Kingdom has tended to focus on the recording of major constructions, often later, engravings and petroglyphs and a greater focus of historic and Islamic sites and sequences. These factors, combined with the absence of the formation of tell mounds, may have delayed the development of archaeological research and exploration in the Kingdom, but they have also served to preserve many key sites in good condition, untouched and un-looted by people. As a result, it is expected that many significant archaeological discoveries will be made in time in the Kingdom of Saudi Arabia, but it will take a series of case studies, similar to the one contained in this thesis, to be successfully implemented and completed first. The following chapter, Chapter 4, will introduce the first new data-base of this thesis by discussing the prehistoric remains on the Farasan Islands.

Locality	Material	IRM Lab. No.	^{14}C content (% mod.)	Assumed initial ^{14}C content (% mod.)	^{14}C age uncorr. (years B. P.)	Cultural Stage
Jobil East of KSA	Charcoal	7616	55.5 + 2.8	100	5090 ± 80	Ubaid
Ganas1 East of KSA	Charcoal	7619	1.0 + 0.7	100	7060 ± 445	Ubaid
Ganas2 East of KSA	Charcoal	7616	9.5 + 0.5	100	6655 ± 320	Ubaid
Al-Dosariya East of KSA	Charcoal	7618	5.0 + 0.6	100	6135 ± 325	Ubaid
Al-Dosariya East of KSA	Charcoal	7619	7.9	100	6900 ± 330	Ubaid

Table 3.1: Table showing C14 dating of Neolithic sites in Saudi Arabia (After Naeem, 1995:80) A single radiocarbon assay from this site Al-Dosariya yielded a date of 9030 BP which is of similar age to the site of al-Majama (see Chapter 6).

Fig. 3.1 Map showing the distribution of prehistoric sites in the Kingdom of Saudi Arabia (After Almohai 2007: 69)

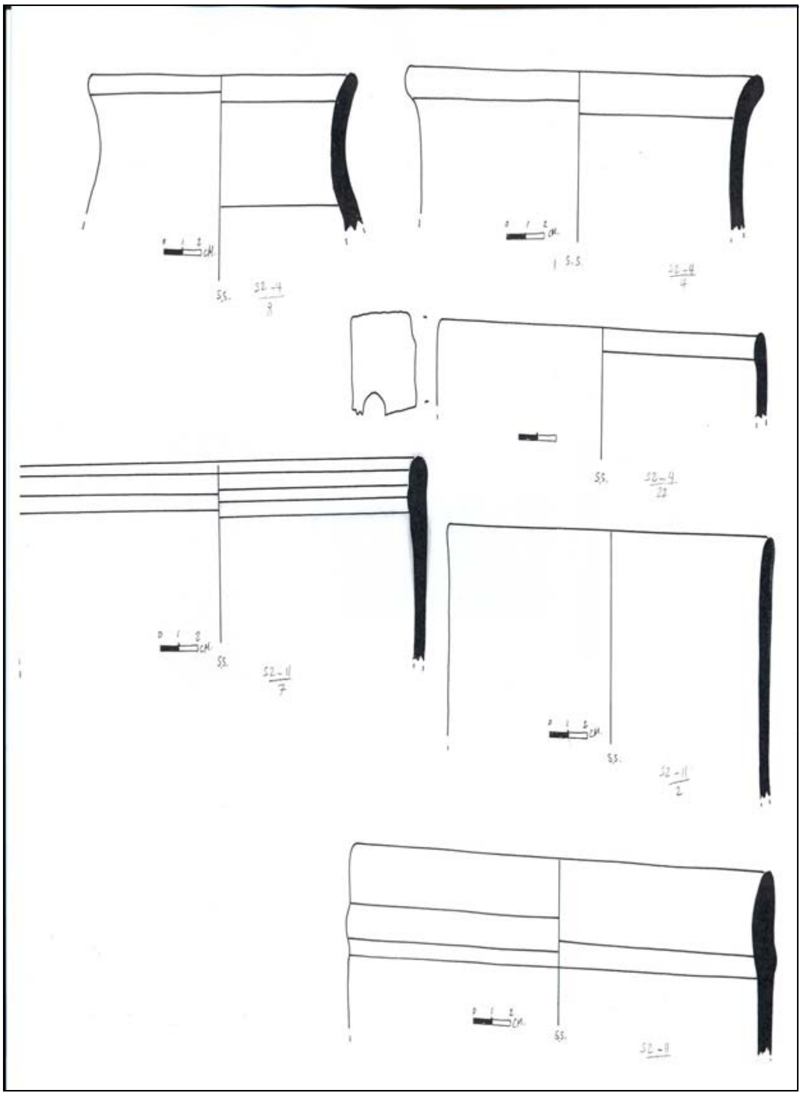

Fig 3.2 Abu Khamis site, Ubaid type of ceramics After Al Masri 1975.

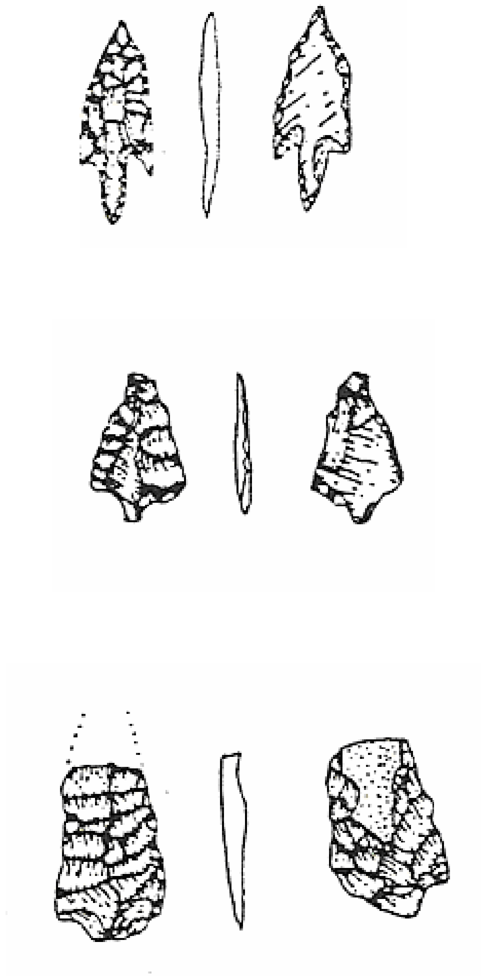

Fig 3.3 Arrowheads from Ain Qannas site After Al Masri 1975.

CHAPTER 2: THE GEOGRAPHY AND PALAEOENVIRONMENT OF THE NEAR EAST AND THE KINGDOM OF SAUDI ARABIA

2.1 INTRODUCTION

Having introduced the aim and objectives of the thesis in Chapter 1, this chapter will now define the geographical context of the study area of the Near East and the Kingdom of Saudi Arabia – the focus of this study. Having outlined the country's borders, regions, climate and topography, the objectives of this chapter are to assess the geography and climatic setting of the south-west of Kingdom of Saudi Arabia before addressing our current understanding of the palaeoenvironment of the Arabian peninsula.

2.2 THE GEOGRAPHY OF THE NEAR EAST

The Near East is a frequently-used political and geographical term to refer to the region including northern Africa, the Levant, the Arabian Peninsula, Anatolia, Turkey, Iraq and Iran. Although there are different geographical features in the ancient Near East, such as coasts, mountains, steppe, river valleys, lakes, and seas, we will concentrate on the main natural units in this regard, mountainous regions over 1000 metres. These include the Pontic Mountains in northern Turkey, and Taurus Mountains in the northern part, in addition to the Levantine western and eastern mountains that pass through Syria, Lebanon, Palestine, Jordan. This mountainous zone also includes the Elburz Mountains in northern Iran, and the Zagros mountains on the borders between Iraq and Iran, the height of which exceeds 2000 metres above sea level, especially in the area of eastern Turkey and northern Iran (Kafafi 2005). Penetrating these mountains are groups of valleys, rivers and plains with mountainous regions providing access to meadows, upland pastures and trees with farming and cultivated crops in the surrounding plains. The large rivers of this area are also important features and the Tigris and Euphrates were formed during the Pliocene geological era, in part, as a result of tectonic events that resulted in major down-faulted troughs, while the Iraq valley plains were infilled with river deposits that were eroded by natural factors from northern and eastern mountain heights (Kafafi 2005). On their seaward side, many of these mountain chains are flanked by coastal plains. The Levant also includes the Afro-Asian Great Rift Valley, which begins in the northern Syria (Al-Umq) plain, and passes on south towards the lake areas in central Africa. The Jordan rift and the Dead Sea, in addition to the Araba Valley, are amongst the longest continually-inhabited areas of human civilization. The Jordan rift differs in its width from one area to another (between 3 and 25 kilometres) as it decreases toward the Dead Sea, to reach 410 metres below sea level, and so this is considered the lowest point on the earth's surface. This geographical diversification appears to have led to cultural diversification (Redman 1978), whereas the delayed appearance of sedentary settlement in some countries, such as the surrounding area in Iraq and the Nile valley, was because of the absence of political unity throughout the centuries. Mountainous lands also contributed obstacles to movement between the coast and desert and the low level of rainfall in some desert areas required people to live in close proximity to permanent water sources, such as springs and natural basins.

2.3 CLIMATE OF THE NEAR EAST

The different geographical units, such as the coast, mountains, and low valleys and their vegetation result in different climate types. This is naturally of significance as climate has always been regarded as an influential factor in the development of social complexity and a temperate climate characterised by a low level of temperature and high level of rainfall has been considered by many to be the main factor affecting the availability of plants and animals (Kafafi 2005). This, in turn, helps human communities to live a prosperous life through domestication and stable, sedentary settlement. On the other hand, areas of aridity and desert present limitations to the development of both sedentary and pastoral societies. Thus the geography of a region, its topography and the nature of the surrounding areas and their plant life may be expected to have an effect on the nature of climate, including temperature and rainfall. There are other factors that can help us in determining the nature of climate and its effect on prehistoric communities in the Near East and comparing them to other parts of the world (Redman 1978). For example, it is well known that winds passing over oceans and seas contain significant amounts of water vapour, which in turn results in rain upon meeting cold air or when the rising air masses cool over coastal ranges. The western mountains of the Levant, and their location close to the Mediterranean, intercept the western and northern winds that blow from the sea, which in turn assists in the growth of trees and crops around these mountains (Kafafi 2005). Towards the southern part of the Arabian peninsula, the Indian Ocean monsoon results in a very different pattern of seasonal rainfall. In contrast to the westerly winds of the north which result in winter rainfall, here summer rainfall dominates, especially along the coasts of southern Oman and in south-west Arabia, including Yemen and the Jizan region of Saudi Arabia. Variations of these western and monsoonal climatic belts are held to be very significant for the development of Arabian prehistory (Redman 1978).

Deserts extending through large areas of the ancient Near East are also considered to contribute to the factors that have affected the nature of the climate in Arabia as dry winds, full of silt and sand particles accentuate the already high temperature levels that could reach between 15 and 20^{o}C in a few hours (Redman 1978: 21), and the force of such wind leads to increased dryness in the area which can destroy its plant cover. Normally, these warm winds blow during autumn and spring, and the high levels of temperature in the desert are associated with low temperatures in the northern hemisphere of the earth. It has also been observed that the temperature in the Levant, whether in plains or in valleys, is very high during the summer, especially in the daytime. This case also applies to other locations, especially the narrow area between the east coast of the Mediterranean and the western hills. In all cases, the determinant of climate in the Levant is the Mediterranean, which is very hot during the summer and cool during the winter when snow can fall on mountains, especially during very cold seasons (Redman 1978).

The level of annual rainfall in the Near East differs from one area to another, depending on the topography and proximity to coast and lakes (Kafafi2005). In addition, the quantity of rainfall differs from one year to another, varying from 500 mm in the west to as low as 50 mm in the desert. This variance of rainfall affects farming, as a high level of rainfall leads to higher crop yields and more production, with people depending on rain in their farming instead of irrigation. In addition, there was heavy rainfall in winter on high mountains and on the coastal plain, and accordingly, people during those ancient times depended on farming of crops during winter as is the case today (Kafafi2005). Crops such as barley, wheat, peas, lentils, chick peas, and flax (for linen) are all winter crops, and are planted during the period between October and December each year while harvesting of crops begins in May and June; but this differs from one area to another depending on the local climate in each place. From this point we see that the nature of the climate and plants influences the nature of human activities during the year (Kafafi 2005). Whilst some areas, such as the Nile valley, relied on late summer floods to help grow winter crops, in Mesopotamia the spring floods required communities to dig channels to conduct water for irrigation during the spring thus highlighting the ability of individual communities to intervene artificially to enhance their own natural environments (Redman 1978).

In Jordan the earliest evidence of herd animals of sheep and goats comes from the deserts where there is also evidence of seasonal agriculture. In southern Jordan, however, the Neolithic economy was based on hunter-gathering. Herd animals were introduced there in the late seventh or early sixth century BC and eventually herd animals replaced hunted animals and initiated a herder-gatherer economy (Rosen 2008 :119). By the end of the sixth millennium BC, formative tribal organisation existed in the desert, and separate tribal groups sometimes combined in hunting, building monumental structures such as ritual "solstice" sites; and in setting traps for gazelles. Hunting also played a social role among these pastoral groups. There are important differences between owning a herd and the associated conservation of animals and hunting and exploitation of them and this creates basic differences in value systems between hunters and herders. In the herder-gatherer phase of evolution there was an explosion of spiritual activity reflected in the construction of desert shrines often of great size. These shrines were related to the solstice and frequently involved rituals associated with death and burial. There was a connection between this spiritual activity and the new pastoral way of life, but it is often difficult explain and archaeology has so far failed to do so. There is much speculation on this subject but little hard evidence (Rosen 2008 :120).

Another aspect of pastoral ideology is the organisation of space. The clustered room architecture of the PPNB is replaced by larger habitation huts the centres of which are open spaces which were possibly animal pens as at the Pottery Neolithic or Chalcolithic sites. The shrines have already been mentioned, and the development of large circular burial structures in southern and central Sinai suggests a need to demarcate and legitimise ownership of territory. The development of distinct settlement areas is matched by a two level hierarchy of site size which probably indicates seasonal movement within a territory. The increased territoriality is also linked to the pressures of herd management, such as the availability of food and water supplies. To some extent these site distribution patterns parallel those of desert hunter-gathers of 5,000 years earlier. With the rise of herding societies territoriality also becomes an issue of shared borders. Population increase may be an additional factor leading to increased territoriality (Rosen 2008 :121).

The rise of economic relations between nomadic tribal groups and sedentary societies occurred because of increased social complexity. Copper seems to have been the focus of much of the trade between the two groups, but the desert nomads also produced and exchanged milling stones, beads, seashells, hematite and chipped-stone tools. They also seem to have imported from the settled groups commodities such as grain and pottery. The large number of early Neolithic settled sites suggests an increase in the desert population and it is unlikely that this population could be sustained by a herding-gathering subsistence economy and the abandonment of Arad, in Palestine, around 2,700 BCE, seems to have entailed the collapse of its pastoral nomadic hinterland (Rosen 2008 :123).

Technology also played and important part in this development, as did product exploitation; the efficiency of herd exploitation based on dairy products and meat was double that of mobile hunting. Hair and wool were an additional source of income and helped to push the economy beyond the level of subsistence, while the domestication of the donkey made long distance trade possible for the first time as did the domestication of horses, for riding, which must have had a similar impact. But it was the use of domestic camels as pack animals in the first millennium BC that was a watershed event in pastoral nomadic history in the Near East. A strong pack animal can carry 200 to 325 kg. of goods and can travel for several days without water. These camels made possible long-distance trade with Arabia that was previously unheard of. This long distance trade using camels became the classical stereotype of the nomad. The rise of the Nabateans who established a trading route between Petra and the spice route through the desert was only possible because of the use of camels. In addition, the invention and use of the North Arabian riding saddle in the latter half of the first millennium BC, and the introduction of the composite bow, allowed fighting from camelback and made desert tribal societies a military threat. The invention of large woven tents in first millennium BC was also a technological milestone in the history of pastoral nomadism. The tent allowed great mobility for nomadic life and gave greater flexibility of spatial arrangement within camps and made possible larger communal structures with internal divisions (Rosen 2008:125).

A further technological development was the construction of wells and cisterns which often served as borders between tribes, or were the cause of inter-tribal conflict. They also extended the grazing areas for sheep and goats. Desert agriculture was made possible though nomadic control over farming areas. This may have increased internal tribal inequalities. Desert farming in areas of low rainfall using cisterns and run-off systems is still practised by Bedouins today and produces barley and wheat. The introduction of the gun in the late eighteenth century CE had a further powerful impact on Bedouin society in the Near East. Patterns of warfare changed because the early matlock musket could not be used mounted so Bedouin raiding strategy changed to the ambush. The use of the gun also caused the near extinction of gazelle, roe deer and ostrich and reduced the social role of hunting. More recent technologies such as the use of trucks for transporting animals, wheeled water containers, tractors and communication technologies have also had great impacts (Rosen 2008:126).

The evolving nature of neighbouring settled communities also had profound effects on pastoral nomadic lifestyles. These effects can be classified as follows: sedentary societies have always expanded into nomad territory which tends to compress them into smaller areas which then increases pressure on resources. These expansions occur as a result of increasing populations, increasing political integration and military power; as well as more effective technologies. Even when these expansions are unsuccessful, the physical infrastructures which are left behind change the nature of pastoral societies. Over centuries the goods sold by Bedouins have changed from being totally made by the Bedouins themselves to being totally imported. As a result, nomadic economic activity has become absorbed in to the wider economic picture. The long-term history of Negev pastoral nomadism suggests that their economic activities have increased in range, importance and the number of people engaged in them. There was a move from simple herder-gathering to a range of cottage industries to supplement their pastoralism in the Bronze Age, while by Nabataean times trade systems became the very reason for the presence of nomadic tribes in the Negev. In the Byzantine period, local nomads served as guides to pilgrims visiting Sinai; raised camels and donkeys for the Byzantine army; worked as peacekeepers for the Romans, with raiding as an additional economic activity. In modern times the nomads have had greater access to markets and this involved cash transactions. Economic integration between the nomads and settled communities seems to have increased with time. There has been a long-term increase in the nomadic population over time and this is reflected in the number of camps and small campsites beyond the areas of the settled population. This increase in the nomadic population from a few hundred in the herder-gatherer phase to thousands in the Classical Era must indicate levels of adaptation and integration with the settled community (Rosen 2008 :126).

2.4 THE GEOGRAPHY OF THE KINGDOM OF SAUDI ARABIA

Having thus introduced the geography of the Near East, and the constraints on everyday life, this section will now summarise the geography of the Kingdom of Saudi Arabia. The Kingdom Saudi Arabia, with an area of about 865,000 square miles, occupies the bulk of the Arabian Peninsula. It is roughly one-third the size of the continental United States, and the same size as all of Western Europe, and lies at the crossroads of three continents, Europe, Asia, and Africa, extending from the Red Sea on the west to the Persian Gulf in the east. To the north, it is bordered by Jordan, Iraq, and Kuwait, and to the south, by Yemen and the Sultanate of Oman. To the east lie the United Arab Emirates, Qatar, and the island state of Bahrain. Saudi Arabia's terrain is varied, but on the whole fairly barren and harsh, with salt flats, gravel plains, and sand dunes, but few lakes or permanent streams (Gradi 2004). The topography and geology of Saudi Arabia is varied and may be divided topographically into two major systems represented by the Arabian shield, covering almost one third of its western part and containing a huge range of Precambrian rocks; and the Arabian shelf in the eastern part of the Kingdom, which is made of sedimentary deposits and soils sloping towards the Arabian Gulf, drained by wadis flowing from the western part towards the Persian Gulf (Shaheen 1997). To the south is the Empty Quarter, the largest sand desert in the world and in the south-west, the mountain ranges of Asir Province rise to over 9,000 feet. Extensive lowlands lie on its eastern side where it is fringed by the coast of the Persian Gulf, and on the western side it is edged by the Red Sea, while the chain of Al Sarawat (Hijaz) Mountains extend from the north to the south of the Kingdom (Al Abdulhadi 2002) .

As noted above, the Arabian Shield is an ancient massif composed of stable crystalline rock, whose geologic structure developed concurrently with the Alps. Tectonic movements have caused the entire mass to tilt eastward and the western and southern edges to tilt upward. In the valley created by the fault, known as the Great Rift, the Red Sea was formed. This fault runs from the Mediterranean along both sides of the Red Sea, south through Ethiopia and the lake country of East Africa, gradually disappearing in the area of Mozambique, Zambia, and Zimbabwe (Al Ahamry 2001). Scientists analyzing photographs taken by American astronauts on the joint United States-Soviet space mission in July 1975 detected a further vast fan-shaped complex of cracks and fault lines extending north and east from the Golan Heights, and these fault lines are believed to be the northern and final portion of the Great Rift, and presumed to be the result of the slow rotation of the Arabian Peninsula counter clockwise in a way that will, in approximately 10 million years, close off the Persian Gulf and make it a lake (Abu Moath 2001). On the Arabian peninsula itself, the eastern line of the Great Rift fault is visible in the steep, and in places high, escarpment that parallel the Red Sea between the Gulf of Aqaba and the Gulf of Aden. The eastern slope of this escarpment is relatively gentle, dropping to the exposed shield of the ancient landmass that existed before the faulting occurred. A second lower escarpment, the Jabal Tuwayq, runs north to south through the area of Riyadh. The northern half of the region of the Red Sea escarpment is known as the Hijaz and the more rugged southern half as Asir. In the south, a coastal plain known as the

Tihamah, rises gradually from the sea to the mountains. Asir extends southward to the borders of mountainous Yemen leaving the central plateau, the Najd, extending east to the Jabal Tuwayq and slightly beyond and a long, narrow strip of desert known as Ad Dahna. This separates Najd from eastern Arabia, which slopes eastward to the sandy coast along the Persian Gulf. North of Najd a larger desert, An Nafud, isolates the heart of the peninsula from the steppes of northern Arabia (Abdul Kareem 2003; Fig. 2.1).

2.5 CLIMATE OF THE KINGDOM OF SAUDI ARABIA

With the exception of the Province of Asir, with its towns of Jizan on the western coast and Najran in the interior, Saudi Arabia has a desert climate characterized by extreme heat during the day, an abrupt drop in temperature at night, and slight, erratic rainfall. Because of the influence of a subtropical high-pressure system and the many fluctuations in elevation, there is also considerable variation in temperature and humidity. The two main extremes in climate are felt between the coastal lands and the interior (Othman 1996) but along the coastal regions of the Red Sea and the Persian Gulf, the desert temperature is moderated by the proximity of these large bodies of water. Temperatures seldom rise above 38^{o}C but the relative humidity is usually more than 85 percent and frequently 100 percent for extended periods. This combination produces a hot mist during the day and a warm fog at night. Prevailing winds are from the north and, when they blow, coastal areas become bearable in the summer and even pleasant in winter. A southerly wind is accompanied invariably by an increase in temperature and humidity, and by a particular kind of storm known in the Persian Gulf area. In late spring and early summer, a strong north-westerly wind - the Shimal, blows; it is particularly severe in eastern Arabia and continues for almost three months (Fahed 2000). The Shimal produces sandstorms and dust storms that can decrease visibility to a few metres (Hossam 1998). A uniform climate prevails in Najd, Al Qasim Province and the great deserts with an average summer temperature of 45^{o}C, but readings of up to 54^{o}C are common. The heat becomes intense shortly after sunrise and lasts until sunset, followed by comparatively cool nights. In the winter, the temperature seldom drops below 0^{o}C, but the almost total absence of humidity and the high wind-chill factor make a bitterly cold atmosphere. In the spring and autumn, temperatures average 29^{o}C. The region of Asir is subject to Indian Ocean monsoons, usually occurring between March and October and an average of 300 millimetres of rainfall occurs during this period, 60 percent of the annual total (Othman 1996). Additionally, in Asir and the southern Hijaz, condensation caused by the higher mountain slopes contributes to the total rainfall (Khan 1993) but for the rest of the country, rainfall is low and erratic and the entire year's rainfall may consist of one or two torrential outbursts that flood the wadis and then rapidly disappear into the soil to be trapped above the layers of impervious rock. This is sufficient, however, to sustain forage growth and although the average rainfall is 100 millimetres per year, whole regions may not experience rainfall for several years. When such droughts occur, as they did in the north in 1957 and 1958, affected areas may become incapable of sustaining either livestock or agriculture (Hossam, 1998). Most of the depressions that cross over the area do so between the months of September and May, with the result that most rain falls in winter and early spring and late autumn. The rain differs from one place to another in view of the nature of cyclonic rains, which vary according to the path of depressions from year to year (Ali 2008) (Fig. 2.2).

2.6 THE GEOGRAPHY OF THE SOUTH-WEST OF THE KINGDOM OF SAUDI ARABIA

Having introduced the geography of the Kingdom of Saudi Arabia, the aim of this section is to introduce the geography of the south-west of the Kingdom of Saudi Arabia, the study area of the thesis. The study area comprises Jizan and Najran, of which the former borders the Red Sea. The former lies between longitudes 41^{o}20’ and 43^{o}20’ east, and latitudes 16^{o}20’ and 17^{o}40’ north and was known in antiquity by the name of Al-Mikhlaf Al-Sulaimani, which means the region of Sulaimani - one of the rulers of the fourth Hijri century (equivalent to 900 AD). The topography of Jizan may be divided into three main blocks: islands in the Red Sea, the coastal plain and the Tihamah Mountains. The coastal plain covers half of the area of Jizan, and extends parallel to the Red Sea from the furthest northerly point to the furthest southerly point, narrowing in the north but expanding in the south to a width of 45 kilometres. Salt marshes are generally found near the coastline, but some of them penetrate for some kilometres inland and appear in a divided shape, parts of which are covered by sand dunes (Khan 1993). The greater Jizan area includes the administrative capital Jizan, and its main port, and is bounded on the north and north-east by Asir on the east and south by Yemen and on the west by the Red Sea (Fahed 2000). The coastal plain of the Tihamah is situated on the eastern edge of the Red Sea rift valley and its development began in the Oligocene Age and has continued up to recent geological times. However, the geological history of this area dates back to an earlier period long before the development of the recent tectonic pattern, with the deposition of Precambrian eugeosynclinal sedimentary and volcanic rocks. These rocks, now metamorphosed and heavily denuded, form the truncated upland of today's Arabian - Nubian shield complex, and were affected by several Precambrian organic and plutonic events before the cratonisation occurred. The Precambrian series is exposed all along the north-eastern flank of the Red Sea and the eastern mountains of Jizan, which may be called isolated mountains or island mountains. Finally, there are a number of islands off the coast which include those of the Farasan group, including Hayar, Azab, Farafer, Dhahek, Al Ashiq, Al Kabeer, Amnah, Qadiah, Al Oltain and Ramin (Khan 1993).

Jizan contains a number of distinct environmental regions, including a marine zone with salt marshes, and the coastal plain environment, represented by the Tihamah plains, which contain vast quantities of clay and silt. In addition, there are sites where volcanic rocks are found, including the potential for sources of obsidian for lithic manufacture. The plain is bisected by a series of major main valleys, such as the Bish, Al-Sir, and Jizan valleys, where many archaeological sites of a more recent date are to be found, including those affiliated to the Kindah, which dates to the middle of the first millennium AD (Ahmed 1987). Offering a position close to both coast and the mountains, the accumulation of a plain of fine sediments and clay, has led to great fertility and it is believed that the environment between 20,000 and 13,000 years ago was characterised by low temperature, and a high level of salinity in the Red Sea water, which was 80 metres below its current level with the formation of vast marshes (see Section 2.7 below). The coastal plain, especially during summer, experience high temperatures and high levels of moisture, which results in the seasonal movement of people away from this area during summer, but as the highlands also have a relatively harsh winter climate its inhabitants tend to move to the Red Sea coast for the winter (Othman, 1996). Jizan is surrounded by hills in the east, and having the sea to the west, the area generates very high, temperatures and humidity. This situation decreases towards the east and in the isolated mountains, where temperature levels are in the range of the twenties centigrade. On the coastal plains, there is less than 100 mm of rain per year, while in other locations of Jizan there are higher levels of rain, especially in the eastern area of the Haroob Mountains, where the level is more than 400 mm (Hossam 1998). Finally, we come to Najran which is one of the Kingdom of Saudi Arabia's most modern cities. Its region is bounded by Yemen, Dhahran Al-Janoub, the Asir region and Oman and the city is surrounded by orchards and a range of rocky mountains. The summer climate is hot and the winters are mild with significant rainfall in the mountainous areas (Salihi 2004)(Fig 2.3).

2.7 PALAEOENVIRONMENT

Having thus discussed the geography and climate of the study area, this section with examine our current understanding of the region’s palaeoclimate and palaeoenvironment. By the end of the last glacial age, approximately 10,000 BC, the ice coverage at the polar latitudes had subsided, and a new climate had started to emerge all over the world. The Holocene age that followed is thought to have had a major effect on populations as vast areas became dry, leading to population adjustments by the end of the Palaeolithic with increased numbers setting the scene for the Neolithic, or the food production stage (Abass 1998). The most prominent and direct effect of Middle to Late Quaternary climate change on environments in the Arabian Peninsula was the change in moisture supply caused by the strengthening and weakening of monsoon circulation (McClure 1976). The first half of the Holocene was characterised by humid conditions, which favoured human occupation of the region. Further wet phases occurred earlier during the Quaternary, but there is still an urgent need for further data for understanding population movements and possible migration routes out of Africa. Major phases of aeolian deposition occurred in the Wahiba Sands and the eastern Rub’ al-Khali, controlled by sediment supply related to the lowering of global sea level but the lack of dune accumulation in the eastern Rub’ al-Khali during the last glacial cycle is explained by limited sediment-supply when the Persian Gulf basin stabilised (Preusser 2009). It is possible that some spatial differences in the deposition pattern may have been caused by a temporal lack in preservation potential, linked to groundwater level and, as a consequence, secondary effects of climate change were substantially important for sculpting the present landscape of eastern Arabia. Additionally, the orientation of dunes to the north and to the south of the recent summer position of the ITCZ indicates that the circulation pattern over Arabia during mid-latitude glaciations was similar to that of the present (Preusser 2009). These macro-developments provided the context for the emergence of the first Neolithic communities as the wide use of the new nutritional resources led to population growth, which itself played a role in the establishment of the first sedentary villages (Al-Amin 2003).

An increase in humidity occurred in the Arabian Peninsula during the period between 36,000 and 17,000 years BP, when lakes were formed in the depressions of the older alluvial and aeolian topography (McClure 1976). This episode was terminated by the cool dry episode of the Late Glacial Maximum between 18,000 and 20,000 BP although the overlap in dates may be due to differences in calibrations and other factors. A further increase of humidity about 10,000 years ago brought again a semi-arid environment to most of the region covered by the Kingdom of Saudi Arabia, and again shallow lakes were formed in the inter-dune depressions of the desert soils on dunes. The Rub Al-Khali has provided good examples of evidence of relict lakes and its Mundafan site is a key area of 150 square kilometres covered by dunes. McClure (1976) divided the 24 metre thick lake deposit into three strata deposited between 6100 and 8800 BP (McClure 1976, 1978). The above sequence is supported and supplemented by the sequence from the Raml at-Sabatayn and al-Hawa. This sample site is a large flat basin in the desert of Yemen surrounded by dunes and fed by wadis. The region has an Indian Ocean monsoon rainfall and an average temperature of 27^{o}C. Vegetation is scarce, though herbaceous plants grow on sand (Lezine et al. 1998). The al-Hawa lacustrine sequence lies on a microglomerate layer in a sandy matrix and is mainly composed of laminate siltstone, silty mudstone and mudstone with biogenic components, interrupted by sandstone layers. It is interrupted by sandstone layers dated from c. 8000 BP and analysis of shells show that the palaeolake of al-Hawa was formed in a very arid environment in saline and highly evaporated conditions. Such conditions are observed today in dry areas of North Africa and research suggests that the isotopic composition of precipitation was controlled by the amount of rain falling over the core site and points to the extension of reed swamp populations at the lakeshore during the same time interval. The return to dry conditions was responsible for the subsequent drying out of the al-Hawa lake (Lezine 2007). Up to 91 pollen and fern spore taxa have been recorded in the sediment, belonging to three distinct groupings all of which are found in modern Yemen, except Podocarpus, the nearest source of which is the East African highlands. Herbaceous pollen taxa are of Saharo-Sindian origin and the pollen spectra are dominated by herbaceous taxa, typha and ferns. Tree pollen grains are scarce, below percentages of 13 percent, and this suggests the permanency of a semi-arid landscape in the al-Hawa basin during the early to mid-Holocene (Lezine 2007).

During the Holocene, southern Arabian hydrology was very sensitive to both orbitally induced monsoon variations and other superimposed variations of the global climate system. The summer monsoon influence increased significantly after 10,300 BP and decreased after 7,000 BP in response to movements of the Inter Tropical Convergence Zone over the Arabian Peninsula. Furthermore, the abrupt climate variations during the Holocene have also been recorded in Southern Arabia, thus confirming previous observations on the Indian monsoon system from the adjacent ocean (Lezine 2007). In the early Holocene period, about 6,000 years ago, a new environmental phase started, aeolian activity intensified and new dunes started to form in limited areas (Jado et al. 1984). In the United Arab Emirates, the relict lake located at the Awafi site in Ras al-Khaima has provided a key sequence (Parker et al. 2006). The four main sedimentary units are: Unit 1, which included yellow and orange sands which date from the last Glacial, these are mainly Pleistocene sands dated to around 18,000 BP; Unit 2 was deposited in the lake and comprises laminated sand layers and grassland with woody elements, which date from between 8,500 and 6,000 BP; Unit 3 comprises marls and intermittent sand layers, which date between 6,000 and 4,000 BP; and, finally, Unit 4 whose sands contain carbonate laminations related to 4,000 BP and represent the aridification of the environment and the formation of the desert during the last 4,000 years (Parker et al. 2006). It is also held that there was an Early Holocene moist interval in Arabia for some 3,500 years (Parker et al. 2006).

Relict lakes have been known in the Yemeni highlands since 1970 and are found at high altitudes and within the reach of the Arabian Ocean monsoon. The Dhamar archaeological survey has recognised several lake basins at Zeble, and al-Adhla, sections of which have also been recorded in well holes, quarry pits and drainage cuts. The Jahran palaeosol, a dark brown or black organic soil, frequently lies above the lake deposits, where it represents a phase of drying of the lakes in question, but elsewhere it also developed during the early to mid-Holocene moist interval (Parker et al. 2006). In the highlands around Dhamar, the Jahran paleosol falls into two classes: firstly, relict soil horizons with no evidence of human activity; and secondly, those with evidence of human activity, such as obsidian flakes and artefacts and animal bones. There is also a single dated peat horizon, which though superficially similar, varies in humic content and the quantity of human remains. Although the paleosols fall roughly within the early to mid-Holocene moist interval, they continued to develop after that period and should not be viewed simply as the product of increased moisture. It is quite possible that they developed in the presence of some tree cover and human activity and their initiation might have resulted from increased atmospheric moisture and associated vegetation but their continuation is probably the result of positive feedback of organic carbon within the soil. The Jahran-Thayyillah-Jubah paleosol shows significant evidence of Neolithic activity with traces of such occupation more occasionally found within the Jahran horizon. This is then followed by a phase of soil erosion associated with Bronze Age sites. The late Holocene drying phase in southern Arabia was gradual whereas its initiation was rapid and similar drying phases are evident at the site of al-Hawa, resulting from weak phases of the Indian Ocean summer monsoon and are correlated with ice-rafting and cooling in the North Atlantic (Wilkinson 2009). The Dhamar lake deposits consist mainly of calcium carbonate-rich marls. The Bet Hahmi sequence mainly consists of grey marls in marshes or lakes. These deposits are around 1m deep and contain freshwater molluscs. Two undated palaeosol horizons are found below this lake deposit. The deep lacustrine marl is overlain by an erosional discontinuity followed by an additional marl horizon containing freshwater shells (Davies 2006). Similar lake marls were recorded at al-Adhla and Zeble, where a lake basin was found to contain a two metre deep sequence of laminated marls and palaeosols. The Zeble sequence consisted of a thin calcreted horizon below which was a white silt marl with sediments containing prehistoric obsidian artefacts. Below this was a thin palaeosol underlain by marl sediments of shallow lakes or marshes and a deep sequence of banded lake marls which may represent an earlier phase of Pleistocene development. The Zeble relict lake and marshes are overlooked by high cliffs containing one of the few Neolithic sites in the region, with significant numbers of bifacial foliate points. These consist of foliate arrowheads of chert and obsidian which may have been used by hunters from the mid-Holocene lake region. Radiocarbon dating evidence suggests that the moist period of these Yemeni lakes roughly is roughly comparable with the period of high lake levels in the Arabian interior and that it is therefore possible that occupation of the nearby Bronze Age settlement at Hawagir coincided with a brief phase of lake development during the second millennium BC (Parker et al. 2006).

In Yemen, moist conditions developed rapidly in at least three different locations as evidenced by the development of peat, sedimentation in lakes and marshes, and the formation of a lake at al-Adhla . The formation of lakes, marshes and wet valley floors depends on a number of factors, including rainfall, slope conditions and run-off and even in the twentieth century there were still local small wetland areas when favourable circumstances existed. The above-mentioned Holocene phase of lake development, which resulted from a strengthened monsoon in the Indian Ocean, continued until approximately 7,700 BP but in the highlands around Dhamar lakes were starting to dry around 7320 BP. The radiocarbon dates of the lakes in Rub' al Khali and the Yemen highland paleosols are comparable with the climate proxy records from Qunf Cave, Oman. There is a complementary record from paleolakes and in the highlands around Dhamar as well as in the Wadi al-Jubah area, where a well developed dark brown to black paleosol forms a distinctive marker below later Holocene soils (Wilkinson 2009). These paleosols developed during the early to mid-Holocene moist period and some of them continued to exist into the late Holocene climatic drying (Wilkinson 2009).

Further to the east in northern Oman, precipitation has two main sources, northern and southern. These two sources have different isotopic signatures and the ground is recharged by precipitation from both sources. Both show in the moisture source during the Holocene and in the mid-Holocene period precipitation came mainly from the southern moisture source but in the late Holocene it came from both northern and southern sources. At present, more than 80 percent of total annual rainfall in Oman occurs during the summer monsoon season and in tropical regions monsoon-type precipitation is inversely correlated with the total amount of precipitation (Fleitman et al. 2002). The stalactites from the Qunf Cave in Oman provide one of the best isotopic sequences for southern Arabia and show three features: an abrupt increase in monsoon precipitation; an interval of generally high monsoon precipitation averaging two percent; and, a long-term gradual decrease in monsoon precipitation. Although carbon isotope variations are often difficult to interpret because dissolved inorganic groundwater depends not only on the type of surface vegetation but also on plant density, distribution of plants, interaction between soil water and CO_2, and interaction and evaporation between rocks and water, care is needed in interpreting changes in surface vegetation (Fig 2.4 shows the distribution of evidences of climate change in Arabia; (Fleitman et al. 2002).

2.8 SEA LEVEL CHANGE

Finally, this chapter will review our current understanding of sea level change. Although the variety of different sea level curves available are derived from different sources of information (Jado 1984), and show differences in detail, there is agreement in general trends and the maximum amplitude between interglacial and glacial maximum sea levels. Indeed, the bathymetric contour in the Red Sea by Aramco gives an approximation of coastline configuration at the glacial maximum, and highlights the areas of new land exposed in the southern basin and the narrowness of the channel through Bab al-Mandab Straits. A more detailed analysis of changing coastline configuration in the southern channel was based on bathymetric data and modelling of isotopic distortion but it is not clear from the data whether there was a land connection at low sea level, but if there was it would have been only a few meters high and would not have formed a barrier to the movement of water between the Red Sea and the Gulf of Aden (Bailey 2007). The Red Sea isotope record indicates that there was no such barrier in the last 400,000 years and whilst Fernandez and others claim that the sea channel would never have been less than four kilometres wide and 15 metres deep, deductions from the isotope record suggest an uninterrupted flow of water between the Red Sea and the Gulf of Aden even at the lowest sea level and suggests that the channel might have consisted of a series of narrow channels rather than a single broad one (Bailey 2007). This morphology depends on the ability of the population to make boats or to swim across several kilometres of water and on the existence of resources on the other side worth crossing for. The current flow in the narrow channel is likely to have been a hazard and it remains uncertain whether the crossing could have been made without boats over the last 125,000 years (Bailey 2007).

The circumstances described so far apply to the last 125,000 years. Evidence suggests little overall movement of the earth's crust during this time. A similar cycle of sea level variation probably applies back to 900,000 years, but it should be noted that if earlier glaciations were more extensive than the last glacial they would have produced a greater drop in sea level, which could have created a dry crossing at the southern end of the Red Sea. However, there is insufficient data to support this hypothesis. The isotope record in earlier periods probably included the effects of temperature variation and changes in isotopic composition resulting from expansion of the continental ice sheets. Before 90,000 years the deep sea record suggests fluctuations in sea level, but results of the isotope record are difficult to interpret. Another variable that may affect the width and depth of the southern channel is tectonic movement, but rates of movement have probably not been constant over this period and most of the movement at the southern end of the Red Sea consists of deformation of the Danakil depression. This has probably been the case for the past two million years, and evidence suggests that the Red Sea maintained a connection with the Indian Ocean for about five million years (Bailey, 2007). On a more detailed level, evidence of sea level change is apparent within the study area of this thesis as the upper edge of the cliff and the land beyond it along the coastal plain of Jizan are some 3.5 metres above the present-day sea level. This exposed plain contains some notable 'planation' surfaces with thick accumulations of pelecypod and gastropod shell, in loose piles or wider, flat shell banks. Although the shells no longer form a continuous strip, they appear to indicate the presence of an older barrier beach and the individual piles, include numerous man-made shell middens, which are further discussed in Chapters 4 and 5. A single radiocarbon date from one of these shells generated a date of 4,700 years before present and it is conceivable that these shells were propelled by storm tides over the then flatter cliff during the Holocene transgression, which was responsible for the formation of deeper notches. Immediately beyond the cliff, there is a gentle uphill slope 20 to 40 metres in height (Zotl 1984), where coral colonies of the reef flat forming the cliff have been destroyed by weathering in places. This slope is backed by another slightly overprinted cliff step some 1.5 metres in height, giving an overall height of some eight metres above the present sea level. It is of note that the flat surface immediately in front of this step is dissected by several individual deep canyons. These canyons do not, however, extend back into the next-highest cliff step and the reef flat adjacent to the second cliff step shows the typical duricrust-weathering profile, with a hard and still light gray upper crust and the yellowish, unconsolidated undercut. It seems that this upper crust prevented further canyon-like erosion, while the undercut permitted marine erosion, which back-cut the old cliff line (Dabbagh et al 1984).

2.9 CONCLUSION

This chapter has reviewed the geographical and environmental background and palaeoenvironmental history of the Near East and Saudi Arabia as well as providing a description of the base characteristics of the study region. The importance of this chapter was to provide a context for the identification and spread of prehistoric settlements and sites, Neolithic ones in particular. The vast geographical area of Saudi Arabia and its environmental and topographical diversity are all natural elements which are reflected in the adaptation and colonisation of the Peninsula by very different communities of animals, plants and humans. This chapter has also presented the palaeoclimatic sequence of Arabia, which demonstrates that conditions became more suitable for human settlement during the Early Holocene when much of the interior was a semi-arid steppe with favoured localities of a savannah-type environment. It is no co-incidence that the result was increased Neolithic activity and occupation in the desert interior during the Holocene. The following chapter will introduce the Neolithic of the Near East, a review of the history of archaeological research in the Kingdom of Saudi

Arabia as well as the presentation of the spatial and temporal framework of our current understanding of the Neolithic of the Kingdom.

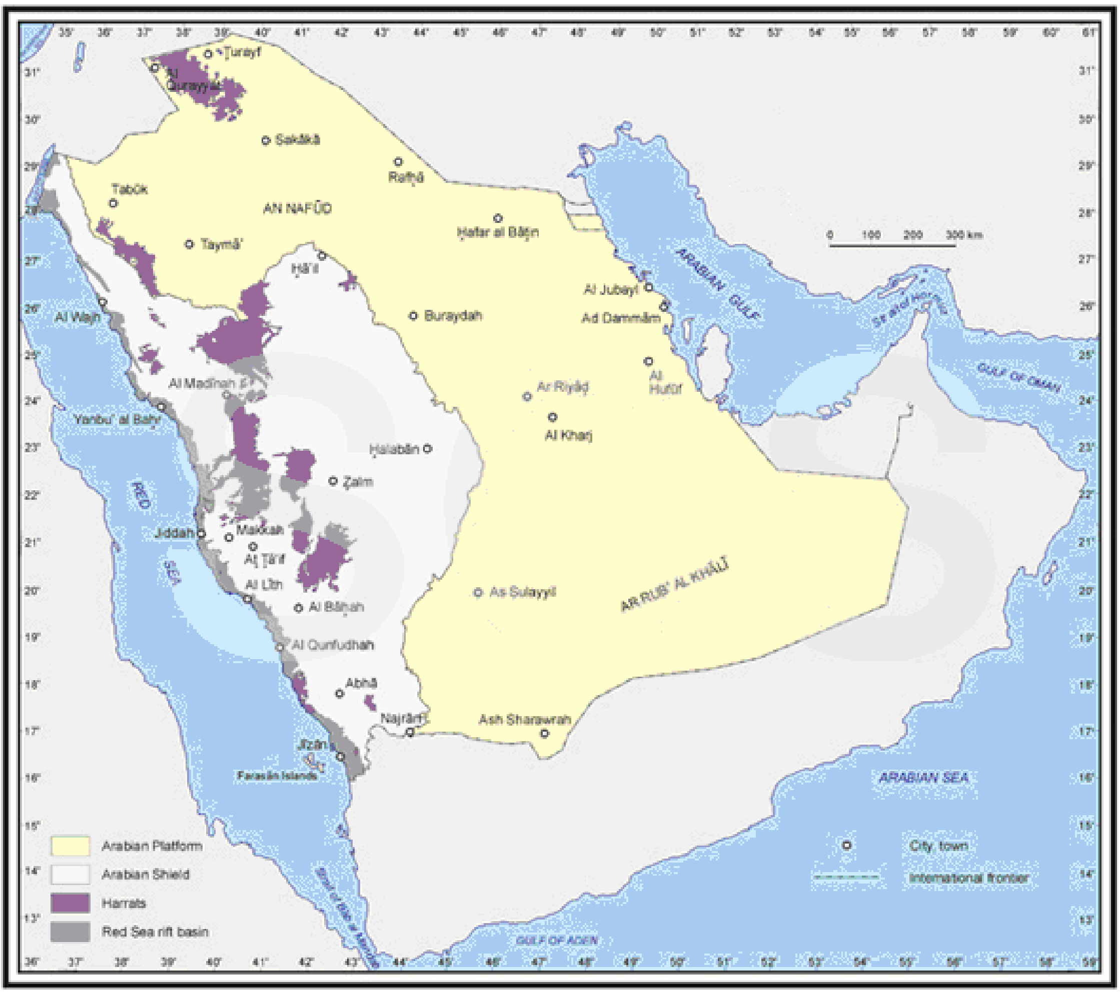

Fig 2.1 Map showing the basic geography of the Kingdom of Saudi Arabia showing some major geological units and the basalt 'Harra' (After Fahed 2007: 156)

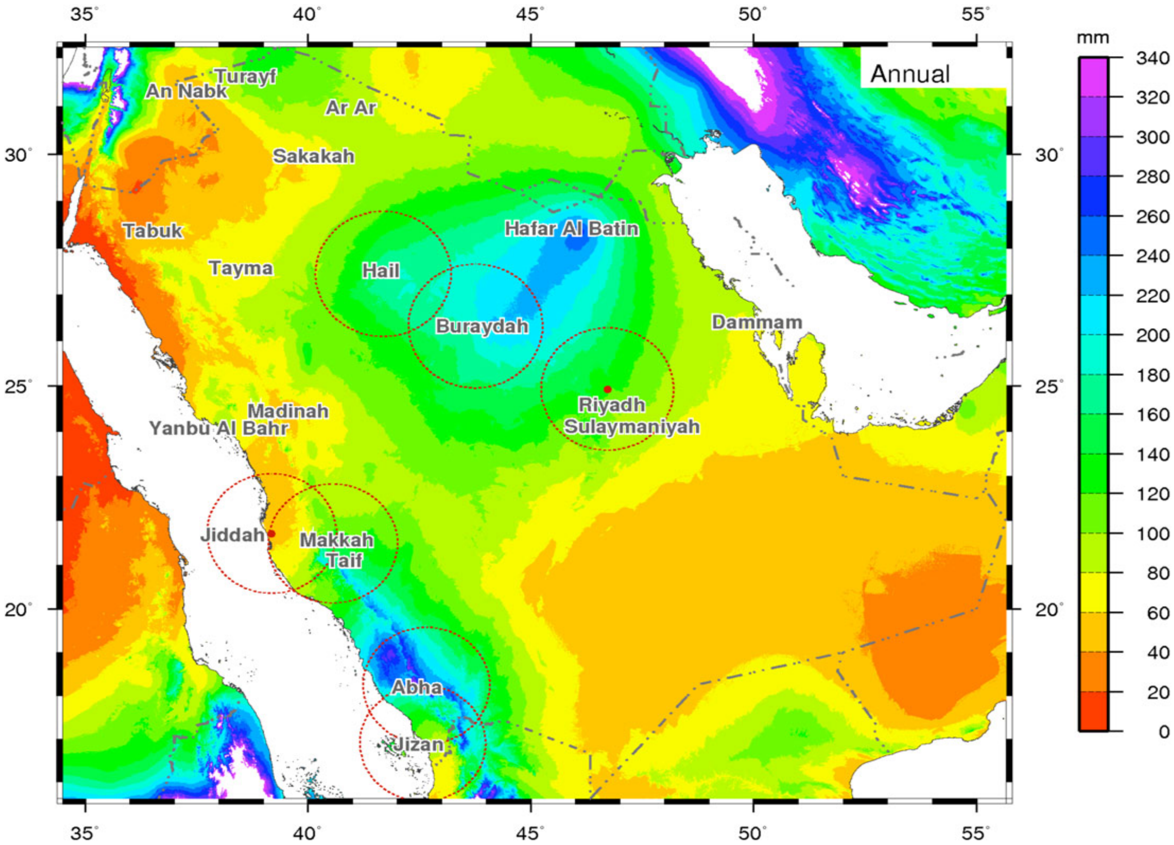

Fig 2.2 Map showing the mean annual rainfall of the Kingdom of Saudi Arabia (mm per annum) (After Mohammed 2007: 67).

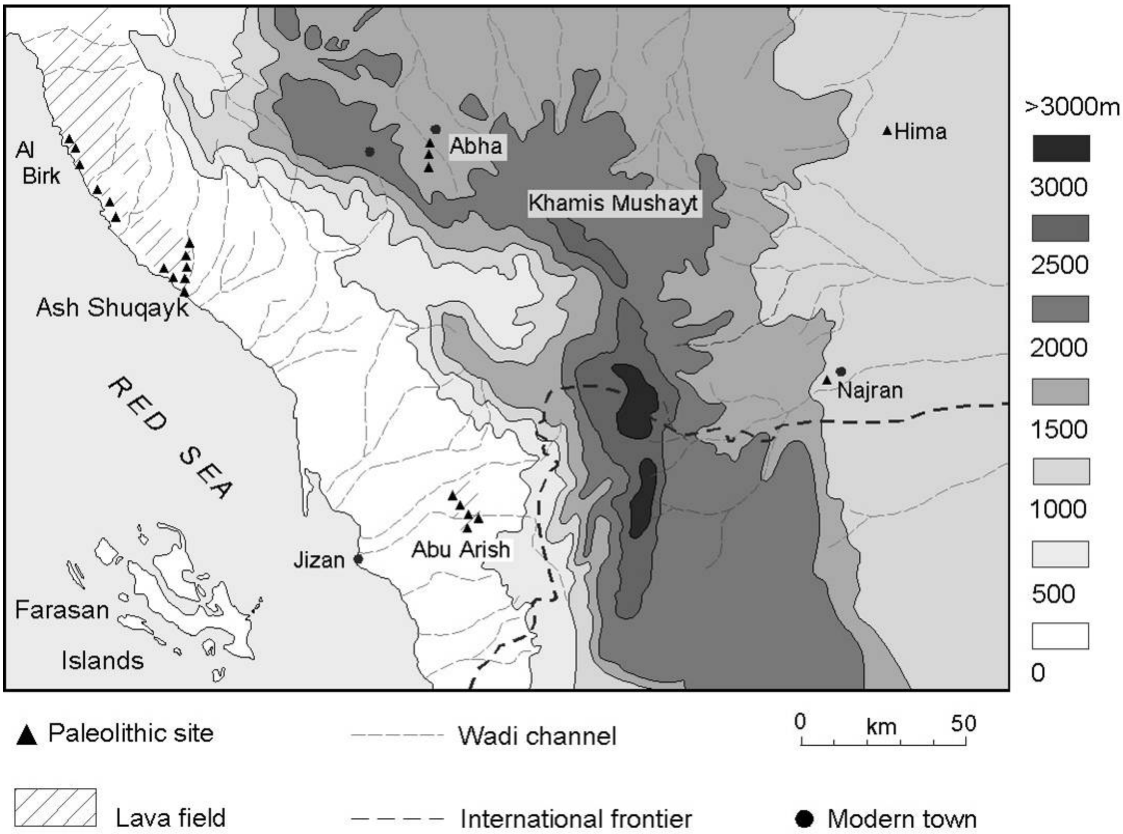

Fig 2.3 Detailed map of the geography of the study region (After Bailey 2006: 4, in press)

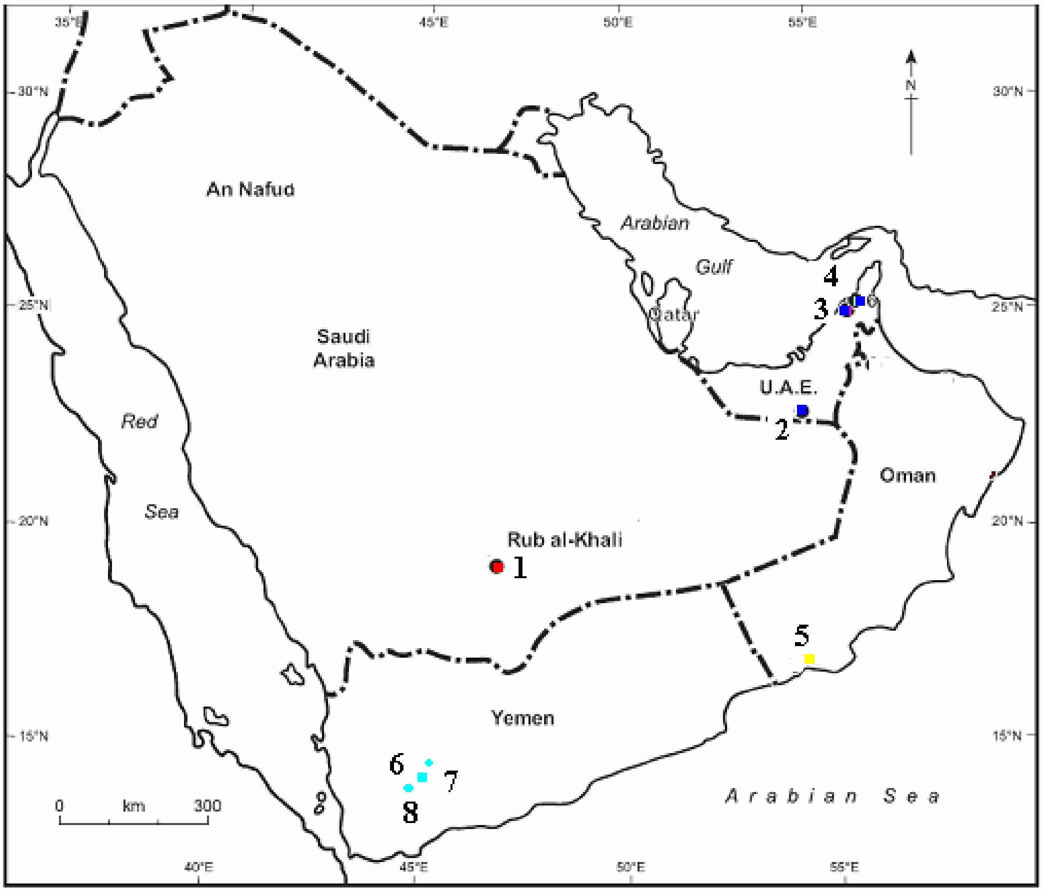

Fig 2.4 Map showing the distribution of the early evidence of paleoclimate in the Arabian peninsula 1 - Mundafan Lake in KSA 2- Hawa lake in UAE 3- Awafi in UAE 4- Liwa, UAE 5- Qunf Cave, Oman 6- Zeble in Yemen 7-Al-Adhla in Yemen 8- Jahran in Yemen

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

The term 'Neolithic' refers to the last Stone Age period and is frequently characterized by criteria such as the practicing of farming, animal domestication, the manufacture of ceramics and the utilization of polished tools. Accompanied by an increasing stability of settlements, it is held to have allowed communities to flourish, as exhibited by the innovation of various techniques in tool-making, more advanced equipment, arts, rituals and primitive rites. Such developments have been frequently cited as developing extremely early in much of the Near East including the Zagros mountains, Anatolia and the Levant (Abass 2001) and the discoveries at these sites has led many archaeologists to analyze Neolithic sites in other areas and regions according to the same cultural yardstick. In distinct contrast to the precocious developmental Neolithic sequences of the Near East, the Neolithic of the Arabian Peninsula was never as early nor as uniform with distinct levels of cultural and region variation dictated by various elements related to the natural environment, as well as factors such as technical achievements, the degree of communication between the inhabitant groups, and contact with other civilizations. Care is therefore needed when using that broad term 'Neolithic', unless in a clearly defined sense, as most of the individuals involved in the archaeological surveys of Arabia state that their use of the term 'Neolithic Period' refers not only to practicing certain forms of life activity, related to aforementioned traits, but also to a certain chronological period that would include all or some of such attributes.

Again in contrast to the well defined spatial and temporal Neolithic frameworks of the Near East, even the determination of the beginning and end of the Neolithic period in geographical region covered by the Kingdom of Saudi Arabia is a controversial issue. Based on current data, some scholars date the Neolithic period of the southern Arabian Peninsula as beginning around 4,000 BC, although some scholars attributed the beginning to 7,000 BC (Al-Masri 1977: 12), while the end of the era has been dated to as late as 2,000 BC (Zarins 1981: 18). It is acknowledged that part of this controversy is fuelled by the fact that whilst there are a number of well-known Neolithic sites in the Kingdom that have been subject to comprehensive archaeological explorations, vast areas of the Eastern Region, the North of the

Kingdom, the south-western areas and the Empty Quarter have never been surveyed and few excavations fully published. As noted above, the Neolithic period is considered to be a key cultural period for the increase in the establishment of sufficient economical resources leading to settlement stability, but that also led to the emergence of seasonal living patterns comprising population movements within a range of environmental constraints. It has been suggested by some that the eastern, central, Empty Quarter, and north-western areas represent the main centres for such settlements of mobile groups and that it is possible that some moved from such areas, slowly spreading to other areas in the north and north-western areas of the Kingdom of Saudi Arabia, including Syria, where they settled (Al-Mmin 2003). Alternatively, other scholars suggest that external groups settled in the north of the Kingdom of Saudi Arabia, citing the example of the northern of Arabian peninsula, which has characteristics of Neolithic period settlements situated in the north-west of the Kingdom of Saudi Arabia (Ingraham et al. 1981: 77). Similarly, cultural links between the eastern parts of the Kingdom of Saudi Arabia and the Euphrates region could be attributed to the movement of inhabitants between the two areas.

In contrast, little attention has been paid to the sequences of the south-west of the Arabian Peninsula and the focus of this thesis is to outline the physical traits of the Neolithic period in the south-west of the Kingdom of Saudi Arabia, as well as the settlement features, environmental context, and resources available for the inhabitants, via the archaeological features and artefacts at such sites. By such analysis, it is hoped to review the hypothesis formulated for this cultural period, closely determining its characteristics as much as possible. It is also noted that this research draws on data from Al-Sihi, which has already been made available in the author's MA dissertation (2006).

1.2 AIM AND OBJECTIVES

The aim of this thesis is to define the nature, date, function and the characteristic features of the Neolithic of south-west of the Kingdom of Saudi Arabia, in particular investigating the relationship between coastal occupation and the interior. The objectives of this thesis relate to the nature and character of the Neolithic in the Kingdom of Saudi Arabia, including an understanding of the similarities and links between its Neolithic sequence and that of its neighbouring areas; an examination of the characteristic features of the Neolithic of the south-west of the Kingdom of Saudi

Arabia; a review of the environmental changes that influence human adaptations within the Neolithic period; an investigation as to whether the variety in the region's cultural assemblage has resulted from adaptive differences or was a result of the archaeological classifications used; the investigation of any relationships between the Neolithic in the south-west of the Kingdom of Saudi Arabia and the known shell middens on the coastal belt and islands; and, finally, a survey and review of the distribution, date and function of the Neolithic settlement in Jizan region. These objectives will be achieved by undertaking settlement and site survey and selecting sites for excavation, classification and analysis.

1.3 METHODOLOGY

Having introduced the aim and the objectives of the thesis, the following sections will introduce the thesis' methodological approach and discuss how this approach will contribute to our general understanding of the development of the pattern of settlement in the south-western of the Kingdom of Saudi Arabia and the other stated objectives.

1.3.1 SURVEY METHODOLOGY

The site and settlement survey undertaken as part of this thesis follows on from the pioneering work of the Comprehensive Survey of the Kingdom of Saudi Arabia started in 1975 with the intention of testing these preliminary findings with a more systematic approach to recording the location, function and variability of changes in both settlements and landscape, mindful of the fact that survey may also provide information as to an approximate estimation of population levels as well as economic, social and environmental conditions (Wilkinson 1996). Before discussing the methods of archaeological survey, however, it is first necessary to define the term 'archaeological site' within the context of the study region. In archaeological terms, a site may be defined as an area which provides physical evidence of past human occupation and this may include surface scatters of lithics and shell, and other artifacts, differences in soil colour, and or the presence of cut features. In the Near East where sites are often characterized by surface mounding, less obvious traces of settlement may be found and can be distinguished by microtopographic surveying of mounded areas or by the presence of nearby enclosed depressions caused by the excavation of mud bricks, which were used for building (Wilkinson 1996). However, based on the results of the Comprehensive Survey, it was anticipated that the major site types in the study region would be shell middens, artefacts scatters, mounded sites, rock art sites, Islamic sites dated after 500 AD, ancient South Arabian sites dated between 100 and 500 AD, graves, stone structures, and finally, coral structures. Further classes of site categories were developed as the present research developed and are provided in detail in Chapter 9.

As noted by Wilkinson in 1996, Near Eastern surveys may be conducted using a range of techniques depending upon circumstances, including reconnaissance surveys using cars, which was the main method employed by the Comprehensive Survey of Saudi Arabia. This approach was also utilized during this research in order to offer coverage but survey was also conducted on foot to recover as many significant sites in the region as possible. These foot surveys also included intensive surveys conducted across the landscape either using sample squares and transect lines, a methodology seldom used in Arabia but employed in the hinterland of Sohar (Wilkinson 1996). In this survey of the region, informal discussions were also conducted with local informants to find out what sites were known from the area as well as their location. When these were visited or identified, artefact collections were made in the normal way by collecting only characteristic examples. The final tier of the methodology resulted in selected sites being excavated for dating and other material. The transect line was found to be a particularly convenient method of providing a sample of settlement across the 'grain' of the landscape, especially as they may be set out across the sample region either arbitrarily or, more normally, systematically, but from a randomly selected starting point. If evenly spaced, transects can give a fairly accurate estimation of the distribution of cultural material across the landscape. Transects also provide a more representative picture than sample quadrats, by providing information across natural or geological boundaries, and it is best to position them so that they cover the full range of geological variation. Although transect sampling may only provide an incomplete record, usually in the range of 5 to 20 percent of the survey area, when tested against the pattern of modern settlement it has been demonstrated that it can give a fair approximation of the actual pattern of settlement (Wilkinson 1996).

As the area of study examined covered most of the south-west of the Kingdom of Saudi Arabia, with dimensions of 100 kilometres north to south and 130 kilometres from east to west, it was only possible to sample the pattern of settlement and prehistoric activity. For the purposes of survey, the area was divided into a series of sample regions from west to east (Fig. 1.1). Zone 1, the Farasan Islands were subject to transect and sample survey; Zone 2, the Coastal plain was survey by transect; Zone 3, the Tihamah Mountains, were survey by following the main road by car and interviewing local people; and Zone 4, the Najran region of the interior desert, was subject to transects. The main strategy of the archaeological survey was to undertake transects across the entirety of zones 1 to 4 and some areas were recorded simply by driving through the area looking for sites or using local informants. Each zone was divided in to smaller survey areas or assessed by means of transects. The transects were recorded by four to five archaeologists in a line at a distance of 15 to 20 metres apart from one another and the size of each transect measured 100 metres by 1 kilometre. However, it should be noted that health and safety issues meant that the survey of mountainous areas was more general in nature. The survey of the Farasan Islands, conducted in collaboration with Professor G Bailey and his team, began at Janaba bay and also utilised the transect method with every shell midden and artefact scatter noted, given a number and a GPS reading recorded. We continued the recording from both southerly and northerly directions on the main island and applied a similar methodology to Al-Saqid and Qumah islands. All identified archaeological sites were analyzed, described and located using a GPS unit and artefacts were collected. The important Neolithic sites in each of the zones were then identified for more instrusive sampling and excavated and transects 1, 2, 3, 6 and 7 were laid out from south to north, transects 4 and 5 from east to west in Jizan region, whereas transects 8 and 9 were laid out from east to west in Najran, transects 10,11,12,13 were laid out from south to north of Farsan island (Fig. 1.1).

1.3.2 EXCAVATION METHODOLOGY

As noted above, exploratory trenches were excavated wherever evidence was required to further understand the archaeological sequence or date of sites in each Zone (Table 1.1). Two excavations were undertaken in Zone 1, the Farasan Islands. Trench 1 was located in the main island of Farasan at Janaba Bay. The site (104), was selected because it was easily accessible and was a relatively small mound in danger of damage from the industrial and port activities nearby. Trench 2, As-Saqid (197), was chosen to provide a contrast to Janaba Bay, because it was a bigger mound in a different type of location. Due to the difficulties of identifying stratigraphy within the middens, both trenches were dug using 50 centimetre spits, and all recognizable features registered and photographed during the excavation process. Two sites were also excavated within Zone 2, the coastal plain. The first of these, Al-Sihi, (site 271) had already been excavated as part of the author' MA thesis and the following is drawn directly from that work "The archaeological methodologies adopted for the investigation at Al-Sihi included field survey, excavation, and post-field analysis. The survey involved walking over the site in straight lines with a 10 metre distance between each line. The major aim of the survey was to collect as much information as possible about the research area and the distribution of artefacts across the site. The survey included a more intensive random sampling, which involved the selection of seven arbitrary grid samples of 2 x 2 metres each. To assess the significance of the site and its sequence more intensely, the survey made a complete surface collection of five of these squares and test excavations for the remaining two trenches. A vital part of site assessment was the collection of representative samples of artefactual and non-artefactual material remains from the surface, for which we were able to use the stratigraphic sequence of the trenches to link surface finds with periodisation. The present author was fortunate to find and use the 10 metre grid system left at the site by the early survey conducted by Zarins and Zahrani in 1981 and the main datum point, bench marks, baselines and arbitrary baselines with iron pegs were also still intact at the site" (Al-Ghamdi 2006: 36). In addition, a second large site within Zone 2 was investigated as part of this thesis – Al-Majama (site 278). Once the elevation and location of the central bench mark was determined, four squares were selected, two for excavation squares and two for surface collection. The squares were chosen according to the density of the surface finds because there were large parts of the location that were devoid of finds. The archaeological trenches were again excavated in 10 centimetre spits on account of the poor stratigraphy, and all of the features were registered and photographed during the excavation process.

In contrast, we were unable to identify any suitable sequences for excavation within the Tihamah mountains, our third zone during the survey. Despite our intensive survey, following paths and trails across the mountain peaks, we failed to find any archaeological deposits, a picture corroborated in the published reports of the Archaeology Journal of Saudi Arabia (*Atlal*). However, as we successfully identified a number of petroglyphs, these were copied and photographed. A single site, Hima (Site 419) was identified in Zone 4, Najran, for further investigation. Having established a point at the centre of the site of Hima, Trench 1 was laid out in the northern part of the site, measuring an area of 5 x 5 metres. A second trench, Trench 2, was located in the eastern part of mound covering a similar area and a third square, Area 3, was selected for surface collection to the south of the central point. Two further squares, 4 and 5, were laid out for surface collections to the south-east and east of the mound respectively. Excavation was conducted using 20 centimetre spits, after the surface collections were collected.

Name	Excavation	Zone
Janaba Bay (site 104) As-Saqid (site 197)	1 2	1
Al-Sihi (site 271) Al-Majama (site 278)	1 2	2
Hima (site 419)	1	4

Table 1.1 Archaeological excavations within the four survey zones.

1.3.3 ARTEFACT STUDY AND ANALYSIS

As noted above, during the survey we conducted field recording of each site, including a description of the site's environment, topography, and geology. Characteristic artefacts for study were also collected from sites for more detailed description, analysis and categorization. Following the end of each fieldwork survey, the recovered materials were removed from the study zones and taken to the Archaeology Department in Riyadh and divided, classified and analyzed. This involved a comparative study of the archaeological remains, with archaeological materials being compared with those from archaeological sites of similar cultural phasing. Lithic artefacts were first isolated from non-artefacts, the former being distinguished by the presence of intentional flaking, however, those flakes included core, core fragments, flakes and/or blades, tools, retouched blades or flakes. Consideration was then given to raw material, technology and function and all lithic artefacts were numbered and photographed. Ceramics represented the largest and most noteworthy group of artefacts found on the survey and the analysis presented in this thesis is based on apparent differences in ware, form and surface treatment. As it proved impossible to export material to the UK for scientific analysis, a general analysis of the clay and inclusions was based on observations from the naked eye and a hand lens. Forms were recorded with reference to Zarins' (1981) earlier work, although this was based on very few complete vessels. In addition, we focused on sherd size, weight and rim diameter and surface treatment, such as scraping, slipping, polishing, and wet self-smoothing and decoration was also recorded. It is notable that the entire corpus of ceramics recovered during the survey and excavations contains no complete forms and that the potsherds collected from the surface, mostly representing the latest phase of occupation of sites, was wind-eroded and sand-blasted. Finally, many of the sites yielded large quantities of shells, which were collected from the surface collection and from spits excavated within the trenches before being classified and attributed to the species or family type.

1.4 CHAPTER BREAKDOWN

This, the first chapter of the thesis, has set out the aim and objectives of the research and will now be followed a chapter, Chapter 2, which will present and discuss the geographical and environmental context of the Near East and the Kingdom of Saudi Arabia before examining evidence for palaeoclimatic and environmental change with the region. Chapter 3 will introduce the varied definitions of the Neolithic in the Near East and the distribution and date of key Neolithic sequences in the Near East, and specifically the history and nature of the Neolithic sequences of the Kingdom of Saudi Arabia. It will also critically present a review of the history of the development of archaeology as a discipline in the Kingdom. The fourth Chapter will present a review of the new survey and excavation data from the first zone of the study, the Farasan Islands, along with a review of their location and environment. Chapter 5 will then discuss the second zone, the Coastal Plain, and the results of the archaeological survey there and the excavations at Al-Sihi and Al-Majama sites. The chapter will also discuss the characteristics of this newly recorded cultural sequence and attempt to attribute a function and date to its material culture and introduce the categories of artefacts at the site, such as ceramics, stone tools, fauna and molluscs. Finally, it will consider their distribution within the site as a whole and within the chronological sequence of the two sites. The sixth chapter will examine the third zone, the Tihama Mountains, and the results of the survey and, in particular, the study, analysis and classification of the recorded rock art. Chapter 7 will introduce the results of the survey in the interior area known as the Najran as well as an overview of the characteristics of its culture and attribute a function and date to its material culture. The eighth chapter will draw together the results of the fresh archaeological work in the south-west of the Kingdom of Saudi Arabia and reflect on the comparative nature of the sites, before offering a conclusion in Chapter 9.

1.5 CONCLUSION

Having thus introduced the aim and objectives of this thesis, its survey and excavation methodology and chapter breakdown, it only remains to draw attention to the broader significance of this thesis. As will be clearly articulated in Chapter 3, the development of archaeology as a discipline in the Kingdom of Saudi Arabia is some years behind that of its cultural and geographical neighbours, especially the study of its Neolithic sequences. Partly, this is due to isolating cultural and geographical elements as well as the absence of some of the older sequences found in Mesopotamia more generally. This position is even truer for the understanding of the Neolithic sequences of the south west of the Kingdom, where apart from Zarins' brief survey and excavation almost forty years ago, almost no research has been undertaken. Indeed, the present author's MA thesis in 2006 has now been expanded and enhanced in an attempt to provide the first comprehensive study of the nature, date, function and the characteristic features of the Neolithic of south west of the Kingdom of Saudi Arabia, in particular investigating the relationship between coastal occupation and the interior. Before proceeding to a discussion of the newly recorded data, however, the broader geographical context of the Near East and Kingdom will be presented.

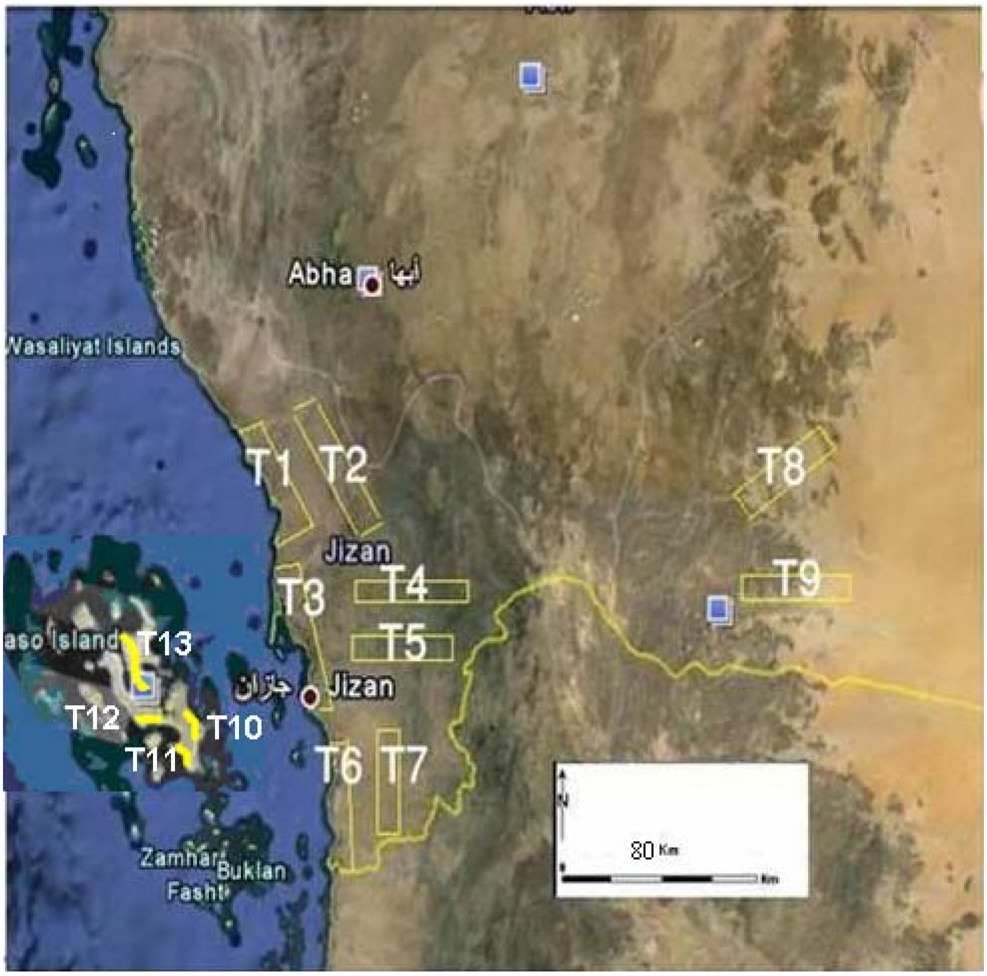

Fig 1.1 Map of the south west of the Kingdom of Saudi Arabia showing the completed archaeological survey transects .

LIST OF TABLES

LIST OF FIGURES

Acknowledgements

All praises gratitude and thanks to the almighty *ALLAH*, the Supreme, for giving me the strength and the ability to do something I wouldn't have even thought about it in the first place. And I would like to thank my *Parents* for their love, support and inspiration. My extreme wishes and regards to my wife and her parents for supported and helped me . I am particularly grateful to *Professor Robin Coningham and Professor Wilkinson* for suggestions and constructive criticisms. It has been a pleasure working under their supervision.

I would particularly like to thank the Saudis-British team under the direction of Prof Geoff Bailey and Mr Ali and Mr Saad who drew the artifacts and maps.

Saud Al-ghamdi
2011

ABSTRACT

Although the archaeology of Saudi Arabia forms the basic chronological and geographical framework for the archaeology of the Arabian Peninsula as a whole, its later prehistoric sequence is still not well-defined. The aim of this thesis is to start defining this sequence in the southwest of the country by assessing the characteristics of some newly discovered sites, and surveying and sampling them. This research will attempt to designate a function to the sites, date their material culture, and define their relationship with other prehistoric sites in Arabia.

The objectives of this thesis are firstly to define the term 'Neolithic', to consider the characteristics of its earliest affiliated sites in the Near East, and to outline the research aims, objectives and methodology; secondly, to survey the geographical and environmental background of the Near East and Saudi Arabia; thirdly to summarize the history of archaeology in the Kingdom of Saudi Arabia. Additional objectives are to define the Neolithic sequences, to discuss the climate change and sea level and the results on archaeological survey in the region.

The core of the thesis presents the results of the archaeological survey and excavation in the Farasan Islands, the coastal plain and interior area and discusses the characteristics of its freshly recovered material culture, its date, and how it supports or refutes models for the spread of the Neolithic in the Near East as a whole. Archaeological survey is also used to introduce the archaeology of the Tihama mountains and the study and analysis of the rock art and to study the interior area with regard to the chronology of the south-west of Saudi Arabia.

The results demonstrate the significance of the shell middens of the Red Sea islands and coastal plain, and provide evidence for one of the earliest Neolithic sites in Saudi Arabia: Al-Majama.

DURHAM UNIVERSITY

The Neolithic Archaeology of the South west of the Kingdom of Saudi Arabia

By

S. Al-ghamdi

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CHAPTER 4: THE FARASAN ISLANDS (ZONE 1)

4.1 INTRODUCTION

Having thus introduced the varied definitions for the Neolithic and an overview of the key Neolithic sequences of the Near East and of the Kingdom of Saudi Arabia, the purpose of this chapter is to present the results of the new archaeological survey and excavations in the Farasan Islands undertaken as a core part of this dissertation, Zone 1. In addition, this chapter will examine the location and morphology of the Farasan Islands, and their environments, the results of the new survey and excavation, including a discussion of the recovered artefacts of shells, ceramic and stone. The survey, excavations and technical analysis (such as the classification of fish bones) was done in association with the British- Saudi team in 2006-2008 (Bailey 2007).

4.2 THE GEOGRAPHY OF THE FARASAN ISLANDS

As noted in Chapter 2, the Red Sea is a tectonic depression, or trough, that was formed when the Arabian Peninsula split away from the continent of Africa about 24 million years ago during the Jurassic epoch (Al Boq 2001). As it formed a semi-closed basin, where evaporation occurred at high levels, salts and other sediments accumulated, and it is expected that the sea was turned into a salty lake devoid of life. However, the subsequent cooling of the earth's outer shell five million years ago resulted in the appearance of the current trough of the Red Sea, joined by an increase in the height of land on both shores of the sea, that led to its splitting away from the Mediterranean. This was from the Suez Canal to the break of Bab Al-Mandab strait that led to a link between the Red Sea and the Indian Ocean (Zotl 1984). From that ancient date, the lithosphere formation began at the bottom of the Red Sea, which led to the continuous expansion of the bottom of the Red Sea by a distance of two centimetres annually. Because of this, the Red Sea is considered an "ocean under progress", as it is expected that its width will grow by about 20 km during a period of one million years if the level of expansion keeps going on at this level, and it is expected to turn into an ocean within a period of 150 million years (Mostafa 2000: 6).

From this geological context, the Red Sea may be considered one of the most saline seas in the world (Al Boq 2001). Indeed, the level of salts is about 36 parts per thousand in all oceans, and it is semi-constant, while the level of salts in the water of the Red Sea is 36.5 rising to 40.5 parts per thousand at the entrance of the Suez Canal and the Gulf of Aqaba. The Sea is, however, not closed and its currents moves towards the Aden Gulf and the Arabian Gulf in summer as a result of the south-westerly seasonal winds, while it reverses during winter towards the Red Sea as a result of the north-easterly winds, and the level of water in the Red Sea decreases by one metre in summer compared to its level in winter (Zotl 1984). It is anticipated that these currents will result in the Red Sea's water being totally renewed every 200 years. The total area coverage of the Sea is about 450,000 km^2, and its average depth is 491 metres, in comparison to the average depth in oceans which is about 3700 metres (Zotl 1984). The maximum depth in the Red Sea is about 2850 metres, which matches the highest peak in Al-Sarawat Mountain. The Red Sea extends to about 2000 kilometres in its length, and its width is between 180 kilometres in the north and 350 kilometres in the south, as it is wider in front of the shores of Jizan, where the Archipelago of Farasan lies. It narrows to about 30 kilometres at the strait of the Bab Al-Mandab. The majority of islands in the Red Sea are coral islands and not volcanic (Dabbagh et al. 1984).

In the southern part of the Red Sea, where it reaches its maximum width of 350 kilometres, remarkably flat shoals lie off both coasts. The current research presented here focused on the Farasan Bank, which is situated on the Arabian side and attains a width of up to 120 kilometres. Whilst the depth of the sea is almost always less than 100 metres, often the water is only a few metres deep, and the Farasan Islands are located within this bank and some 40 kilometres from the Arabian coast in a position corresponding with Jizan. On the African side, the Dahlak Islands are to be found in a similar position of almost mirror-image symmetry (Mostafa 2000). The two main islands of the former group are Farasan Al Kabir and Sajid and the length of both islands runs noticeably parallel to the Red Sea from northwest to southeast. The larger of the two, Farasan Al Kabir, is over 60 kilometres long and has a width of between five to eight kilometres, whilst Sajid is 35 kilometres long and some 10 kilometres wide. Other larger islands are Ad Dissan, Zufaf, Qummah and Dumsuk. All these islands are surrounded by a number of small ones of which only three are permanently inhabited and the few inhabitants' livelihood comes mainly from fishing and cultivation of small oases (Al Boq 2001). Little therefore remains to recall the period of economic prosperity at the turn of the last century, when the islands were important for pearling (Dabbagh et al. 1984). As noted above, only three of the 176 islands that form the Farasan Archipelago are inhabited, these being Grand Farasan, Sajid, and Qamah. Grand Farasan is about 66 kilometres long and between five and eight kilometres wide and Sajid is 35 kilometres long and 10 kilometres wide and there is a new bridge linking the two. The area of Grand Farasan is about 369 square kilometres, Sajid is 109 Qamah 14.3, Al-Dassan 34, and Zafaf is about 30 square kilometres. The entire area of the main islands is therefore not more than 600 square kilometres (Al Boq 2001).

4.3 CLIMATE

The Farasan Islands have a sub-tropical desert climate and receive almost as little rain as the Rub'al-Khali, but being surrounded by the sea, they are humid all year round. No regular climatic records are available for the islands, but as they lie between 40 and 100 kilometres west of Jizan, we may make reference to the records there. These meteorological records from Jizan, on the mainland, indicate that the annual mean temperature for April to October averages over 30^{o}C, that the January mean minimum was 21.9^{o}C and, finally, that the July mean maximum is 37.7^{o}C (Al Boq 2001). On the islands, influenced as they are by the surrounding seas, the average temperatures are probably 1^{o}C warmer in winter and 1-2^{o}C lower in summer. The daily air temperatures are 30-38^{o}C in June and 21-32^{o}C in March with average sea surface temperatures of 33^{o}C in October and 27^{o}C in January (Al Boq 2001). Annual rainfall for Jizan averages 70.7mm, with most of it falling in October, then in January and May, the last named as a result of the Indian Ocean monsoon (Naseer 2003). Rainfall in the Farasan Archipelago is probably lower than on the mainland coast with an estimated 20mm in winter, 10mm in spring and extremely dry during autumn and summer. Violent rainstorms pass over the islands in narrow belts, suggesting that local heating of the air over islands might cause variable local precipitation. Evaporation far exceeds rainfall, but sufficient rain is received to maintain the ground water (Naseer 2003). Condensation of dew probably contributes much of the island's vegetation water needs, resulting in the year-round availability of plants (Maftah 2001)(See fig 4.1).

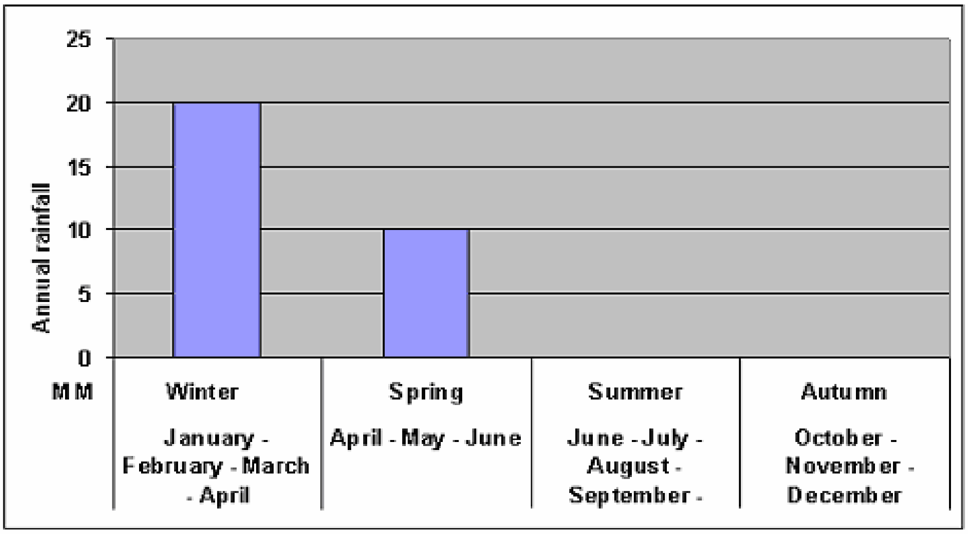

Fig 4.1: Table showing the annual rainfall (mm) in the Farasan Archipelago

Winds over the southern Red Sea are channelled by the topography and they prevail from the northwest and north from May to September and from the southeast and south from October to April. There are periods of calm in late spring and autumn when the direction changes and the turbulence and sudden temperature changes associated with this wind convergence zone causes cloudiness and some rain (Al Boq 2001). Winds are strongest from December to February, blowing at more than force 7 for five percent of the time, when for periods of a fortnight the ferry passage from Jizan can be rough. The result of the summer northerly winds is to drive surface waters south, inducing subsurface inflow from the Gulf of Aden. The result of the winter southerly winds and of sinking highly saline water in the northern Red Sea induces an anti-clockwise subsurface current from the north. This draws a surface plume of cool, less saline, nutrient-rich surface water from the Gulf to about 18^{o} north. As a result, the winter sea level is between 0.5 to 1.0 metre higher than in summer, when evaporation is high and flooding low, and level coastlines become temporary lagoons providing natural nurseries for young, commercially-valuable fish (Naseer 2003). The salinity of the surrounding seas varies between 40 and 45 parts per thousand, and in enclosed lagoons is noticeably alkaline. Both currents contribute to the high productivity of the southern Red Sea. The tides in the islands are semi-diurnal twice daily, fluctuating between 1.0 and 1.5 metres (Al-Shreef 2006).

4.4 HUMAN AND NATURAL ENVIRONMENT

As noted above in Section 4.3, only three islands within the Farasan Archipelago are permanently occupied and their inhabitants grow date palm trees in two of the main villages, Qsar and Al-Muharraq, whilst the total number of date palm trees on Sajid Island is estimated to be 5,000 (Maftah 2001). The inhabitants also grow sorghum, corn, watermelon, and cantaloupe, and agriculture is divided between regular irrigation, processed through water extracted from wells, and other kinds of irrigation dependent on the rains. The majority of the 15,000 people living in the Farasan Archipelago seek their living from working in fishing and agriculture in addition to pearling, as well as government employment (Al Boq 2001). In addition to domesticated species, there is a very varied distribution and character of mangrove communities in the Archipelago. Diverse mangrove is found on all the wet tropical coasts of the Indo-Pacific region and, with the exception of the southern Red Sea, the only type of mangrove tree that grows in these forests is *Avicennia marina* because it is able to tolerate extreme salinities and short exposure to winter frost. It is also the species of mangrove most tolerant to variations in temperature (Maftah 2001). Although the distribution of mangrove forest around the Persian Gulf, and in Oman, is discontinuous and patchy, the greatest area occurs in the UEA. Mangrove community habitats are sparse in the northern Gulf region and reach no further than 27^{o}N in Saudi Arabia but because of the more favourable conditions in the southern Red Sea, a greater variety of species is found there (Phillips et al. 2004). However, the fauna associated in the Arabian mangrove forests is species-poor and variable with few species being mangrove-specific and many of the species, for example small crabs and molluscs such as the cementing oyster are also found on muddy, rocky shores adjacent to mangrove forests. Because of the limited extent of Arabian mangrove forests there is close interaction with other coastal habitats, and some marine species, such as juvenile fish, are dependent on mangrove at particular stages in their life cycle (Phillips et al. 2004).

4.5 SURVEY AND EXCAVATION

As noted in Section 1.3.1, the survey of Zone 1, the Farasan Archipelago, began in Janaba Bay and recorded every shell midden and artefact scatter identified in the transect's course, giving it a number and a GPS reading recorded. The team continued the recording from both southerly and northerly directions on the main island and applied a similar methodology to Al-Saqid and Qumah islands. All identified archaeological sites were analyzed, described and located using a GPS unit and artefacts were collected. The two most promising sites, that is those offering surface finds of Neolithic material, were then identified for more intrusive sampling via excavation. As also noted in Section 1.3.2, two excavations were undertaken in Zone 1 with Trench 1 cut in the main island of Farasan at Janaba Bay (site 104). This site, 104, was selected because it was easily accessible and a relatively small mound in danger of damage from the industrial and port activities nearby, and Trench 2, on As-Saqid (site 197), was chosen to provide a contrast because it was a bigger mound in a different type of location. Due to the difficulties of identifying stratigraphy within the middens, both trenches were dug using either 0.5 or 0.6 metre spits, and all recognizable features registered and photographed during the excavation process. All the survey and excavation was completed in a single season in 2006 and it was very apparent that the majority of archaeological sites were shell mounds and scatters of varying size (Fig 4.6).

4.6 ARCHAEOLOGICAL SURVEY

When the survey team arrived in the Farasan Archipelago, they were the second team ever to investigate the archaeology of the islands, there being a gap of 25 years between their work and that of the Archaeology and Museum Agency engaged in the Comprehensive Survey of the South West of the Kingdom of Saudi Arabia. Indeed, whilst the earlier survey of the Islands recorded only 24 archaeological sites (Zarins 1982), the new survey identified 400 archaeological sites in total. Most of these sites have marine shells associated with them and most are dominated by poorly defined lenses and accumulations of shells. Many of these shell mounds or middens are of a substantial size, up to 4 metres high, and sometimes they appear to form a virtually continuous distribution along the shoreline. The sites often form clusters, with thicker mounds on the beachfront and shallower shell deposits or shell scatters situated further back from the shoreline. It is notable that some middens appear to be associated with ceramic sherds of Islamic and pre-Islamic types but many have no apparent association with ceramics or other artefacts, at least none that are visible on their surfaces, and may date to a pre-ceramic era. The remains of structures built from blocks of coral are also occasionally present, both on mounds and in association with shell scatters but only on Qumah Island, was the survey team to find more substantial occupation with several shell mounds, coral-built graves and a mosque (Figure 4.6).

Types of site	Prehistoric	Pre-Islamic	Islamic	Shell mounds
Number	**0**	**0**	**0**	**400**

Table 4.1 Sites identified in the survey of the Farasan Islands

4.7 EXCAVATION

4.7.1 TRENCH 1 JANABA BAY (SITE 104)

The first site to be excavated was site104 in Janaba Bay on the main island of Farasan. Janaba Bay was chosen because it was easily accessible for the team and because it was a relatively small mound in close proximity to industrial and port activities which may expand and damage it in due course. The site was located on the top of the reef and covered with shells and was noticeable due to its height of two metres and diameter of between four and six metres. The trench was started from the top of the shell mound with a width of 0.5 metres and due to the absence of clearly identifiable context, spits of 0.6

metres excavated (Fig. 4.7). The mound was excavated with a step trench 1 metre in length. When we started work in Trench 1, Spit 1 was found to contain a large number of shells although Spit 2 revealed even more with a huge number of different types of shell, small numbers of fish vertebra and charcoal. Below Spit 2, Spit 3 yielded further evidence of shell and fish bones (Fig. 4.8) and Spit 4 further shell. Finally, during the excavation of Spit 5 we reached a solid base of virgin sand three metres below the top of the mound.

4.7.2 TRENCH 2 AS-SAQID (SITE 197)

As noted above, site197 at As-Saqid was chosen to provide a contrast to that of Janaba Bay as it is a bigger mound in a different type of location. Trench 2 was located on site 197 on the southern shore of As-Saquid island, about 150 m from the coast. It is a mound with diameter of between five and 10 metres and height of some three metres (Fig. 4.9) and each spit measured 0.6 metres in depth. The trench started from the top of the mound with a width of 0.6 metres and length of 0.3 metres. Spit 1 included a large number of different types of shell with further shell in Spits 2, 3, 4 and 5, the latter of which terminated in virgin sand (Fig. 4.10).

4.8 MATERIALS ANALSYIS

4.8.1 CERAMICS

Zarins' earlier field survey recorded that the ceramics found on the surface of the Farasan middens belonged to the cultural sequence of South Arabian. In particular, he noted that they looked similar to those that he had recovered from the shell midden of Al-Sihi on the coastal plain of Jizan, where they were dated to about 3300 BC (Zarins 1985). Our new survey only recovered ceramics from the surface of sites, all other spits only yielded shell, bone and lithics. A total of 1180 sherds, weighing a total of 3785 gm were recovered by our survey and classed into three main groups, those belonging to the Islamic period, those belonging to the pre-Islamic period and those which can be attributed to the Neolithic of the Kingdom of Saudi Arabia and dated to between the second and third millennium BC. It is disappointing to note that there were no diagnostic forms recovered just body sherds or very badly eroded and weathered rims (see Appendix 5).

4.8.1.1 ISLAMIC GLAZED CERAMICS c.800 - 1200 AD

A total of 450 sherds, weighing 800 gm of Islamic glazed ceramics were collected from the surface survey (Fig. 4.2). These sherds are all of a fine temper, intact and free of stains and their surfaces indicate that the firing process was of an even and high temperature with a glazing burnished paint added. The sherds are thin and well-fired and are decorated in geometrical shapes formed by lines, squares, and triangles (Fig 4.11). The majority of glazing was green and blue, while there are some pieces that were decorated with a white colouring.

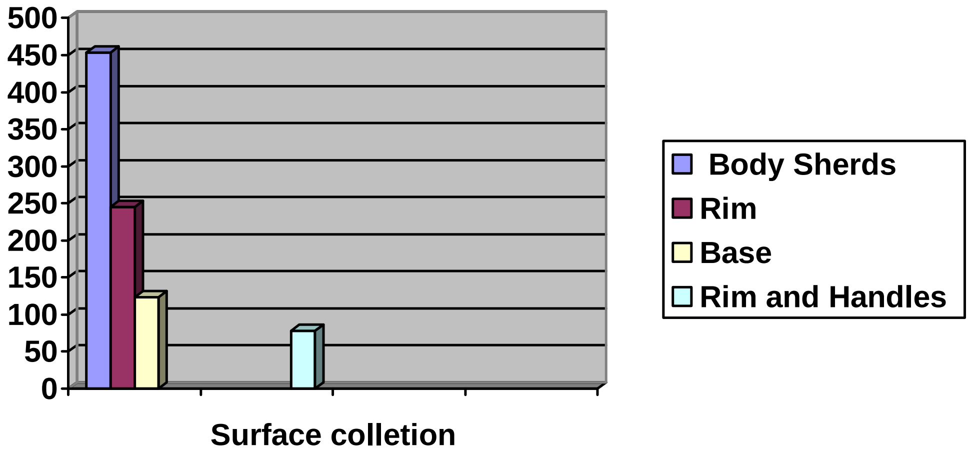

Fig 4.2 Graph showing the number of Islamic ceramics recovered

4.8.1.2 PRE-ISLAMIC CERAMICS BEFORE 800 AD

A total of 380 sherds, weighing 920 gm of this category were collected from the surface (Fig. 4.3). Their clay matrix is free of stains and well-fired and decoration consists of geometrical shapes and dots. The sherds are thin, cohesive and red and brown in colour.

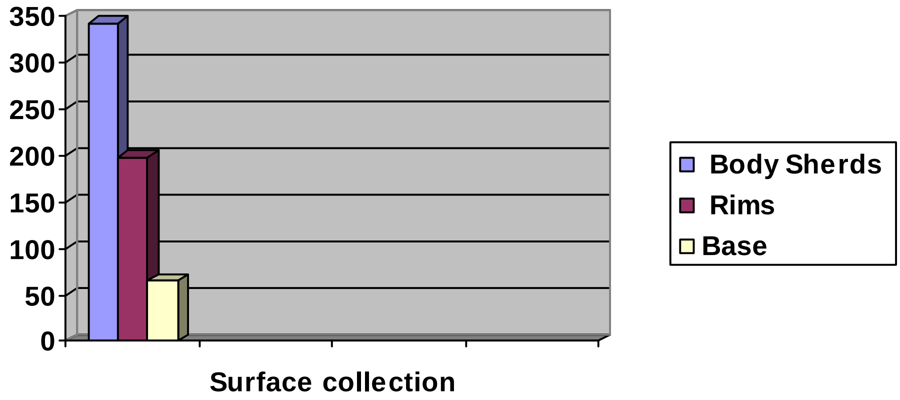

Fig 4.3 Graph showing the number of pre-Islamic ceramics recovered

4.8.1.3 NEOLITHIC CERAMICS

Unfortunately, no Ceramics from the Neolithic Period were identified in the excavations at the two sites, however, a total of 390 sherds, weighing 1422 gms were collected from the surface (Fig. 4.13). Most sherds of this category have a heavily stained clay matrix and some individual sherds are very thick (Fig. 4.4). Some sherds show evidence of having been well-fired, while others were less well-fired and a number were entirely black in colour, which suggests that they were subject to firing in a reducing environment. The majority were undecorated, however, a small number were decorated with geometrical shapes (Fig. 4.13).

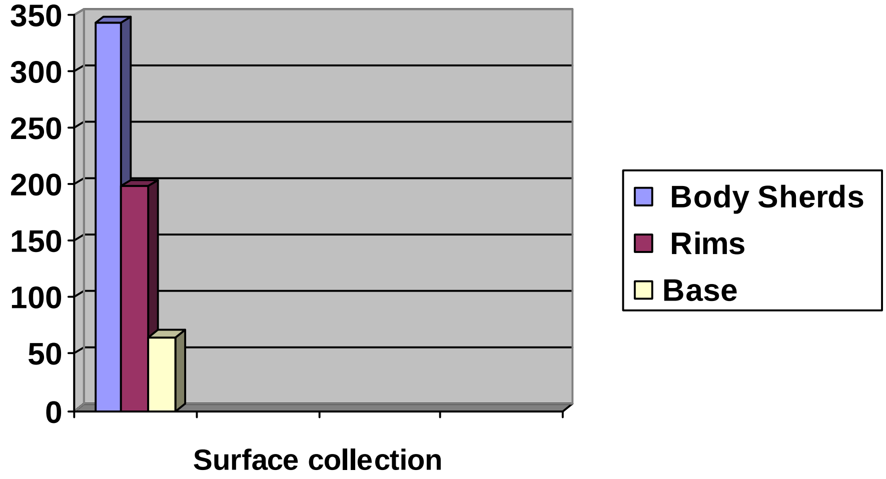

Fig 4.4 Graph showing the number of Neolithic ceramics recovered

4.8.2 LITHIC ARTEFACTS

Only three finds of lithic artefacts were recovered from the excavations and surveys, two grinders (Fig. 4.14) and one axe (Fig 4.15), this paucity suggests that lithic tools found in the Farasan Islands are extremely rare and poor in quality and quantity. Indeed, it appears that its inhabitants did not rely heavily on the production of stone tools but were largely dependent on fishing and the collecting of sea food, or transporting the fish and shells to Jizan in the east or to the south of Africa directly. Whilst the axe was a surface find recovered from Site 275 on Farasan island and we are thus unable to date it, the two grinders were both recovered from Spit 3 of Trench 1 at Janaba Bay (site104).

4.8.3 SHELL

As noted above, the vast majority of the distinguishable archaeological sites in the Farasan Islands are formed by large deposits of shell. The excavated shells weighed a total of 83 kg and species were identified by the Jeddah Marine College. They included *Bivalvia*, *Gastropod*, *Bursidae*, *Stombidae*, *Fasciolaria trapezium*, *Ostreide thais mancienella*, which live at depths of between 3 and 5m, and *Cardita gubernaculum*, *Ranularia boschi, Codakia tigerina, Spondylus exilis*, and *Strombus plicatus sibbaldi* which live at depths of between 5 and 10m (Tables 4.5 & 4.6).

Spit	*Bivalvia*	*Gastropod*	*Bursidae*	*Stombidae*	*Fasciolaria*
10-30 cm	2543	2276	1898	3434	6765
30-60 cm	3243	2322	1454	2309	5645
60-90 cm	2434	1276	1232	2665	7611
90-140 cm	1239	1288	877	2123	5656
140- 180 cm	4534	980	498	3876	4543
Total	**31939**	**7242**	**5956**	**14387**	**30220**

Spit	*Trapezium*	*Strombusplicatus sibbaldi*	*Thais mancienella*	*Spondylus exilis*
10-30 cm	3346	4343	5656	5464
30-60 cm	6577	2987	6453	3465
60-90 cm	4323	2876	3433	2327
90-140 cm	3290	3986	4546	1289
140- 180 cm	3980	2390	6690	4546
Total	**21516**	**16562**	**26658**	**17091**

Spit	*Ranularia boschi*	*Tigerina codakia*	*Strombus plicatus sibbaldi*
10-30 cm	6575	4908	3435
30-60 cm	4343	4562	3346
60-90 cm	4990	3980	1656
90-140 cm	5980	4398	1230
140- 180 cm	6767	2800	2876
Total	**28655**	**20548**	**12543**

Table 4.1 Trench 1 Shell weights (mg) Janaba Bay (site 104).

Spit	*Bivalvia*	*Gastropod*	*Bursidae*	*Stombidae*	*Fasciolaria*
10-50 cm	4324	2767	6543	4321	4329
50-100 cm	3434	2655	3488	2321	3490
100-150cm	4598	1659	3210	1290	2556
150-200cm	5477	2321	5432	790	2966
200-300cm	2189	3459	1238	1245	3765
Total	**20032**	**12223**	**19911**	**9967**	**17306**

Spit	*Trapezium*	*Strombusplicatus sibbaldi*	*Thais Mancienella*	*Spondylus exilis*
10-50 cm	2876	2327	54325	1287
50-100 cm	2987	1876	4342	785
100-150cm	2955	884	3432	656
150-200cm	3900	1299	2879	1216
200-300cm	3277	1764	1298	870
Total	**15995**	**8150**	**101276**	**9214**

Spit	*Ranularia boschi*	*Tigerina codakia*	*Strombusplicatus sibbaldi*
10-50 cm	43542	5434	7656
50-100 cm	3232	6745	6560
100-150cm	2123	6765	3897
150-200cm	1232	5438	4365
200-300cm	2768	4358	7678
Total	**13896**	**28740**	**30156**

Table 4.2 Trench 2 Shells weight (mg) As-Saqid (site 197)

4.8.4 FISH

Initial identifications of the fish bones suggest that the families: *Myliobatidea*, *Serranidea*, and *Scaridae* were present and which lived at a depth of 5 and 30m in the Red Sea. Fish bone is also present in Janaba Bay site 104 spit 4.

Spit	*Scaridae*	*Serranidea*	*Myliobatidea*
30-60 cm	٨	١٣	١٦

Table 4.3 Trench 1 fish bones weight (mg) Janaba Bay (site 104).

4.9 CONCLUSION

This new survey of the two key islands of the Farasan Archipelago, Farasan Island and Qamah Island, has clearly demonstrated the presence of 400 sites comprising middens of shell and fish bone, confirming and extending the findings of Zarins' earlier survey (1982). The survey results have also indicated that both islands have been subject to human occupation, although it is not yet possible to hypothesise whether this was permanent or periodised, from the prehistoric period until the Islamic conquest and occupation of the island . The vast number of shell and fish bone middens also indicate that those inhabitants were largely supported by their access to the rich aquatic resources of the Archipelago. The presence of sites with ceramic sherds attributed to the Neolithic indicates the antiquity of this occupation and the radiocarbon measurements on samples of shell and charcoal from the midden sampled by Trench 1 at Janaba Bay(site 104) have provided calibrated dates for its accumulation of between the third and fourth millennium BC – demonstrating firmly that this midden may be attributed to the Neolithic of the Kingdom of Saudi Arabia (Table 4.4). It is very possible that the Neolithic occupation of the islands was seasonal and even today the islands' natural resources are exploited seasonally as with the Harid fish season, which draws large numbers of people from the Archipelago and mainland (Maftah 2001). It is also very clear that there are similarities between the material culture of the islands and Jizan, both demonstrating a dependence on fishing and shellfish. Finally, it should be noted that all the artefacts recovered from the trenches were confined to the upper layers of the excavation, whereas the shells were present throughout. This implies a restricted access to such stone tools, again suggesting that a more seasonal exploitation of the island may have been practice during its early utilisation. The following chapter, Chapter 5, will introduce the archaeology of the coastal plain, which, as has already been noted, has many cultural and subsistence similarities with that of the offshore islands.

Lab No.	Provenance	Sample Material	Conventional Radiocarbon age BP	Cal BC
OxA-19587	Base, Janaba	charcoal	4709±31	3378–2626
Beta-255383	Top, Janaba	shell	5010±50	3520–3320

Table 4.4 New radiocarbon measurement from Trench 1 Janaba Bay (site 104) in Farasan Islands (After Bailey 2006:11) .

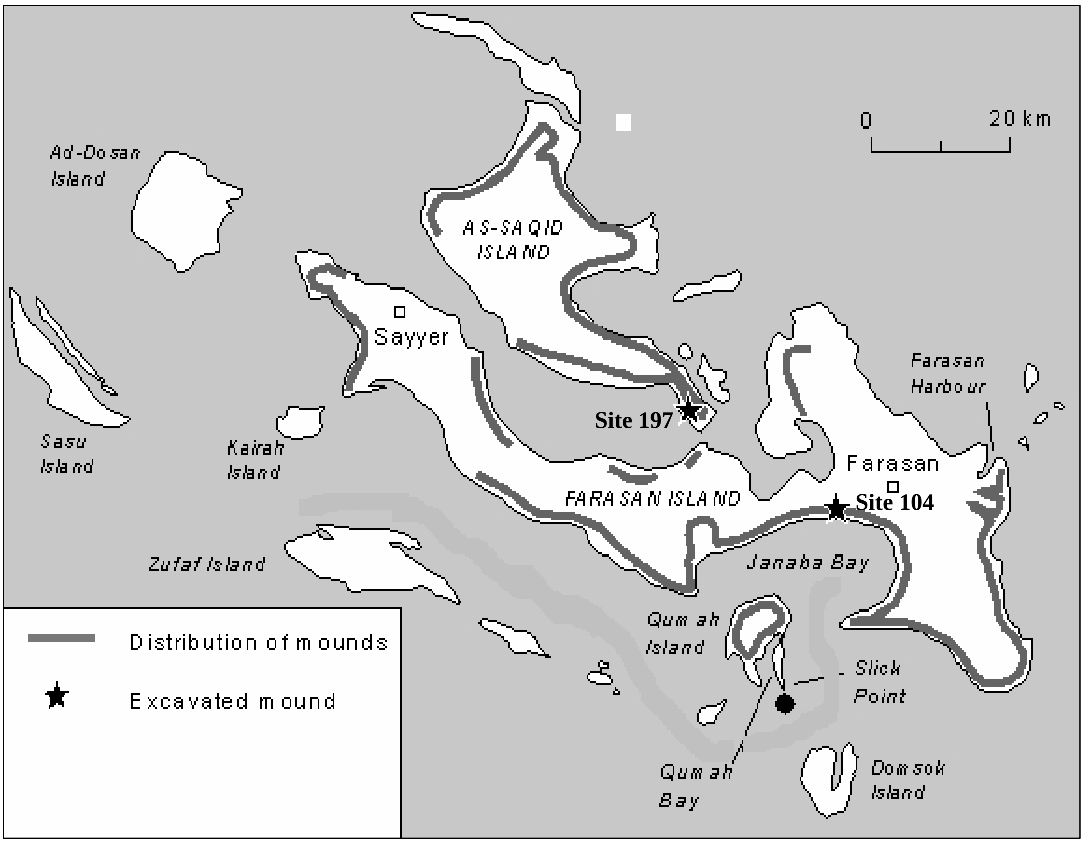

Figure 4.5 Map showing the distribution of shell middens and archaeological sites in the Farasan islands with the two excavated sites, Janaba Bay (site104) and As-Saqid (site197) indicated by stars (After Bailey 2007: 15)

Figure 4.6 Trench 1, Janaba Bay, (site104) Farasan island photo by Alghamdi

Figure 4.7 Spit 1, Trench 1, Janaba Bay, (site104) Farasan island photo by Alghamdi

Figure 4.8 Spit 3, Trench 1, Janaba Bay, (site104) Farasan island photo by Alghamdi

Figure 4.9 Spit 3, Trench 2, As-Saqid (site197) Farsan Island photo by Alghamdi

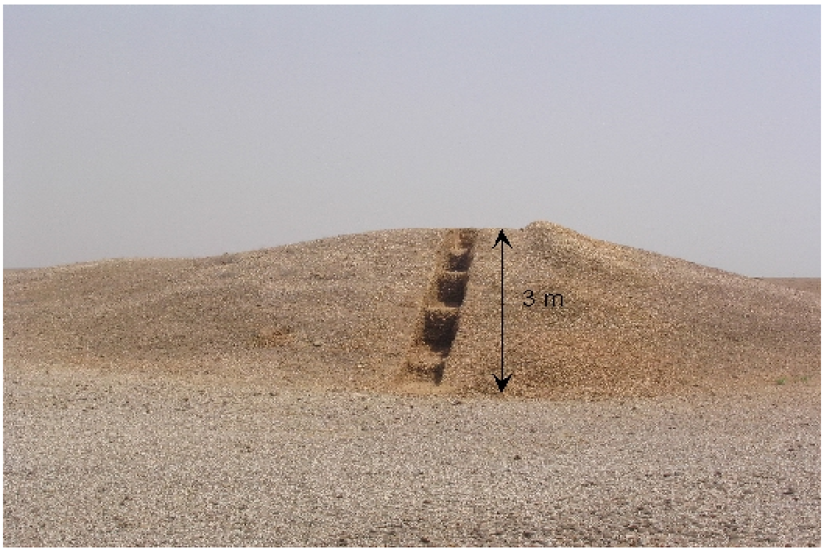

Figure 4.10 Trench 2, As-Saqid,(site197) Farsan Island photo by Alghamdi

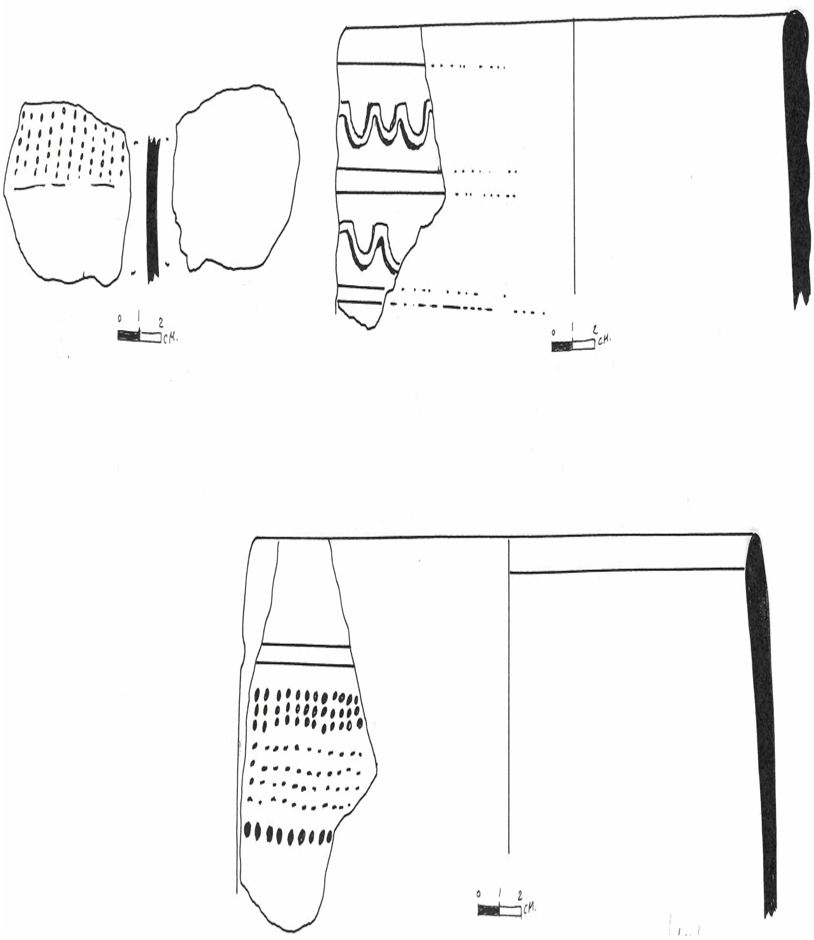

Fig 4.11 Glazed ceramics from Sites 210 Drawn by Ali

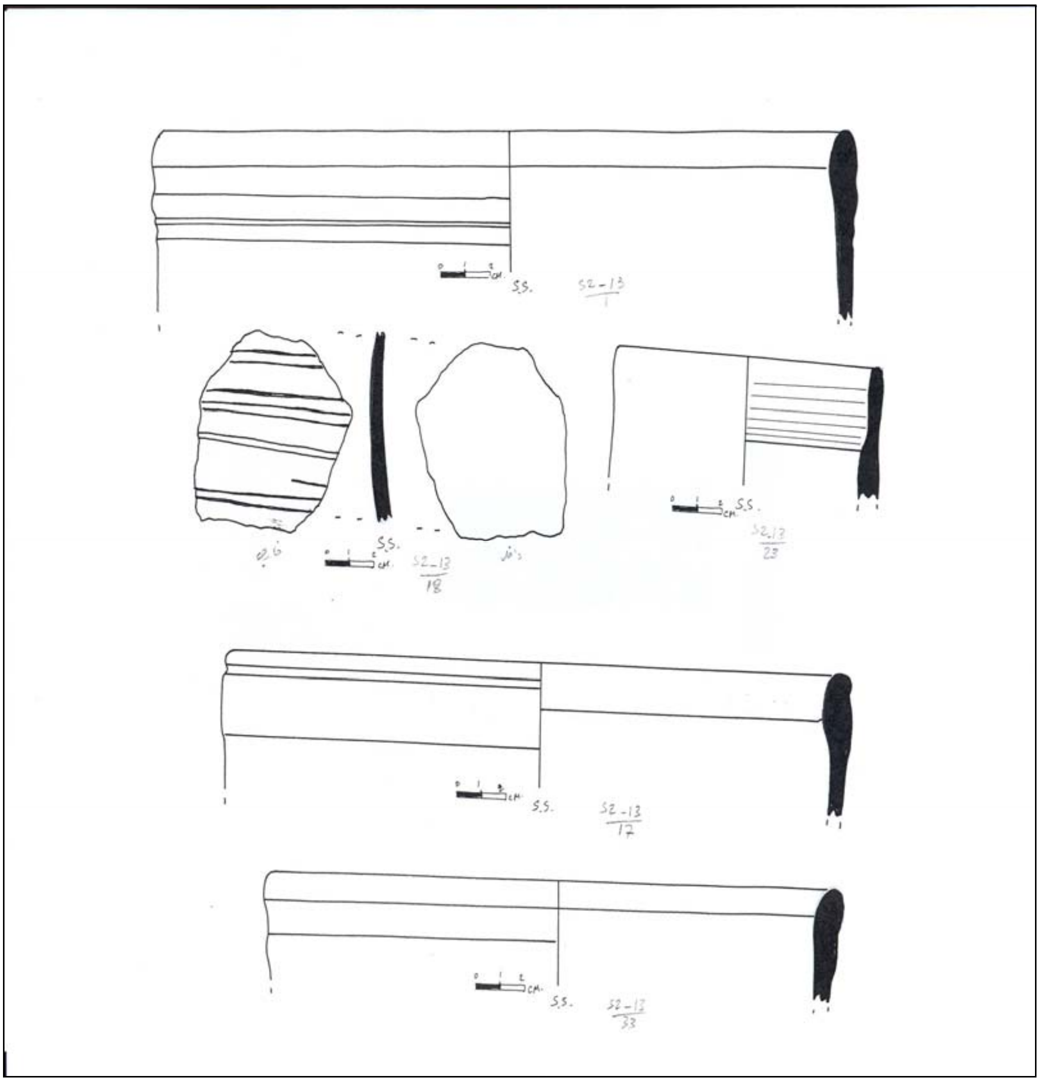

Figure 4.12 Pre-Islamic ceramics from Sites 419 Drawn by Ali

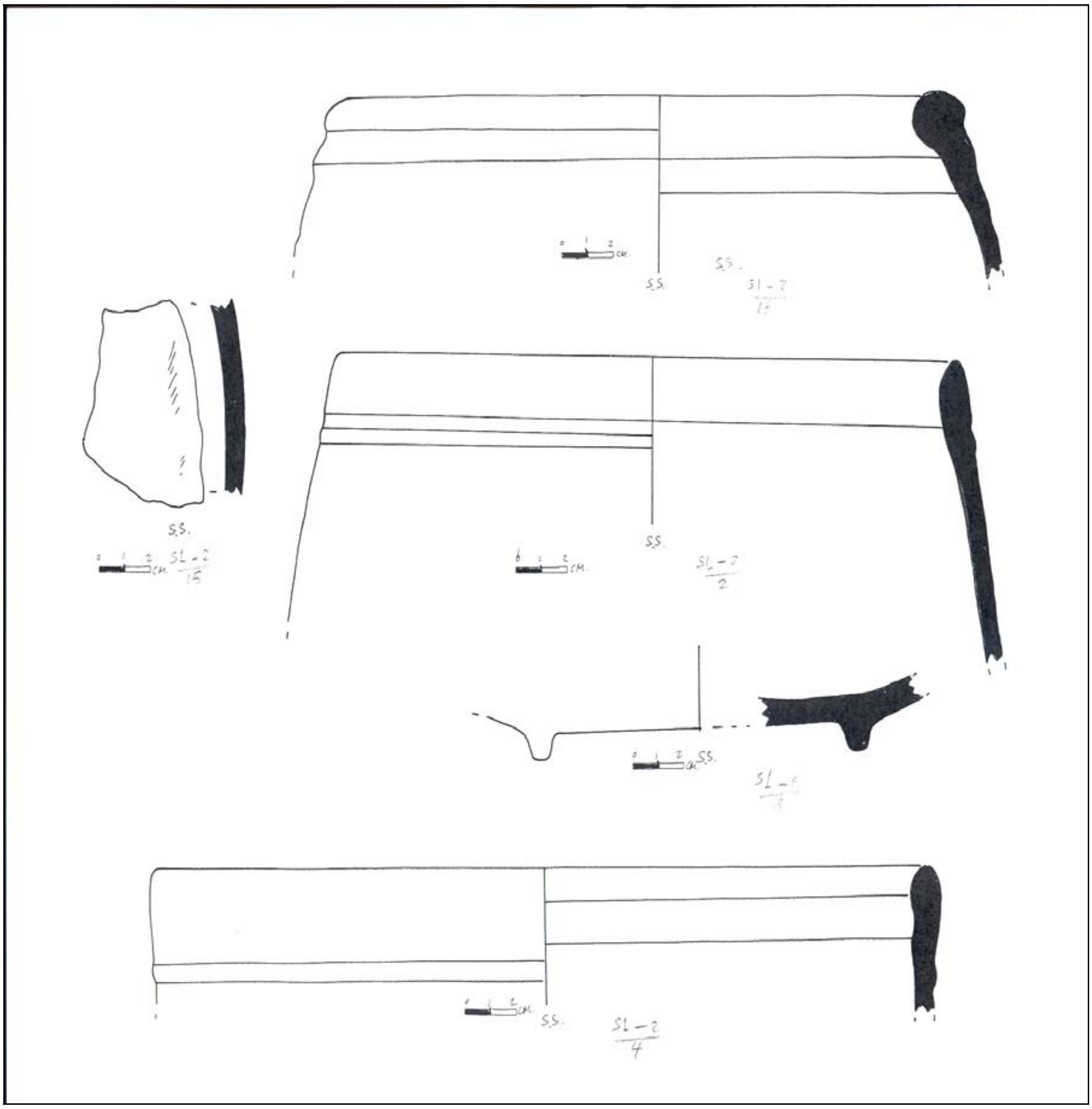

Figure 4.13 Neolithic ceramics from sites 288 Drawn by Ali

Figure 4.14 Stone grinders from Trench 1, Janaba Bay(site 104), Spit 3 photo by Alghamdi

Figure 4.15 Axe from Site 275 photo by Alghamdi

Figure 4.16 *Bivalvia*
photo by Alghamdi

Figure 4.17 *Gastropod*
photo by Alghamdi

Figure 4.18 *Bursidae*
photo by Alghamdi

Figure 4.19 *Stombidae*
photo by Alghamdi

Figure 4.20 *Fasciolaria trapezium*
photo by Alghamdi

Figure 4.21 *Thais mancienell*
photo by Alghamdi

Figure 4.22 *Ranularia boschi*
photo by Alghamdi

Figure 4.23 *Codakia tigerina*
photo by Alghamdi

Figure 4.24 *Spondylus exilis*
photo by Alghamdi

Figure 4.25 *Strombus plicatus sibbaldi*
photo by Alghamdi

Appendix 4: Table1 Archaeological sites in the Interior area (Zone 4) All the data from Alghamdi work 2007

Site Number	GPS Location	Size of Location	comments	Date
398	E 42 20 00 N17 12 00	1000x1000m	Hima site ,large sites includes lithics tools	Neolithic Period
399	E 44 20 00 N17 12 526	5x5m	Glazed ceramics	Islamic Period
400	E 44 35 00 N 18 33 00	5x5m	Site is a group of sand hills contain glazed ceramics.	Islamic Period
401	E 44 30 00 N 18 20 00	10x5m	Foundations buildings	Islamic Period
402	E 44 30 00 N 18 43 00	3x3m	Ceramics	Islamic Period
403	E 44 30 00 N 18 33 00	20x20m	Site is a mountain that contains some ceramics	Islamic Period
404	E 44 02 00 N 18 33 00	1x1m	Foundation building	Islamic Period
405	E 44 33 00 N 18 19 00	5x10m	Site is a mosque	Islamic Period
406	E 44 26 00 N 18 14 00	4x4m	Site is a group of stone circles	Pre history Period
407	E 44 28 00 N 18 15 00	10x15m	some pieces of ceramics	Islamic Period
408	E 43 57 00 N 17 28 00	20x40m	Islamic foundation building	Islamic Period
409	E 43 55 00 N 17 59 00	50x30m	A group of graves	Islamic Period

Appendix 4: Table 2 Archaeological sites in the Interior area (Zone 4)

410	E 44 27 00 N 17 37 00	50x30m	Ruins of buildings	Islamic Period
411	E 44 26 00 N 17 37 00	20X20m	A group of graves	Islamic Period
412	E 44 27 00 N 17 38 00	5x5m	A well	Pre Islamic Period
413	E 44 27 00 N 17 55 00	10X20m	Group of archaeological hills that contains ceramics	Pre Islamic Period
415	E 44 28 00 N 17 55 00	5X5m	A well, close to which there are pieces of ceramics	Islamic Period
416	E 44 29 00 N 17 55 129	40 x 30m	A group of archaeological hills which there are many pieces ceramics	Pre Islamic Period
417	E 44 7 00 N 17 29 00	20X25m	Mosque	Islamic Period
418	E 44 6 00 N 17 29 00	60X50m	Site is a group of archaeological hills, that include some ceramics	Pre Islamic Period
419	E 44 0 00 N 17 22 00	20x20m	Site is a volcanic area	Unknown
420	E 44 16 00 N 17 32 00	1x1m	Ceramics	Pre Islamic Period
421	E 44 19 00 N 17 37 00	5x10m	Scatter	Unknown
422	E 43 53 00 N 17 38 00	4x4m	Scatter	Unknown
423	E 44 3 00 N 17 36 0	15x10m	A castle	Islamic Period
424	E 44 2 00 N 17 34 00	3x7m	Glazed ceramic	Islamic Period

Appendix 4: Table 3 Archaeological sites in the Interior area (Zone 4)

425	E 43 53 00 N17 29 403	10X20m	Site is large grave and castle	Pre Islamic Period
426	E 43 45 00 N 17 52 00	25x60m	Site is formed of destroyed buildings	Islamic Period
527	E 44 07 00 N 17 34 00	10X25m	An archaeological castle	Pre Islamic Period
428	E 44 16 23 N 17 31 41	10x10m	foundation buildings	Islamic Period
429	E 44 26 46 N 17 36 18	5x10m	Site is formed of ruins of a mosque	Islamic Period
430	E 44 31 31 N 17 37 39	4x4m	Scatter	Islamic Period
431	E 44 27 36 N 17 44 57	10X20m	Foundation building	Islamic Period
432	E 44 25 19 N 17 46 20	10X10m	Scatter	Unknown
433	E 40 30 36 N 17 42 44	5X5m	Scatter	Unknown
434	E 44 02 351 N17 43 870	10X20m	Scatter	Unknown
435	E 44 07 362 N17 42 833	5X10m	Scatter	Unknown
436	E 44 08 193 N17 38 718	30X30m	Mound	Unknown
437	E 40 34 66 N 17 32 19	10X20m	Mound	Unknown
438	E 44 43 29 N 17 32 70	10x10m	Site is a Mosque	Islamic Period
439	E 44 30 26 N 17 32 42	5X5m	Site is a small castle	Unknown

Appendix 4: Table 4 Archaeological sites in the Interior area (Zone 4)

440	E 44 46 10 N 17 29 31	10X10m	Scatter	Unknown
441	E 44 07 46 N 17 29 15	20X20m	Ceramics	Islamic Period
442	E 44 11 18 N 17 30 03	30X20m	Burial mounds	Unknown
443	E 44 12 40 N 17 31 08	20X10m	Burial mounds	Pre Islamic Period
444	E 44 18 19 N 17 31 19	30X20m	Mounds including stones	Pre Islamic Period
445	E 44 13 48 N 17 22 53	10X15m	Mounds	Unknown
446	E 44 26 36 N 17 48 32	30X15m	Ceramics	Pre Islamic Period
447	E 44 39 53 N 17 47 52	15X40m	Glazed ceramics	Islamic Period
448	E 44 35 13 N 17 38 44	5X10m	Foundation building	Unknown
449	E 44 23 14 N 17 55 57	10X20m	Site is formed of ruins of old buildings in addition to a well	Unknown
450	E 44 39 32 N 17 46 50	5X10m	Islamic foundation building	Islamic Period
451	E 44 35 245 N17 06 853	20X20m	Islamic foundation building	Islamic Period
452	E 44 35 43 N17 06 75	10X10m	Remains of destroyed buildings	Islamic Period

Appendix 3:Table 1 Archaeological sites in the Tihama mountain (Zone 3) All the data from Al-ghamdi work 2007

Site Number	GPS Location	Comment	Date
392	E 42 44 756 N 17 10 787	Caves , rock art	Late second millennium BC
393	E 43 02 975 N 16 43 376	Volcanic mountains	Unknown
394	E 42 38 439 N 17 11 463	Caves, rock art	Between 800 and 500 BC.
395	E 42 38 459 N 17 11 463	Caves, rock art	Unknown
396	E 42 38 439 N17 11 403	3 Caves, rock art	Unknown
397	E 42 65 876 N17 13 457	Caves, rock art	Unknown

Appendix 2: Table 1 Archaeological sites in the Coastal plain (Zone 2) All the data from Alghamdi work 2007

Site Number	GPS Location	Size of Location	comments	Date
208	E 42 20 283 N 17 12 874	10x5m	Shell midden	Unknown
209	E 42 20 325 N 17 12 526	10x5m	Shell midden	Unknown
210	E 42 20 363 N 17 13 92	5x5m	Site is formed of sand dunes, which include Islamic ceramics	Islamic Period
211	E 42 20 125 N 17 14 463	5x5m	Shell midden	Unknown
212	E 42 20 156 N 17 14 683	10x5m	Sand dunes, ceramic and pieces of bones	Prehistoric
213	E 42 34 867 N 17 15 604	3x3m	A well mouth of which is two meters wide	Islamic Period
214	E 42 17 661 N 17 41 434	500x500m	A natural hill, that contains small amount of stone tools and potteries.	Islamic Period
215	E 42 18 160 N 17 40 332	1500x1000m	Volcanic hill, contains tools	Prehistoric
216	E 42 41 762 N 17 01 612	4x4m	A well	Islamic Period
217	E 42 49 959 N 16 35 466	20x10m	Site contains decorated glazed ceramics	Islamic Period
218	E 42 11 201 N 16 20 010	20x20m	Site is a group of sand hills that contain stone tools, ceramic in addition to some pieces of coral	Prehistoric

Appendix 2: Table 2 Archaeological sites in the Coastal plain (Zone 2)

219	E 42 06 207 N 16 45 066	30x30m	Site includes foundation buildings	Unknown
220	E 42 05 780 N16 45 534	20x20m	Site includes graves, includes also some stone circles	Prehistoric
221	E 42 06 458 N16 43 978	Mountain	Site is a mountain that contains some ceramics	Prehistoric
222	E 42 04 999 N 16 37 802	10x10m	Site is a grave	Islamic Period
223	E 42 34 909 N 17 15 515	15x15m	Site is a mosque.	Islamic Period
224	E 42 17 640 N 17 41 444	3x3m	Site is a group of stone circles.	Prehistoric
225	E 42 41 977 N 17 01 616	4x4m	Some pieces of ceramic .	Islamic Period
226	E 42 51 939 N 16 41 206	1000x1500m	Excavation	Neolithic Period
227	E 42 19 359 N 17 44 991	30x30m	A group of graves.	Islamic Period
228	E 42 18 132 N 17 44 753	20x20m	Foundation buildings	Islamic Period
229	E 42 46 658 N 15 24 887	20x20m	A group of graves	Unknown
230	E 42 08 834 N 16 39 174	1x1m	A well	Unknown
231	E 42 09 359 N 16 40 119	5x10m	Glazed ceramics	Islamic Period

Appendix 2: Table 3 Archaeological sites in the Coastal plain (Zone 2)

232	E 42 25 253 N 17 08 613	100x100m	Ceramics	Prehistoric
234	E 42 25 717 N 17 08 446	30x30m	Ceramics	Pre Islamic Period
235	E 42 515 765 N 17 08 451	30x30m	Ceramics	Islamic Period
236	E 42 44 613 N 17 11 233	2x3 km	Site is a volcanic mountain	Prehistoric
237	E 42 51 390 N 17 13 842	50x30m	Stone circles	Prehistoric
238	E 42 48 489 N 17 21 743	50x50m	A group of pre-Islam inscription .	Pre Islamic Period
239	E 42 45 187 N 17 19 120	500x200m	Pieces of ceramics	Pre Islamic Period
240	E 42 32 734 N 16 53 281	5x5m	A castle	Pre Islamic Period
241	E 42 042 211 N 17 02 29	10x15m	Pieces of ceramics	Prehistoric
242	E 42 05 443 N 16 43 771	20x20m	Site is large grave.	Islamic Period
243	E 42 02 351 N 16 43 870	30x20m	Site is formed of destroyed buildings .	Pre Islamic Period
244	E 42 07 362 N 16 42 833	10x5m	An archaeological castle	Pre Islamic Period
245	E 42 08 193 N16 38 718	10x10m	Site is a group of destroyed buildings	Islamic Period
246	E 42 41 311 N17 09 018	25x25m	Mosque	Islamic Period

Appendix 2: Table 4 Archaeological sites in the Coastal plain (Zone 2)

247	E 42 54 096 N17 37 608	5x10m	Rock Art	Pre Islamic Period
248	E 42 54 096 N17 35 811	10x10m	Shell midden	Unknown
249	E 42 56 639 N17 39 554	5x10m	Shell midden	Unknown
250	E 42 53 977 N17 37 694	10x10m	Shell midden	Unknown
251	E 42 52 137 N17 09 173	15x15m	Shell midden	Unknown
252	E 42 02 882 N16 43 501	30x15m	Shell midden and stone tools	stone tools
253	E 42 39 466 N16 530 381	1.5x1.5km	Site includes stone tools, ceramic	Pre Islamic Period
254	E 42 41 210 N16 53 039	5x4 m	Shell midden	Unknown
255	E 42 49 451 N16 57 727	20x50m	Mosque	Islamic Period
256	E 42 49 753 N16 57 988	5x10m	Site is an castle	Islamic Period
257	E 42 52 226 N17 01 380	200x100m	Mosque and foundation building	Islamic Period
258	E 42 52 168 N17 01 374	1x1km	Foundation building	Islamic Period
259	E 42 52 137 N17 01 502	105x150m	Site is a group of destroyed building	Islamic Period
260	E 42 35 245 N17 06 853	150x200m	Site is an archaeological hill, that includes some ceramics	Islamic Period
261	E 42 35 434 N17 06 750	250x200m	Site is an grave site, that includes one well	Islamic Period

Appendix 2: Table 5 Archaeological sites in the Coastal plain (Zone 2)

262	E 42 39 042 N17 09 612	20x20m	An site that contains one mosque and ceramics	Islamic Period
263	E 42 24 147 N17 18 786	10x10	Shell midden	Unknown
264	E 42 23 144 N17 18 154	25x25m	Glazed ceramics	Islamic Period
265	E 42 25 798 N17 16 092	15x15m	Glazed ceramics	Islamic Period
266	E 42 28 396 N17 14 706	25x25m	Destroyed buildings	Islamic Period
267	E 42 24 179 N17 18 783	Unknown	Site is an old passage for Hajj that link Yemen to Holy Makkah	Islamic Period
268	E 42 46 579 N16 24 442	20x20m	Foundation buildings	Islamic Period
269	E 42 56 812 N16 35 732	10x10m	Foundation buildings	Islamic Period
270	E 42 53 758 N17 08 524	30x15m	Inscription	Pre Islamic Period
271	E 42 45 491 N16 29 732 Sihi	1500x1500m	Large site includes Ceramics and shell	Neolithic
272	E 42 48 615 N16 44 077	7x10m	Shell midden	Unknown
273	E 042 71 511 N 16 47 03	30x20m	Shell midden	Unknown
274	E 42 49 367 N16 49 367	10x10m	The site includes stone tools	Prehistoric

Appendix 2: Table 6 Archaeological sites in the Coastal plain (Zone 2)

275	E 42 44 302 N16 39 752	5x5m	The site includes stone tools, glazed ceramics	Islamic Period
276	E 42 44 423 N10 39 369	5x5m	Glazed ceramics	Islamic Period
277	E 42 44 425 N16 39 770	10x10m	The site includes stone tools, glazed ceramics	Islamic Period
278	E 42 42 764 N16 42 205	500x500m	Al-Majama site excavation The site includes stone tools, ceramics	Neolithic Period
279	E 42 50 549 N16 39 739	15x5m	The site includes stone tools, Shell, with human bones and lava	Islamic Period
280	E 42 44 635 N16 39 673	20x20	The site includes stone tools, ,lava and quartz	Unknown
282	E 42 49 637 N16 39 670	50x50m	The site includes stone tools, and ceramic	Unknown
283	E 42 349667 N16 39 648	20x30m	The site includes stone tools	Unknown
284	E 42 44 704 N16 39 939	15x10m	The site includes stone tools	Unknown
285	E 42 49796 N 16 39 600	10 x 10 m	The site includes stone tools	Unknown
286	E 42 39 740 N 16 39 637	20 x 20	The site includes stone tools, ,ceramic and obsidian	Unknown
287	E 42 39 743 N 16 39 473	200 x 300 m	Shell midden	Unknown
288	E 42 40 539 N 16 46 759	5 x 5 m	Shell midden	Unknown
289	E 42 40 558 N 16 46 699	5 x 10 m	Shell midden	Unknown

Appendix 2: Table 7 Archaeological sites in the Coastal plain (Zone 2)

290	E 42 40 563 N 16 46 659	5 x5 m	Shell midden	Unknown
291	E 42 40 585 N 16 46 589	10 x 10 m	Shell midden	Unknown
292	E 42 40 626 N 16 46488	5 x 5 m	Shell midden	Unknown
293	E 42 40 665 N 16 46 472	10 x 20 m	Shell midden	Unknown
294	E 42 40 790 N 16 46 470	5 x 3 m	Shell midden	Unknown
295	E 42 40 921 N 16 46 548	5 x 5 m	Shell midden	Unknown
296	E 42 40 947 N 16 46 655	10 x 6 m	Shell midden	Unknown
297	E 42 40 954 N 16 46 538	5 x 5 m	Shell midden	Unknown
298	E 42 40 028 N 16 46 426	3 x 3 m	Shell midden and Ceramics	Islamic Period
299	E 42 40 046 N 16 46 379	5 x5 m	Shell midden	Unknown

Appendix 2: Table 8 Archaeological sites in the Coastal plain (Zone 2)

300	E 42 41 199 N 16 46 438	5 x 1 m	Shell midden	Unknown
301	E 42 41097 N 16 46329	5 x 5 m	Shell midden	Unknown
302	E 42 41 161 N 16 46 282	5 x 10 m	Shell midden	Unknown
303	E 42 41 616 N 16 46 393	3 x 3 m	Shell midden	Unknown
304	E 42 41 692 N 16 46 412	5 x 5 m	Shell midden	Unknown
305	E 42 41 085 N 16 46 061	10 x 10 m	Shell midden	Unknown
306	E 42 41 124 N 16 46 114	3 x 3 m	Shell midden	Unknown
307	E 42 41 234 N 16 46 432	5 x 5 m	Shell midden	Unknown
308	E 42 41 146 N 16 46 159	5 x10 m	Shell midden and ceramic	Unknown
309	E 42 41 111 N 16 46 192	10 x10 m	Shell midden	Unknown
310	E 42 41 121 N 16 46 426	20 x 10 m	Shell midden, ceramic and stone tools	Unknown
311	E 42 41 183 N 16 46 285	10 x 10 m	Shell midden and ceramic	Unknown

Appendix 2: Table 9 Archaeological sites in the Coastal plain (Zone 2)

312	E 42 41 154 N 16 46 376	5 x 5 m	Ceramic	Prehistoric
313	E 42 41 522 N 16 46 752	10 x 10 m	Shell midden and ceramic	Prehistoric
314	E 42 41588 N 16 46 218	50x 50 m	Shell midden, ceramic and stone tools	Unknown
315	E 42 41 634 N 16 46 837	10 x 10 m	Shell midden	Unknown
316	E 42 41 362 N 16 46 749	5 x 5m	Shell midden, ceramic and stone tools	Unknown
317	E 42 41 420 N16 46 647	10 x 20 m	Shell midden and ceramic	Unknown
318	E 42 43 477 N 16 46 965	50 x 100 m	Shell midden	Unknown
319	E 42 47 897 N 16 39474	20 x 20m	Shell midden	Unknown
320	E 42 47 937 N 16 39 473	10 x 200 m	Shell midden, ceramic and stone tools	Islamic Period
321	E 42 47 847 N 16 39 493	10 x 10 m	Shell midden	Unknown
322	E 42 44 885 N 16 39 712	10 x 10 m	Shell midden	Unknown
323	E 42 44 889 N16 39 761	20 x 50 m	Shell midden	Unknown
324	E 42 51 378 N 16 39 972	10x 5 m	Shell midden	Unknown
325	E 42 47 067 N 16 28323	10 x 10 m	Shell midden	Unknown
326	E 42 47 104 N 16 28 338	5 x 5 m	Shell midden	Unknown

Appendix 2: Table 9 Archaeological sites in the Coastal plain (Zone 2)

327	E 42 47 178 N 16 28 386	2 x 2 m	Shell midden	Unknown
328	E 42 47 175 N16 28 383	2 x2 m	Shell midden	Unknown
329	E 42 47 006 N16 28 161	20 x 10 m	Shell midden, ceramic and stone tools	Unknown
330	E 42 46 964 N 16 28 183	5 x 10 m	Shell midden	Unknown
331	E 42 46 165 N16 28 188	5 x 5 m	٣ Shell midden	Unknown
332	E 42 46 886 N 16 28 239	10 x20 m	Shell midden	Unknown
333	E 42 46 665 N 16 27 635	10 x10 m	Shell midden	Unknown
334	E 42 46 742 N 16 26 755	5 x 5 m	Shell midden	Unknown
335	E 42 46 783 N16 27 555	20 x 10 m	Shell midden	Unknown
336	E 42 46 126 N 16 28 564	5 x 5 m	Shell midden	Unknown
337	E42 47 158 N 16 28 588	5 x 5 m	Shell midden	Unknown
338	E 42 47 171 N16 28 607	5 x10 m	Shell midden	Unknown
339	E 42 47 579 N16 29 038	5 x 5 m	Shell midden	Unknown
340	E 42 46 839 N 16 29 771	10 x 10 m	Shell midden	Unknown
341	E 42 42 601 N16 42 601	5 x 5 m	3 Shell midden	Unknown

Appendix 2: Table 10 Archaeological sites in the Coastal plain (Zone 2)

342	E 42 42 735 N 16 44 735	5 x5 m	Shell midden	Unknown
344	E 42 42 539 N 16 44 836	10 x20 m	Shell midden	Unknown
345	E 42 44 522 N16 44 882	20 x 20 m	Shell midden	Unknown
346	E 42 42 503 N16 44 932	5 x 5 m	Shell midden	Unknown
347	E 42 42 491 N 16 44 961	30 x 20 m	Shell midden	Unknown
348	E 42 42 478 N 16 44 995	10 x 10 m	Shell midden	Unknown
349	E 42 39 735 N16 46 605	5 x10 m	Shell midden	Unknown
350	E 42 39 525 N16 47 576	20 x 10 m	Shell midden	Unknown
351	E42 39 558 N 16 47 641	5 x 5 m	Shell midden	Unknown
352	E 42 39 653 N16 47 653	2 x 2 m	Shell midden	Unknown
353	E 42 39 416 N 16 47 674	5 x10 m	Shell midden	Unknown
354	E 42 39 395 N 16 47 742	5 x5 m	Shell midden	Unknown
355	E 42 39 395 N16 47 742	5 x 5 m	Shell midden	Unknown
356	E 42 39 290 N 16 47 798	5 x 5 m	Shell midden	Unknown
357	E 42 39 277 N 16 47 815	2 x 2 m	Shell midden	Unknown

Appendix 2: Table 11 Archaeological sites in the Coastal plain (Zone 2)

358	E 42 39 737 N 16 47 837	10 x 10 m	Shell midden	Unknown
359	E 42 39 735 N16 46 605	5 x10 m	Shell midden	Unknown
360	E 42 39 013 N16 47 961	2 x 2 m	Shell Scatter	Unknown
361	E 42 39 056 N 16 47 005	23 x 2 m	Shell Scatter	Unknown
362	E 42 39 052 N16 47 907	1 x 2 m	Shell Scatter	Unknown
363	E 42 39 352 N 16 47 938	5 x 5 m	Shell midden	Unknown
364	E 42 39 415 N 16 47 933	5 x5 m	Shell midden	Unknown
365	E 42 39 378 N 16 47 911	10 x10 m	Shell midden	Unknown
366	E 42 39 482 N16 47 943	20 x 10 m	Shell midden	Unknown
367	E 42 39 546 N16 47 630	5 x 10 m	Shell midden	Unknown
368	E 42 39 682 N 16 39 717	10 x 10 m	Shell midden	Unknown
369	E 42 39 776 N 16 47 716	1 x 1 m	Shell Scatter	Unknown
370	E 42 40 079 N16 47 959	10 x20m	Shell midden	Unknown
371	E 42 18 956 N 17 21 766	5 x 5 m	Shell midden	Unknown

Appendix 2: Table 12 Archaeological sites in the Coastal plain (Zone 2)

372	E 42 18 959 N 17721 717	3 x 3 m	Shell Scatter	Unknown
373	E 42 18 958 N17 21 688	5 x 5 m	Shell midden	Unknown
374	E 42 18 665 N 17 21 665	10 x 10 m	Shell Scatter	Unknown
375	E 42 18 961 N 17 21 622	10 x10 m	Shell Scatter	Unknown
376	E 42 18 967 N 17 21 550	50 x50 m	Shell Scatter	Unknown
377	E 42 18 973 N 17 18 973	5 x10 m	Shell Scatter	Unknown
378	E 42 18 932 N 17 21 228	2 x 2 m	Shell midden	Unknown
379	E 42 18 929 N 17 19 927	10 x 10 m	Shell midden	Unknown
380	E 42 19 015 N 17 19 867	10x 10 m	Shell Scatter	Unknown
281	E 42 19 371 N 17 20 095	5 x5m	Shell midden	Unknown
382	E 42 19 744 N 17 19 892	5 x 10 m	Shell midden	Unknown
383	E 42 19 970 N 17 18 334	3 x 3 m	Shell midden	Unknown
384	E 42 20 430 N17 12 303	5 x 5 m	Shell midden	Unknown
385	E 42 22 696 N 17 08 379	5 x 5 m	Shell midden	Unknown
386	E 42 23 480 N 17 07 020	20x100 m	Shell midden	Unknown

Appendix 2: Table 13 Archaeological sites in the Coastal plain (Zone 2)

387	E 42 22 604 N 17 22 604	200x500 m	Shell midden, ceramic and stone tools	Prehistoric
388	E 42 25 972 N17 08 472	200x200 m	Shell midden, ceramic and stone tools	Prehistoric
389	E 42 25 756 N 17 08 475	200x50 m	Shell midden, ceramic and stone tools	Unknown
390	E 42 25 626 N17 07 331	300 x 500 m	Lava field ,basalt ,obsidian, prehistory ceramic ,stone tools.	Prehistoric
391	E 42 26 138 N 17 07 691	20x100 m	Shell midden	Unknown

Appendix 1: Table 1 Archaeological sites in the Farasan Islands (Zone 1) All the data from Saudi British team (Director Prof. G. Bailey)

Site Number	GPS Location	Artifacts & Comment	Date
1	E 42 3.832 N 16 45.432	2 fragments of bone	Unknown
2	E 42 3.801 N 16 45.429	7 x fragments glass, 3 x fragments bone	Unknown
3	E 42 3.74 N 16 45.417	9 x fragments shell	Unknown
4	E 42 3.716 N 16 45.433	3 x fragments metal, 1 x glass	Unknown
5	E 42 3.654 N 16 45.535	4 x ceramic, 2 x stone	Unknown
6	E 4 2 3.67 N 16 45.566	4 x large fragments of glass	Unknown
7	E 42 3.647 N 16 45.58	2 x crab, 1 x shell, 3 x metal, 2 x plastic	Unknown
8	E 42 3.63 N 16 45.566	1 x polystryrene, 1 x modern, 2 x metal handles, 1 x metal clasp, 1 x copper rivet, 3 x iron pieces, 2 x stone, 1 x glass	Unknown
9	E 42 3.603 N 16 45.597	3 x shell	Unknown
10	E 42 3.594 N 16 45.612	5 x shell	Unknown
11	E 42 3.572 N 16 45.633	2 x ceramic	Pre-Islamic period
12	E 42 3.557 N 16 45.655	6 x ceramic	Pre-Islamic period
13	E 42 3.541 N 16 45.662	8 x ceramic	Islamic period

Appendix 1: Table 2 Archaeological sites in the Farasan Islands (Zone 1)

14	E 42 3.507 N 16 45.69	5 x ceramic	Pre Islamic
15	E 42 3.493 N16 45.702	16 x ceramic	Pre Islamic
16	E 424.481 N1645.714	59 x ceramic (includes some glazed ceramics and some that conjoin)	Islamic
17	E 42 3.466 N16 45.73	2 x lithic (natural)	Unknown
18	E 42 3.454 N16 45.746	11 x glass	Unknown
19	E 42 3.442 N16 45.761	3 x bone	Unknown
20	E 42 3.448 N16 45.769	12 x shell fragments ('Mother of Pearl')	Unknown
21	E 42 3.477 N16 45.796	7 x ceramic	Islamic
22	E 42 3.509 N16 45.809	2 x shells	Unknown
23	E 42 3.543 N16 45.846	5 x ceramic	Islamic
24	E 423.59 N16 45.865	4 x ceramic	Islamic
25	E 42 3.55 N1645.934	Chalky geological sample	Unknown
26	E 42 42.672 N16 16.801	2 x shells	Unknown
27	E 42 42.643 N16 16.78	12 x shells	Unknown
28	E 42 42.617 N16 16.781	2 x bone	Unknown

Appendix 1: Table 3 Archaeological sites in the Farasan Islands (Zone 1)

29	E 42 42.627 N16 16.733	4 x shells	Unknown
30	E 42 42.664 N16 16.708	2 x shells	Unknown
31	E 42 42.653 N16 16.692	12 x shells	Unknown
32	E 42 42.659 N16 16.681	2 x bone	Unknown
33	E 42 42.562 N16 16.671	4 x shells	Unknown
34	E 42 42.543 N16 16.703	20 x ceramic	Unknown
35	E 42 42.53 N16 16.713	29 x ceramic, 2 x glazed	Unknown
36	E 42 42.497 N16 16.727	6 x glass, 1 x glass bracelet	Unknown
37	E 42 42.481 N16 16.734	21 x china, 1 x china	Unknown
38	E 42 42.42 N16 16.784	3 x lava	Unknown
39	E 42 42.413 N16 16.803	4 x glass (modern)	Unknown
40	E 42 3.576 N16 45.914	12 x shell, 1 x clam shell, 1 x fossillised shell	Unknown
41	E 42 42.672 N16 16.801	7 x glass	Unknown
42	E 42 42.643 N16 16.78	2 x china	Unknown
43	E 42 42.617 N16 16.781	1 x lava	Unknown

Appendix 1: Table 4 Archaeological sites in the Farasan Islands (Zone 1)

44	E 42 42.627 N16 16.733	5 x lithic	Unknown
45	E 42 42.664 N16 16.708	1 x lithic (knapped quartzite)	Unknown
46	E 42 42.653 N16 16.692	6 x ceramic; 2 x shell	Unknown
47	E 42 3.576 N16 45.914	3 x shell	Unknown
48	E 42 42.672 N16 16.801	4 x shell	Unknown
49	E 42 42.643 N16 16.78	11 x shell	Unknown
50	E 42 42.617 N16 16.781	6 x shell	Unknown
51	E 42 42.627 N16 16.733	4 x shell	Unknown
52	E 42 42.664 N16 16.708	1 x metal artifact	Unknown
53	E 42 42.653 N16 16.692	6 x ceramic	Islamic period
54	E 42 3.576 N16 45.914	2 x lava	Unknown
55	E 42 42.672 N16 16.801	1 x ceramic; 1 x basalt/lava	Unknown
56	E 42 42.643 N16 16.78	12 x ceramic	Islamic
57	E 42 42.617 N16 16.781	geological sample	Unknown

Appendix 1: Table 5 Archaeological sites in the Farasan Islands (Zone 1)

58	E 42 42.627 N16 16.733	1 x shell; 10 x ceramic (1 glazed)	Islamic period
59	E 42 42.664 N 16 16.708	2 x shells	Unknown
60	E 42 42.653 N 16 16.692	13 x ceramic; 1 x glass bracelet	Islamic period
61	E 42 3.576 N16 45.914	8 x glass (2 glass bracelets)	Unknown
62	E 42 42.672 N16 16.801	1 x grinding stone	Unknown
63	E 42 42.643 N 16 16.78	20 x ceramic (painted & glazed)	Islamic
64	E42 42.617 N16 16.781	2 x shell	Unknown
65	E 42 42.627 N16 16.733	1 x china	Unknown
66	E 42 42.664 N16 16.708	24 x ceramic (unglazed)	Islamic
67	E 42 42.653 N16 16.692	8 x ceramic	Islamic
68	E 42 3.576 N16 45.914	4 x shells	Unknown
69	E 42 42.672 N16 16.801	5 x shell	Unknown
70	E 42 42.643 N16 16.78	3 x shells	Unknown
71	E 42 42.617 N16 16.781	8 x shells	Unknown

Appendix 1: Table 6 Archaeological sites in the Farasan Islands (Zone 1)

72	E 42 42.627 N16 16.733	2 x shells	Unknown
73	E 42 42.664 N16 16.708	1 x ceramic	Islamic
74	E 42 42.653 N16 16.692	2 x ceramic	Islamic
75	E 42 42.653 N16 16.695	3 x ceramic (1 glazed)	Islamic
76	E 42 3.576 N16 45.914	3 x shells	Unknown
77	E 42 42.672 N16 16.801	3 x shells	Unknown
78	E 42 42.643 N16 16.78	3 x shells	Unknown
79	E 42 42.617 N16 16.781	4 x shells	Unknown
80	E 42 42.627 N16 16.733	4 x lithic; 1 x pebble; 1 x lava; 2 x grinding stones (1 lava); 4 x ceramic	Unknown
81	E 42 42.664 N16 16.708	4 x ceramic; 1 x coral; 1 x groundstone axe	Unknown
82	E 42 42.653 N16 16.692	3 x lithic; 5 x ceramic; 2 x lava	Unknown
83	E 42 3.576 N16 45.914	7 x shells	Unknown
84	E 42 42.672 N16 16.801	4 x lithic; 15 x ceramic; 5 x shells	Islamic
85	E 42 42.643 N16 16.78	6 x ceramic; 2 x lithic; 5 x lava; 1 x grinding stone	Islamic
86	E 42 42.617 N16 16.781	1 x ceramic	Islamic

Appendix 1: Table 7 Archaeological sites in the Farasan Islands (Zone 1)

86	E 42 42.617 N16 16.781	1 x ceramic	Islamic
87	E 42 42.664 N16 16.708	3 x ceramic	Islamic
88	E 42 42.653 N16 16.692	4 x shells	Unknown
89	E 42 42.627 N16 16.733	5 x ceramic; 1 x shell	Unknown
90	E 42 42.664 N16 16.708	3 x ceramic; 2 x lava; 1 x shell	Unknown
91	E 42 42.653 N16 16.692	6 x ceramic	Pre-Islamic
92	E 42 3.576 N16 45.914	6 x coral; 6 x lava	Unknown
93	E 42 42.672 N16 16.801	2 x shell; 2 x lithic	Unknown
94	E 42 42.643 N16 16.78	7 x ceramic	Pre-Islamic
95	E 42 42.617 N16 16.781	4 x shell; 3 x lithic; 2 x ceramic	Unknown
96	E 42 42.617 N16 16.781	18 x ceramic (include 2 x incised, 1 x painted)	Pre-Islamic
97	E 42 42.627 N16 16.733	14 x glazed ceramic	Islamic
98	E 42 42.664 N16 16.708	1 x hammer stone; 1 x glass (modern)	Prehistoric
99	E 42 42.653 N16 16.692	Shells mound	Unknown
100	E 42 42.664 N16 16.708	Shells mound	Unknown

Appendix 1: Table 8 Archaeological sites in the Farasan Islands (Zone 1)

101	E 42 42.653 N16 16.692	Shells mound	Unknown
102	E 42 3.576 N16 45.914	Shells mound	Unknown
103	E 42 42.672 N16 16.801	Shells mound	Unknown
104	E 42 42.643 N16 16.78	Excavated mound	Unknown
105	E 42 42.617 N16 16.781	Shells mound	Unknown
106	E 42 42.627 N16 16.733	Shells mound	Unknown
107	E 42 42.664 N16 16.708	Shells mound	Unknown
108	E 42 42.653 N16 16.692	Shells mound	Unknown
109	E 42 42.627 N16 16.733	Shells mound	Unknown
110	E 42 42.664 N16 16.708	Shells mound	Unknown
111	E 42 42.653 N16 16.692	Shells mound	Unknown
112	E 42 3.576 N16 45.914	Shells mound	Unknown
113	E 42 42.672 N16 16.801	Shells mound	Unknown
114	E 42 42.643 N16 16.78	Scatter	Unknown
115	E 42 42.617 N16 16.781	Shells mound	Unknown

Appendix 1: Table 9 Archaeological sites in the Farasan Islands (Zone 1)

116	E 42 42.627 N16 16.733	Shells mound	Unknown
117	E 42 42.664 N16 16.708	Shells mound	Unknown
118	E 42 42.653 N16 16.692	Shells mound	Unknown
119	E 42 42.627 N16 16.733	Shells mound	Unknown
120	E 42 42.664 N16 16.708	Scatter	Unknown
121	E 42 42.653 N16 16.692	Shells mound	Unknown
122	E 42 3.576 N16 45.914	Shells mound	Unknown
123	E 42 42.672 N16 16.801	Shells mound	Unknown
124	E 42 42.643 N16 16.78	Shells mound	Unknown
125	E 42 42.617 N16 16.781	Shells mound	Unknown
126	E 42 42.627 N16 16.733	Shells mound	Unknown
127	E 42 42.664 N16 16.708	Shells mound	Unknown
128	E 42 42.653 N16 16.692	Shells mound	Unknown
129	E 42 42.627 N16 16.733	Shells mound	Unknown
130	E 42 42.664 N16 16.708	Shells mound	Unknown

Appendix 1: Table 10 Archaeological sites in the Farasan Islands (Zone 1)

131	E 42 42.653 N16 16.692	Scatter	Unknown
132	E 42 3.576 N16 45.914	Scatter	Unknown
133	E 42 3.576 N16 45.914	Scatter	Unknown
134	E 42 42.672 N16 16.801	Scatter	Unknown
135	E 42 42.643 N16 16.78	Shells mound	Unknown
136	E 42 42.617 N16 16.781	Shells mound	Unknown
137	E 42 42.627 N16 16.733	Shells mound	Unknown
138	E 42 42.664 N16 16.708	Shells mound	Unknown
139	E 42 42.653 N16 16.692	Shells mound	Unknown
140	E 42 42.627 N16 16.733	Shells mound	Unknown
141	E 42 42.664 N16 16.708	Scatter	Unknown
142	E 42 3.576 N16 45.914	Scatter	Unknown
143	E 42 42.672 N16 16.801	Scatter	Unknown
144	E 42 42.643 N16 16.78	Scatter	Unknown
145	E 42 42.617 N16 16.781	Shells mound	Unknown

Appendix 1: Table 11 Archaeological sites in the Farasan Islands (Zone 1)

146	E 42 42.627 N16 16.733	Shells mound	Unknown
147	E 42 42.664 N16 16.708	Shells mound	Unknown
148	E 42 42.653 N16 16.692	Shells mound	Unknown
149	E 42 42.627 N16 16.733	Shells mound	Unknown
150	E 42 42.664 N16 16.708	Shells mound	Unknown
151	E 42 42.653 N16 16.692	Shells mound	Unknown
152	E 42 3.576 N16 45.914	Shells mound	Unknown
153	E 42 42.672 N16 16.801	Shells mound	Unknown
154	E 42 42.643 N16 16.78	Shells mound	Unknown
155	E 42 42.617 N16 16.781	Shells mound	Unknown
156	E 42 42.627 N16 16.733	Shells mound	Unknown
157	E 42 42.664 N 16 16.708	Scatter	Unknown
158	E 42 42.653 N16 16.692	Scatter	Unknown
159	E 042 46 742 N 16 26 755	Scatter	Unknown
160	E 42 46 783 N16 27 555	Scatter	Unknown

Appendix 1: Table 12 Archaeological sites in the Farasan Islands (Zone 1)

161	E 42 46 126 N16 28 564	Shells mound	Unknown
162	E 42 47 158 N16 28 588	Shells mound	Unknown
163	E 42 47 171 N16 28 607	Shells mound	Unknown
164	E 42 47 579 N16 29 038	large shell mound on south side of Gummah Island	Unknown
165	E 42 46 839 N16 29 771	large shell mound on south side of Gummah Island	Unknown
166	E 42 42 601 N 16 42 601	large shell mound on south side of Gummah Island, with 4 pre-Islamic graves set into the top	Pre-Islamic
167	E 42 42 735 N 16 44 735	series of mounded and deflated shell middens on the north side of Gummah Island	Unknown
168	E 042 42 539 N 16 44 836	2 x low middens	Unknown
169	E 042 44 522 N 16 44 882	deflated midden	Unknown
170	E 42 42 503 N 16 44 932	deflated midden	Unknown
171	E 42 42 491 N 16 44 961	small deflated midden	Unknown
172	E 0 42 42 478 N 16 44 995	modern small midden deposit	Unknown
173	E 42 39 735 N16 46 605	low deflated midden on edge of coral terrace	Unknown
174	E 42 39 525 N16 47 576	low deflated midden on edge of coral terrace	Unknown

Appendix 1: Table 13 Archaeological sites in the Farasan Islands (Zone 1)

175	E 42 39 558 N16 47 641	low mounded midden	Unknown
176	E 42 39 653 N16 47 653	Low spread of midden deposit	
177	E 42 39 416 N16 47 674	possible stone structure – now collapsed, associated finds include ceramics, lava & shell	Unknown
178	E 42 39 277 N16 47 815	Spread of cultural material next to low mounded midden	Unknown
179	E 42 39 737 N16 47 837	low mounded midden deposited directly onto sand dune deposit	Unknown
180	E 42 39 735 N16 46 605	small mounded midden spread	Unknown
181	E 42 39 013 N16 47 961	extensive single layer spread of shells	Unknown
182	E 42 39 056 N16 47 005	2 x small scatter of 'modern' shell waste	Unknown
183	E 42 39 052 N16 47 907	2 x small scatter of 'modern' shell waste	Unknown
184	E 42 39 352 N16 47 938	5 x small scatter of 'modern' shell waste	Unknown
185	E 42 39 415 N16 47 933	2 x small scatter of 'modern' shell waste	Unknown
186	E 42 39 378 N16 47 911	Scatter of modern shell waste	Unknown
187	E 42 39 482 N16 47 943	2 x small scatter of 'modern' shell waste	Unknown
188	E 42 39 546 N16 47 630	Scatter of modern shell waste	Unknown
189	E 42 39 682 N16 39 717	Scatter of modern shell waste	Unknown

Appendix 1: Table 14 Archaeological sites in the Farasan Islands (Zone 1)

190	E 42 39 653 N16 47 653	8 x small scatter of 'modern' shell waste	Unknown
191	E 42 39 412 N16 47 674	3 x small scatter of 'modern' shell waste	Unknown
192	E 42 39 277 N16 47 815	Scatter of modern shell waste	Unknown
193	E 42 39 737 N16 47 837	Scatter of modern shell waste	Unknown
194	E 42 39 735 N16 46 605	large mounded midden sitting on flat coral gravel-like terrace - at least 40 middens visible from this point	Unknown
195	E 42 39 013 N16 47 961	collapsed circular stone structure – ceramics and shelll debris inside and outside the structure	Unknown
196	E 42 39 056 N16 47 005	large upstanding stone structure - at least 4 rooms. Plenty of ceramics and some lava, 2 other associated structures nearby	Unknown
197	E 42 39 052 N16 47 907	Excavated mound	Neolithic
198	E 42 39 776 N16 47 716	north-western end of midden spread on coral gravel surface	Unknown
199	E 42 40 079 N16 47 959	south-eastern end of midden spread at the point where it crosses the tarmac road to As-Segid	Unknown
200	E 42 18 956 N17 21 766	collection of small bivalves and strombus.	Unknown

Appendix 1: Table 15 Archaeological sites in the Farasan Islands (Zone 1)

201	E 42 18 959 N17 721 717	Very large spread of midden material on old coral island	Unknown
202	E 42 18 958 N 17 21 688	Circular mounded midden sitting either on the beach or a small coral platform at approx 1m height	Unknown
203	E 42 18 665 N 17 21 665	small coral island with a series of mounded middens around the outside and some deflated scatter in the centre - ceramics (pre-Islamic) and cone shell collected	Unknown
204	E 42 18 961 N17 21 622	series of 3 sets of stone structure – pre-Islamic and possibly Bronze Age in date	Bronze Age
205	E 42 18 967 N17 21 550	3.5 meters mounded midden with stone structure on top	Unknown
206	E 42 18 973 N17 18 973	4 metre mounded midden with stone structure on top	Unknown
207	E 42 18 932 N17 21 228	series of 4 stone coral like structures - approx 2-3 metres in diameter with some associated pre-Islamic ceramic	Pre-Islamic

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CHAPTER 9: CONCLUSION

9.1 INTRODUCTION

As noted in Chapter 1, the aim of this thesis was to attempt to define the nature, date, function and the characteristic features of the Neolithic of south-west of the Kingdom of Saudi Arabia. In particular, it also aimed to investigate the relationship between the archaeological record of the region's coastal occupation with that of its interior. This broad aim was broken down into a number of objectives relating to the nature and character of the Neolithic in the Kingdom of Saudi Arabia, including the need to understand the similarities and links between its Neolithic sequence and that of its neighbouring areas; an examination of the known and published characteristic features of the Neolithic of the south-west of the Kingdom of Saudi Arabia; a review of the current understanding of the environmental changes that influence human adaptations within the Neolithic period; an investigation as to whether the variety in the region's assemblage has resulted from adaptive differences or was a result of the archaeological classifications; an investigation of possible relationships between the Neolithic in the south-west of the Kingdom of Saudi Arabia and the known phenomenon of shell middens on the coastal belt and islands; and, finally, a survey and review of the distribution, date and function of the Neolithic settlement in Jizan region. Rather than relying solely on the published reports of a very limited number of archaeological excavations and explorations in the region, the aims and objectives of the thesis were addressed through the undertaking of settlement and site survey and selecting sites for excavation, classification and analysis. In view of the breadth and depth of the thesis' approach, the following section will revisit the findings of each chapter in turn before returning to the overall aim of the thesis.

9.2 CHAPTER REVIEW

The thesis commenced by reviewing the geographical and environmental background and palaeoenvironmental history of the Near East and Saudi Arabia as well as providing a description of the base characteristics of the study region. In doing so, the chapter provided a context for the identification and spread of prehistoric settlements and sites within the study area, Neolithic ones in particular. It was demonstrated that the vast geographical coverage of Saudi Arabia brings with it vast environmental and topographical diversity, which are also reflected in the adaptation and colonisation of the Peninsula by very different communities of animals, plants and humans. The chapter also demonstrated that the most recent reconstructions of the palaeoclimatic sequences of Arabia, suggest that conditions became more suitable for human settlement during the Early Holocene when much of the peninsula was a semi-arid steppe with favoured localities of a savana-type environment. It is similarly argued that it can be no coincidence that this Holocene change was accompanied by increased Neolithic activity and occupation in the desert interior.

This process of defining the temporal and spatial framework of the thesis continued in Chapter 3 with a presentation of our current understanding of the later prehistoric sequence of the Kingdom of Saudi Arabia and surrounding countries. It was stressed that this understanding is in a formative stages in comparison with the more established Neolithic sequences of its neighbours. Indeed, many of the Kingdom's temporal and spatial frameworks are fragmentary and it would be true to say that although some Neolithic sites have been identified through exploration and excavation, few have been fully analyzed and fewer fully published or illustrated. This poor level of data is sadly present within a number of publications which provide little detail as to the identification of fish, animal or shell species. Usually, the term 'Neolithic' is applied to any site with stone tools between 8000 and 2000 BC. As noted in the conclusion for Chapter 3, it may be expected that this situation will not change until systematic surveys have been conducted within all regions of the Kingdom of Saudi Arabia and test excavations conducted in order to date, define and analyze the nature of the material culture in the different regions. Without a more detailed understanding of this evidence, any detailed examination of long-term trajectories of region-specific specialization adaptation, and links between specialized fishing and hunting sites will continue to be preliminary. The chapter also reviewed the history of archaeological research in the Kingdom of Saudi Arabia and demonstrated that the Kingdom's archaeological sites have not enjoyed the same research focus on its later Prehistory as its neighbours in the Near East. Instead, it stressed the point that the majority of collaborative projects between Saudi academics and foreigners have been focused on historical or epigraphic research and that very little attention has been given to a number of fundamental questions, such as the nature and date of the development of domestication or the introduction of Neolithic communities or even the earliest record for the development of urban forms. Undoubtedly, as demonstrated in Chapter 3, this position is partly a reflection of the haphazard nature of archaeological research and research agendas before the 1970s but since that time, the state agencies and academic institutions have been involved in developing research-agendas, of which, this thesis represents an attempt to extend this systematic approach to the south-west of the Kingdom.

As noted in Chapter 1, the site and settlement survey undertaken as part of this thesis builds on the pioneering exploration of the Comprehensive Survey of the Kingdom of Saudi Arabia in the 1970s (Zarins 1982) and has the intention of testing those preliminary findings with a more systematic approach to recording the location, function and variability in both settlements and landscape and subjecting selected sites to additional excavation for dating and functional reasons. As also noted in Chapter 1, the study area of the thesis was divided into a series of sample regions from west to east, including Zone 1, the Farasan Islands (Chapter 4); Zone 2, the Coastal plain (Chapter 5); Zone 3, the Tihamah Mountains (Chapter 6); and Zone 4, the Najran region (Chapter 7). The value of this new survey, undertaken in conjunction with an interdisciplinary team from the KSA and UK (Bailey et al. 2006), was made very clearly in Zone 1, where exploration of the two key islands of the Farasan Archipelago, Farasan Island and Qamah Island, recorded the presence of 400 middens of shell and fish bone, confirming and extending the findings of Zarin's earlier survey (1982). The survey also demonstrated that both islands were occupied from the prehistoric period until the Islamic conquest, although it is not possible to identify yet whether this was permanent or episodic. The sheer numbers of middens indicate that the islands' inhabitants were reliant on access to the aquatic resources of the Archipelago. The presence of sites with 'Neolithic' ceramic sherds confirms the antiquity of this occupation and the radiocarbon measurements on samples of shell and charcoal from the midden sampled by Trench 1 at Janaba Bay have provided calibrated dates for its accumulation of between the third and fourth millennium

BC. Chapter 4 concluded that these newly acquired data demonstrates that this midden firmly belongs to the Neolithic period and that there are very clear similarities between the material culture of the islands and the coastal Jizan, with both demonstrating a dependence on fishing and shellfish. It may be of significance that stone artefacts were recovered from the upper layers of the excavation trenches, whereas the shells were present throughout, implying a restricted access which may support the hypothesis that the islands were subject to seasonal exploitation, a pattern practiced today.

The examination of Zone 2, the Jizan coastal belt, built on the previous research of the author, in particular his MA dissertation (Al-Ghamdi 2006) and focused on the results of the excavations of two sites, Al-Sihi and Al-Majama, and the attempt to attribute a function and date to their material culture. It may be concluded that Al-Sihi, a large shell midden covered by shell, fishbone and potsherds, was a coastal fishing site. Artefacts and faunal remains vary in concentration from one area to another and there were few flaked tools, there were many ground stone objects, perhaps used in the shellfish processing. The site's ceramics were predominantly wheel-made and of red micaceous ware, poorly fired and the main forms were jars and bowls, and on the basis of this evidence it is possible to attribute the site to the late Neolithic. Importantly, the ceramics at Al-Sihi belong to a corpus, which has only been recorded before in small amounts at two sites near Ras Tarfa on the Red Sea coast in Saudi Arabia (Zarins 1985) indicating that its tradition is a coastal one with possible generic resemblance to several groups of second millennium BC ceramics at Subir in Yemen. Certainly, the evidence suggests that the economy of Al-Sihi was focused on collecting produce from the sea rather than on domesticated or hunted species. The newly discovered and excavated site, Al-Majama, also is a midden site (but without shells) and with no clear levels or indications of foundations. This feature suggests that the sites may have been seasonally occupied rather than permanently, although this is not entirely clear at this stage. Al-Majama's ceramics are similar to those from Al-Sihi, the Farasan Islands and at Subir on the Aden-Lahej Road along the Hadrami coast, east of Aden (Yemen) and, as already noted in Chapter 5, whilst one might attribute such an assemblage to a date of between c. 2550 and 1500 BC (Zarins et al., 1986: 50), Al-Majama has a much earlier occupation. Indeed, Spit 3 yielded three arrowheads of the Arabian Bifacial Tradition alongside charcoal with radiocarbon measurement to 9730±60 BP (Table 8.3) indicating an early phase of Neolithic occupation. The chapter also concluded that the high ratio of obsidian to flint at the site suggests a local obsidian source, but reiterated its new findings, that the fieldwork Al-Majama demonstrated the presence of a much earlier phase of Neolithic occupation. Whereas the earlier phase is consistent with seasonal or temporary camping and hunting, the later phase is more closely attributable to the occupation at Al-Sihi and the sites on the Farasan Islands.

Finally, the pottery types found on the islands and inland are similar and are both related to the Pre-Islamic and Neolithic period. However, the types of stone tools are different and it can be observed that axes in the Farasan Islands and the coastal plain in Farasan are not retouched, but in the coastal plain the retouching of tools is clear, indicating two different cultures. However, there is a difference between stone tools in the coastal plains between Al-Sihi and Al-Majama sites. At Al-Sihi we did not find arrowheads, but stone tools including grinders and net sinkers. By contrast, in the Al-Majama site we find numbers of arrowheads, obsidian retouched flake, blade projectile point, projectile points, bifacial, bifacial projectile points, circular scrapers, blades and awls. This may reflect that the culture is represented by flake producing and a blade producing culture, which is also based on the hunting and food-gathering economy. This culture spread within the south and the centre of the Peninsula.

The third ecological zone in Jizan is the area of the Tihama Mountains, which are known for their high peaks that reach 2014 m above sea level. There are many caves in this area, which were used for shelter and housing during ancient eras, and the abundant stone, human, and animal drawings indicate that this area witnessed some kind of ancient settlement. The presence of graves indicate that there was a range of burial traditions in the area, in which the body was placed in a sitting position within a stone compartment or bodies were covered with stones, and graves with tree trunks and mud.

Chapter 6 commenced by stressing the point that the archaeological sequence of Zone 3, the Tihama Mountains, is largely restricted to rock art thereby presenting a challenge to the dating of sites and application of relative chronologies to the various preserved sites. Disappointingly, the new survey failed to identify any new Neolithic occupation sites in contrast to the pattern of Neolithic and Bronze Age sites in similar locations in neighbouring Yemen. Whilst this may have been a failure of the survey methodology, it proved impossible to demonstrate an association between sites with rock art and Neolithic pottery and stone tools artefacts. We recorded many examples of depictions of wild species and hunters but, as already noted in Chapter 6, whilst the rock art appears to focus on hunted species, this does not necessarily mean that those who created them were hunters. Overall, the lack of settlement sites in the mountains contrasts with the situation in Yemen. This is partly because many of the previously known sites have been destroyed by agriculture or development activities.

The survey and excavation in Zone 4, the Najran interior, was only slightly more successful and although previous surveys have identified a number of prehistoric sites, the thesis survey only identified one new site – Hima. This site was identified as sharing similarities with sites near Asir and, on the basis of these links, attributed to the later Neolithic of the Kingdom of Saudi Arabia. Its flint and obsidian arrowheads and blades appear to have been sourced from the area around, which contains volcanic rocks. The Chapter concluded by suggesting that Hima may be one of a number of settlements established during the moist stage of the Neolithic era between 5000 and 4000 BC but that the deflated nature of the site made it difficult to draw any further conclusions.

9.3 SOME KEY RESULTS

This thesis was the result of the formulation of a number research questions which were raised during the author’s MA dissertation at Bradford University. Of these, one of the key questions concerned the distribution of shell middens. It is clear that shell mounds are concentrated mainly in the Farasan Islands and on the Jizan coast, and that there are no similar sites in the mountains or in the eastern side of the region. Findings in Zone 1 include shells, Islamic pottery, and pre-Islamic pottery, in addition to other pieces of pottery that could be traced to Neolithic era. As for the presence of stone tools in Zone 1, they are scarce and simple perhaps because there was no easy access to the raw material. In terms of subsistence, it is clear from the large amounts of shells and fish vertebra that the economy depended on fishing and shell collecting. The coastal area hosts a large number of archaeological sites traceable back to the Islamic, pre-Islamic, and the pre-historic era, and the majority of sites are formed of shell mounds. The concentration of shell middens in the Farasan islands and coastal plain of Jizan is very similar to their distribution along the coasts of Oman and the Yemeni Tihama, as described in Chapter 8. In addition to the midden type sites discussed, stone circles and building foundations are common, but their age is unknown because of their lack of stratigraphy which means that they present few opportunities for radio-carbon dating. During the excavation process at the two sites of Al-Majama and Hima, it became clear that there were large numbers of lithics, which were not present in other areas such as the islands and mountains. On the other hand, the sheer concentration of Neolithic activity along the coast and within the islands demonstrates that this region was an area of preferential settlement, at least for the later stages of the Neolithic.

In general during the Neolithic period human settlements were concentrated on the eastern, and western sides of the Arabian peninsula. However, the earliest date of occupation appears to be Al-Majama in the south west of Saudia Arabia and Wadi Watayyah in Oman. Of course, earlier sites (perhaps shell middens) will presumably remain below sea level and that these are currently being investigated by the team directed by Bailey.

The materials found on sites during the survey included fragments of obsidian (evidence of obsidian working), arrowheads, bifacials, scrapers, axes, flakes, and core fragments. These kinds of tools were notably abundant in the Jizan area and this may be due to the proximity of raw material resources. Although it is worthwhile noting Lamya Khalidi's research, which includes chemical sourcing of obsidian, which suggests that there was a significant amount of exchange of obsidian across the Red Sea (2006), this interpretation may not apply to the coastal plain of Jizan, where obsidian was available in abundant amounts. Khalidi, however, focuses on sources of obsidian which may be obtained from East Africa, whereas this thesis has demonstrated that sources of obsidian do exist nearby in the coastal plain and are easily available elsewhere in the south-west of the Kingdom of Saudia Arabia as well. For example, the area of Akwa offers obsidian in the north of Jizan (as discussed in Chapter 5). However, additional chemical sourcing of the obsidian is needed to determine where those artefacts recovered from the survey and excavation may have come from as well as the obsidian exchange systems. As already noted, there is considerable environmental variation between zones that lie within the islands, coastal plain and mountains of the south-west of the Kingdom of Saudi Arabia.

In conclusion, the communities living on the coast and in the islands of the south-west of the Kingdom of Saudi Arabia did not practice agriculture or farming during the Neolithic period and they do not appear to have developed sedentary settlements with evidence for long-term habitations.

These new archaeological investigations have tentatively identified two separate life-ways within the study region. The first of these communities utilised ceramics and depended on the sea as the principal source of living and were probably mobile groups within the coasts and islands of Jizan. The second in the interior area appeared to lack a pottery industry, this is because of the economic structure that was based on hunting and food-gathering.

The Neolithic groups of the south-west of the Kingdom of Saudi Arabia do not appear to have experimented with cultivation or farming and continued as hunter-gathers as there is no evidence for domestic animals or plant domestication. The groups in the islands were dependent on fishing, and those on the coastal plain and in the mountains were hunter-gatherers. It was not until the second millennium BC that truly sedentary pottery making communities made their appearance (Chapter 5).

Comparisons with cultural assemblages from other parts of Arabia (presented in Chapter 8) suggest that the lithics from sites in the SW of the Kingdom of Saudi Arabia showed most similarities with those of southern and eastern parts of Arabia, namely those of the

Arabian bifacial tradition. On the other hand there was little similarity to tool types from Jordan and Syria to the north. This suggests that there is little evidence for migration of people and artefact assemblages from the Levant. Although the model of Rose (2010) concerning coastal refugia in the Gulf might be applied to the area of the Red Sea coast in the SW of the Kingdom of Saudi Arabia there is no evidence to directly support it. However, it seems likely that the Holocene rise in sea level would have driven any populations from the Red Sea basin inland and it is therefore possible that the prehistoric shell middens of the Jizan coast and Farasan Islands are the remains of such populations.

9.4 SIGNIFICANCE AND FUTURE WORK

It now remains to draw attention to the broader significance of this thesis and to identify future areas of research to be undertaken. This research has successfully confirmed Zarin's earlier tentative working temporal and spatial sequences by providing a number of clearly dated sequences within three of the four examined zones. This systematic examination has ended the very clear archaeological vacuum present within the south-west of the Kingdom of Saudi Arabia and will contribute to the ending of its academic isolation. The present research has not been undertaken lightly, and was first piloted by the author for his MA thesis in 2005 and 2006. Taken together, the MA and this PhD represent the first attempt in over 40 years to develop a comprehensive study of the nature, date, function and the characteristic features of the Neolithic of south-west of the Kingdom of Saudi Arabia, in particular investigating the relationship between coastal occupation and the interior. As with all dissertations, there are many aspects of additional questions raised and this thesis is no different. In particular, future work should be concentrated in five core areas: firstly, to broaden our knowledge of the prehistoric sequence by undertaking more excavations and surveys in the region; secondly, by provided more scientific dating for sites, fuller artefact publications and additional sourcing analysis of lithics; thirdly by studying the environmental and palaeoenvironmental sequences of the region, specifically by the identification of palaeosols, relict lakes and relict sand dunes; fourthly by undertaking a more general excavation at the extremely promising site of Al-Majama; as well as by undertaking additional excavations and survey in the Tihama mountain range in an attempt to ascertain the nature and date of its postulated Neolithic occupation and any potential links with Yemen. In addition, scientific analysis of the obsidian sources of Jizan are required, and finally, it is necessary to re-investigate sites associated with the palaeolakes of Mundafan to set these within the context of the Holocene moist interval.

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CHAPTER 8: DISCUSSION

8.1 INTRODUCTION

Having thus presented the results of the new archaeological survey in the fourth and final zone Najran and the results of the new exploration at the site of Hima, this chapter will assess the distribution of archaeological sites across all zones and discuss the emergent chronology of the south-west of Saudi Arabia. It will also compare the material culture from SW Saudi Arabia with selected sequences from other parts of Arabia and elsewhere in the Middle East. Due to the paucity of radiocarbon measurements from within the study zone (only three), and in order to provide additional chronological control, this discussion will include a comparative study with neighbouring regional chronologies and sites.

8.2 CLASSIFICATION AND DISTRIBUTION OF SITES

Whilst the results of the Comprehensive Archaeological Survey of the 1980s remain valuable, the nature of the new data presented by the current survey is far more representative and reliable. Indeed, when the 612 individually recorded sites were classified into morphological and related classes, the following distribution of significant categories was immediately apparent (Table 8.1). The data discussed are based on the four sets of field surveys with details, as given in Appendices 1 to 4, which present the geographical distribution of key site types across the landscape of all four zones.

Overall, the major morphological site types of the south-west of Saudi Arabia are as follows: mounds; walled settlements, which are distinctive on ground or on satellite imagery and implied by topography or constrained by walls; artefact scatters, without mounding or obvious soil marks; stone walls or wall complexes; rock art or inscriptions; stone cairns and burial mounds of stone or soil; other burials, including cists, stone chambers and rock cut tombs; field walls and boundaries of distributions of field walls; stone cairns or other categories, where they are clustered as part of a continuous landscape; water channels, qanats, major canals, all defined as features which have been specifically built or dug for channelling water; wells; industrial sites with abundant slag, metal or stone-working debris; hollow way roads or cuttings through rock to form roads and routes; abandoned villages or other upstanding built structures; shell middens; obsidian sources; and finally, caves.

As a result of the archaeological survey of the Jizan area, it is clear that the coastal plain contained the majority of archaeological sites, while archaeological sites in the mountains are very limited. For example, 400 shell middens were found in the Farasan Islands, 152 archaeological sites in the coastal plain, 8 caves sites in the Tihama Mountains , and 52 archaeological sites in interior areas (see Table 8.1) .

In addition to shells, the middens contain, bone, pottery and a limited number of stone tools. Islamic sites are the only ones containing buildings. In addition to this, several sites could be traced back to the pre-Islamic era. Overall, most artefacts were recovered from the coastal plain and interior area.

Of the above categories of sites, those of direct relevance to the overall aim of this thesis are now considered for more detailed analysis; these include mounds with artefact scatters, burials, shell middens, caves and rock art. These main classes of sites are sub-divided according to the general geographical regions presented in Chapters 4 to 7 of the thesis, namely Zone 1: the Farasan Islands, Zone 2: the coastal plain, Zone 3: the Tihama Mountains and Zone 4: the interior or Najran .

Location	Mounds or Artefact Scatters	Shell Middens or Shell Scatters	Caves and Rock Art
Farasan Islands	0	٤٠٠	٠
Coastal plain	51	١٠١	٠
Tihama Mountains	٠	٠	٨
Najran Region	٥٢	٠	٠

Table 8.1: The classification and distribution of sites across the four survey zones.

The vast majority of the individually recorded sites in Zones 1 and 2 were shell middens. The results of the author’s archaeological survey of the Farasan Islands (Zone 1), clearly demonstrated that most sites were shell middens (318), with smaller numbers falling into the categories of shell scatters (82).

A similar, but less pronounced distribution of sites was also recorded in Zone 2, the coastal plain, with 101 shell middens. Of those sites classified as “Mounds or Artefact Scatters”, 27 were identified as Islamic, 7 as pre-Islamic, and 17 as prehistoric.

It is also clear that the coastal plain and Farasan Islands contained the majority of archaeological sites recorded, and that there were very limited numbers of sites within the Tihama Mountains (where only eight sites were found). Whereas shell middens are entirely restricted to the coastal plain and Farasan Islands, mounds in the Najran region are mainly constructed of sand. Although the mounded sites identified in the Farasan Islands and coastal plain are not all true shell middens, they do include significant amounts of shell. In addition to shell, the middens contained pottery, and small numbers of stone tools. As noted in Chapters 1 and 7, because the different geographical zones provided different challenges for survey, it was necessary to employ different techniques during survey of the mountains, which explains why the total number of 8 caves and 4 clusters of rock art were limited to the Tihama Mountains, and that no other significant artefact scatters or settlement sites were recorded in this area. Finally, in striking contrast to the sites of the islands and coastal plain, the mounds of Zone 4, Najran, are without any evidence of shells, and these may represent relict sand dunes covered by single thin layers of artefacts. The new survey of Zone 4 yielded 26 Islamic sites, 10 pre-Islamic sites and 3 prehistoric sites; the other 13 sites are unknown (see fig. 8.1).

8.3 TOWARDS AN ABSOLUTE CHRONOLOGY

As discussed in Chapter 3, in spite of the significant allocation of resources and the amount of prospection and archaeological survey within the Kingdom of Saudi Arabia, the nature of its Neolithic occupation is still obscure, and its characteristic features are still poorly identified, to the extent that we cannot always differentiate between a pre-ceramic Neolithic site and one of the late Palaeolithic.

However, the radiocarbon measurements obtained from excavated contexts from sites in the Farasan Islands and the coastal plain during the execution of this research have allowed us to start to construct a rather fuller understanding of the region’s Neolithic occupation, especially if one considers that the only existing ‘scientific’ consideration was the suggestion of Zarins of a relative chronology for Al-Sihi, arguing that “Shapes such as holemouths, carinates, spouts, lug handles, ring bases and introverted neck rims suggest a fairly early date, perhaps extending into the late second millennium BC” (Zarins et al., 1981: 21). Table 8.2 shows the distribution of the estimated chronology of sites according to their distribution within the four geographical zones of the survey, as outlined above and as detailed in Chapters 4, 5, 6 and 7. Initial consideration of these data suggest the following pattern of regional chronology: firstly, that the earliest known settlement site was evident on the interior coastal plain, Zone 2, at the site of Al-Majama (Site 278), with a date of 9,730 BP; Secondly, that there was an early presence, probably in the seventh millennium BC, in the interior near Najran, in Zone 4, at the site called Hima (Site 419), although this is a speculative interpretation, as it appears to be a very thin layer of eroded artefacts on a relic sand dune (it is not radiocarbon dated). The third clear pattern is represented by the early establishment of shell middens in the Farasan Islands, Zone 1, which ranges in date between 5010 and 4709 BP in the Farasan Islands, and somewhat later along the edge of the coastal plain of the mainland, Zone 2.

Finally, the single date estimate from the rock art site of Jahfan in the mountains, Zone 3, dates approximately to 800-500 BC (as discussed in Chapter 6), suggesting a later exploitation and establishment of settlement in the Tihama mountains. However, relatively few sites of rock art comprise the chief artefacts in the Tihama Mountains, reflecting the situation of archaeological sites there, which is rather different to the conditions found in the Yemen Highlands, where numerous Neolithic and Bronze Age sites have been recorded as noted in chapter 2.

The Comprehensive Archaeological Survey of the Kingdom of Saudi Arabia demonstrated the existence of a more or less common, Neolithic phase throughout most of the country, with the exception of a variant culture known as the Ubaid, within the eastern area. The identification of this common Neolithic culture is mainly based on the discovery of lithic tools, such as spear heads and blades, although these may not be enough to determine the specific levels of social organization or economic activity for that period.

Whilst pre-eminence may have been given to the identification and distribution of Ubaid ceramics as an indicator of the spread of Neolithic communities, the spread of lithic technologies offer an alternative source of evidence which also matches the new dates from the Neolithic sites of the south-west of Saudi Arabia.

There are also links between the south-western region and the neighbouring areas. Utilising the lithic and ceramic data recorded in the new excavations and survey (presented in Chapters 4, 5, 6 and 7), it is possible to supplement the new radiocarbon measurements for the south-west of Saudi Arabia and demonstrate the significance of the radiocarbon dates, as they show that whilst the ceramic types found on the Farasan Islands reflect a range of dates from the late second millennium BC until 500 AD, the radiocarbon measurements provide a much earlier date range of occupation between 5400 and 3130 BC. Similarly, the date of the ceramic evidence from the coastal plain has been relatively dated to the second millennium BC (the late Neolithic), but the new excavations have demonstrated the presence of lithic tools dating to between 6500 and 4500 BC. In contrast, there are no late Neolithic ceramics in the Najran interior, Zone 4, but there are a number of lithic tools there dated to c. 4500 BC.

There are two very early radiocarbon measurements from Saudi Arabia, one from Al-Majama in the south-west (a single date of 9730±60 BP, generated by the research for this project), and the second at Aloyyna, in the north-west, at 9260 BP (Alasmary, 2008). These two independent measurements suggest that the earliest Neolithic occupation in Saudi Arabia commenced prior to 4500 BC, a date which is paralleled with other parts of the Near East, demonstrating that the area was inhabited by similar communities, and did not experience a delayed occupation. In addition, the Almajama date is similar to the date of Wadi Wutayya in Oman which has a single date of 9230 BP (see table 8.3).

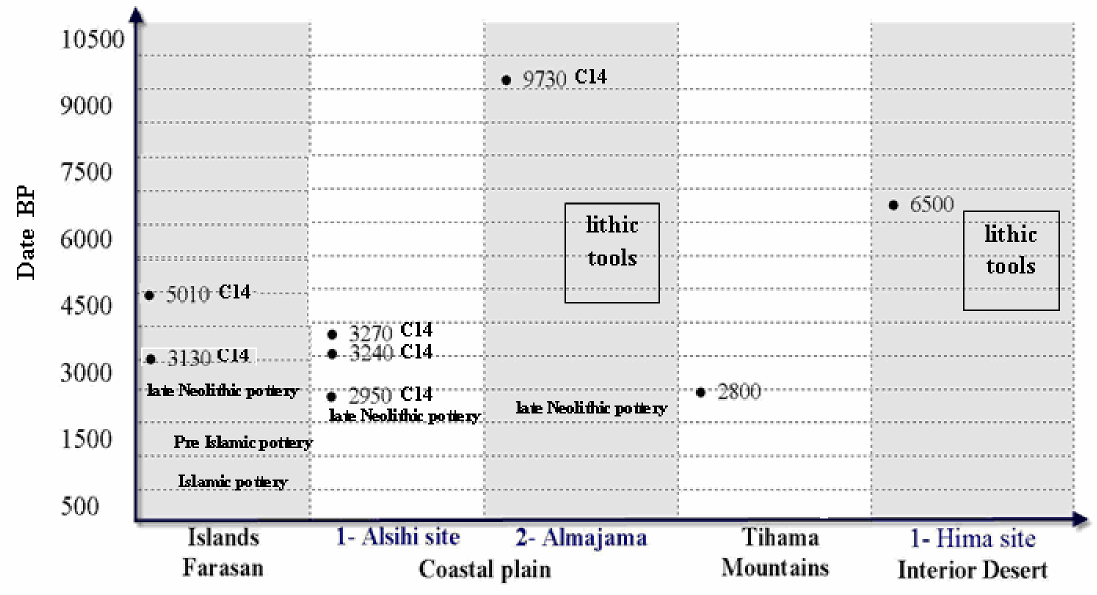


Table 8.2: The distribution of radiocarbon and artefact dates in the south-west of the Kingdom of Saudi Arabia

Lab No.	Provenance	Sample Material	Conventional Radiocarbon age BP	Cal. years BC	Cultural Stage
OxA-19587	Farasan Island[1], Base Janaba	Charcoal	4709±31	3378–2626	Neolithic
Beta-255383	Farasan Island[1], Top Janaba	Shell	5010±50	3520–3320	Neolithic
Beta-255383	Coastal plain, Al-Majama[2] Spit 3 30cm	Charcoal	9730±60	9220	Neolithic
Beta-230059	North-west of KSA, Aloyyna [3] 160cm	Charcoal	9260±50	9000	Neolithic
IRM 7618	East of KSA, Al-Dosariya[4] Level 4	Charcoal	6135±120	5120	Ubaid
IRM 7619	East of KSA, Al-Dosariya[4] Level 7	Charcoal	6900±330	5970	Ubaid
IRM 7619	East of KSA, Ganas1[5] Level 9	Charcoal	7060±445	5980	Ubaid
Hv12964	Wadi Wutayya[6] In Oman	Ash	9615 ± 65	9230	Neolithic

Table 8.3: Radiocarbon dates on early occupation horizons from the current survey and elsewhere in Arabia; based on the work of 1) Bailey (2006, 2) al-Ghamdi (this thesis), 3) Alasmary (2008), 4) Al-Masri 1974, 5), Charpentier (2003), and 6) Uerpmann M. (1992).

8.4 TOWARDS A COMPARATIVE LITHIC ANALYSIS

Lithic tools are one of the most important elements in the study of the Neolithic and are frequently utilised to identify changes in technical developments which are linked to different Neolithic stages in the Near East, in general. The lithic types recovered from the survey and excavation included arrowheads, scrapers and blades, and most of these lithics were recovered from two sites, Al-Majama (site 278) within the central coastal plain and Hima in the Najran area of the interior (site 419) (see table 8.4). The majority of raw materials utilised were obsidian and flint, with an overall percentage of 34% presence of obsidian at all newly recorded sites in the south-west of the Saudi Arabia, compared to the percentage of flint being 66%. The presence of flint and obsidian at individual sites and individual zones differed, however, with 33% of tools from Al-Majama (site 278) being made from obsidian, and 44% percent from flint. The remaining 23% represent other stone types (e.g. quartz) used in lithic manufacture, whilst Al-Sihi (site 271) only contained objects of flint with no obsidian. At Hima (site 419), 65% of objects were made from flint, and 35% from obsidian. The significance of this is discussed below.

The most frequent type of arrowhead was that with bifacial retouch, which included tanged and untanged arrowheads of different sizes. This type was common at the Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4. The raw materials of the arrowheads were obsidian and flint, and it is notable that no examples were recovered from the Farasan Islands in Zone 1, or the Tihama Mountains in Zone 3. The main arrowhead types are :

Type A: Tanged arrowhead, fluted from point.
Type B: Bifacial barbed and tanged arrowhead.
Type C: Fluted bifacial foliate arrowhead (see fig. 8.2).

The second category of lithic tools comprised scrapers, and these were predominantly of the circular type. Tools of scrapers (Type D) were retouched and sourced from obsidian and flint (see Fig. 8.3). They were recovered from Al-Majama (site 278) in the coastal plain and Hima (site 419) in the interior area. As noted above, the raw materials used for the manufacture of the scrapers were both obsidian and flint. Again, it is notable that no examples were recovered from the Farasan Islands, Zone 1, or the Tihama Mountains, Zone 3.

The final type is the channel flake blade, Type E (See fig. 8.4), in which flaking was common and utilised to manufacture a typical long and retouched flake type. Most of the recorded flakes were recovered from the coastal plain at the site of Al-Majama (site 278) and Hima (site 419) in the interior. The raw materials were of obsidian and flint. It is notable that no examples were recovered from the Farasan Islands, Zone 1, nor the Tihama Mountains, Zone 3.

SW of KSA	Farasan Islands	Coastal plain Al-Majama site	Mountain	Interior area Hima site
Type A	----------	١٤	--------------	١٤
Type B	----------	١٠	--------------	١١
Type C	----------	١٨	--------------	٥٣
Type D	----------	٥	--------------	٢٤
Type E	----------	٧	--------------	٨

Table 8.4: The distribution of lithic classes in the south-west of KSA

8.4.1 THE JIZAN AND NAJRAN LITHICS IN RELATION TO THE OVERALL LITHIC CHRONOLOGY OF ARABIA

The Fasad Group or 'Fasad facies' are characteristic of the earliest human occupation in the Ja'alan (Oman) and Gabel Al-Buhais (UAE). The Fasad lithic facies have been estimated to date between 13,000 and 8,500 BP, but domestic fauna do not appear until 7,500 BP and are found in association with a different lithic complex known as the Arabian Bifacial Tradition (Rose 2010). Eight sites have been discovered, but none of them have produced stratified levels. This is also true for all the open-air sites of this period in Arabia. Since the early Holocene they suffered from erosion by natural forces, but there could be as yet undiscovered deposits buried under thick layers of alluvia (Charpentier, 2003: 68).

In both Levantine and Arabian industries, points were manufactured on blade blanks. Levantine blanks were struck from hull-shaped cores, while Fasad facies cores exhibit uni-directional convergent working surfaces distinctive of the so-called Wa'shah method (Rose, 2010). There were no Fasad points from the Jizan survey, as discussed below.

The second line of evidence used in favour of the Levantine hypothesis is based on the discovery of remains of domesticated sheep, goats and cattle at Arabian Neolithic sites beginning about 7,500 years ago. However, DNA sampling of the bovids reveals a genetic origin from somewhere near the Fertile Crescent aurochs, the wild ancestors of domesticated cattle, native to both the Arabian and Iranian sides of the Gulf Basin.

The only species of Arabian Neolithic domestic animal with no wild ancestor in Arabia is sheep, therefore they must have been imported from outside (Rose, 2010).

During the Late Pleistocene and Early Holocene, landscape desiccation and low sea levels would have affected hunter-gatherer mobility patterns. At that time the African savannas became desiccated, while vast areas of fertile land in the Gulf Basin were exposed. With savannah hunting no longer a viable subsistence strategy, the alternative was a marine-based subsistence (Rose, 2010).

There was then an increase in settlement between 8,500 and 6,000 years ago, with the total number of sites in Arabia increasing from ten to over sixty. Part of this increase may have been caused by a change from temporary camps to more permanent structures.

Rose suggested that Arabia's Qatar B/Fasad lithic assemblage was the product of a population based in the Persian Gulf oasis, that is when sea levels were low. However, this has been questioned, and his observation that no domesticates are associated with these assemblages states is weakened by lack of evidence (Carter in Rose, 2010: 871). However, the PPNB lithic technology and the technology of Qatar B/Fasad are totally different because the methods of production of flaking techniques are so different that they can only have come from different populations.

On the question of the destination of the displaced people of the Persian Gulf oasis, Rose hints that they may have played an important part in populating ancient Mesopotamia, the centre of the Agricultural and Urban revolutions (Rose 2010, Carter in Rose, 2010: 871). The people of the Gulf would have been well-adapted to the marshy conditions found in southern Mesopotamia during the 'Ubaid and Uruk period. The blade industry of southern Mesopotamia has little in common with that of the Arabian Peninsula between 8 and 6 ka B.P. It may be useful, however to compare the Qatar B/Fasad industry with that of southern Mesopotamia, but this still leaves unanswered the problem of population discontinuity in Arabia. Alternatively, the genesis of the Arabian Neolithic Arabian Bifacial Tradition may be sought in Yemen, the region with the earliest domesticates in the Peninsula, dated to the eight millennium BP, which had bifacial lithic industries older than any known in eastern

Arabia (Carter in Rose, 2010:871). Another possibility is that there was a different migration from the Levant. Excavations in the twentieth century provided a long 'Ubaid sequence of domestic and religious architecture dating back to 5,500/5,000 BP, which was abandoned in the Middle-Late Uruk period (Carter in Rose, 2010:871).
The discussion of Rose and Carter (2010) is relevant to SW Saudi Arabia, by suggesting that Neolithic origins may be a complex product of movements out of population refugia, some located below present sea level, as well as from other parts of the region, that is not only from the Levant.

Many of the artefacts from the SW of Saudi Arabia are of the Arabian Bifacial Tradition, which is a stone tool industry characterized by multiple-platform cores and pressure-flaked bifacial arrowheads (Edens 1982). Fasad points and domesticated fauna are separated by more than a millennium, so it can be concluded that rather than originating in the Levant, many characteristic features found at Arabian Neolithic sites indicate a development from a Pleistocene population native to the Gulf Oasis. The only radiometric find spots from the region around the Gulf basin at this time are Wadi Wutayya in northern Oman, and Nad-al Thamam and Jebel Faya in the Sharjah Emirate. These have produced a series of absolute dates, clustered between 9680 and 8396 BP (Charpentier 1996: 9).

The Neolithic industries of the Oman region are also relevant to the discussion because they have supplied some of the earliest Neolithic as well lithic industries of shell middens. These include the 'Saruq facies' – a local variant on the Arabian bifacial tradition (Charpentier 1996: 9). The site of Wadi Wutayya is characterized by earlier lithic facies dated to the sixth millennium BC. Its lithic industry would have been contemporary with Qatar B. Two distinct technologies can be defined – the trihedral points facies (6500 – 4500 BC) and the facies of the fusiform points (4,500 – 3,800 or 3,700 BC). A non-stratified surface site, Saruq, belongs to that of the fusiform points with diamond-shaped section. This group of trihedral facies can be named the 'Habarut facies', and correspond to a fully Neolithic culture, a production society with domestication that settled in the coastal villages and was oriented towards fishing. It was an innovative society, and devised trifacial projectiles and sophisticated fishing kit. The creation of trade movement over long distances is a characteristic of the Neolithic. During this period in Arabia internal trade developed and external trade reached as far as the Horn of Africa. Materials traded included precious metals and minerals such as marine shells, clastic rocks, obsidian and flint. In the Emirates, populations corresponding to the ‘Habarut facies’ made contact with Ubaid society (Charpentier 1996: 9). Whether these linkages influenced the lithic industries of SW Saudi Arabia remains to be seen.

The flake producing technology spread into the south and centre of the Peninsula, including some parts of Oman. After appearing in the eastern Peninsula, it spread to the north and north-western regions (Al-Masri, 1974: 223). The main characteristics of Flake Culture are: the chopping of flakes, the dominance of flat cores, and the abundant presence of hunting tools, which are bifacially retouched. This is because of the economic structure that was based on hunting and food-gathering (pasturing and farming were only introduced in the Bronze Age). The Blade Culture, also based on hunting and gathering, is found in the eastern and the northern parts of the Peninsula, but some of its tools are also found on the north-western edge, and a few in the central part of the Peninsula. Another date that was also obtained from the same area goes back to 7520 BP. Flake Culture existed in the eastern region (UAE and Oman) and Yemen (Al-Masri, 1974: 223).

A typical technique used in Yemen during the 6th millennium BC was fluting. The characteristic waste produced by this technique was found on the site at Manayzah (Crassard 2009: 715), which is a rare example of a stratified site which produced a great deal of faunal remains. Several other technical schemes and modes of lithic production have also been discovered recently in the Hadramawt region of Yemen. The description of the Wa'shah debitage method, only present on the surface of the Wadi Wa'shah and Wadi Sana plateaus, marks an important stage in the definition of southern Arabian prehistory, and affirms the presence of prehistoric populations using a laminar technology (Crassard, 2009: 715). The precise dating of this method is still unknown, because of the absence of datable material. The bifacial pieces in Wadi Wa'shah indicate knowledge of knapping, since foliate pieces are rare in Arabia, where the Arabian Bifacial Tradition is the norm. These data suggest the existence of independent socio-cultural complexes in the Yemen during the Early/Mid-Holocene (Crassard, 2009: 715). Although there is some evidence of fluting in the lithics of the

SW region of Saudi Arabia it is not of the same character of those described form Manayzah.

Arrowheads allow for detailed analyses of most sites found on the surface and in stratigraphy. There are five major Early/Mid-Holocene sites in Hadramawt. The following groups of arrowheads were found: (1) flat bifacial arrowheads with symmetrical section; (2) arrowheads with trihedral section; and (3) arrowheads on flakes or blades. The description of these three groups led to the following conclusions: first, flat bifacial arrowheads are probably older than trihedral-point types, and within this group there are several chronological subtypes; secondly, trihedral pointed heads seem to belong to one chronological episode around the sixth millenium B.C, which conclusion is based on the homogeneity of archaeological layers from four different sites (Crassard, 2009: 716).

The trihedral point facies 6500-4500 BC, a new chrono-cultural entity, developed between the seventh and fifth millennia in Oman, UAE, part of Yemen and Saudi Arabia. Its lithic history is characterized by bifacial projectile points. There are nearly a hundred of such sites in the Arabian Peninsula. The bifacial and trifacial industry of most points of Period 1 of Suwayh 1 are trihedral. Bifacial points are present in smaller numbers. Bifacial pieces of this period have parallel edges. Tools made from nodules are characteristic of this period. Very slender fusiform points have parallel or convergent edges. The base is sometimes straight, the section usually diamond-shaped. These points are found at Suwayh 1 and Ra’s Shaquallah in Oman and at Yahar. Short thick fusiform points are more bulky. The section is biconvex diamond-shaped, even pentagonal with straight edges and a V-shaped base. Foliate points with a convex base have parallel or convergent edges and a convex base. They are found at Suwayh 1, at Ra’s al-Hamra (Oman), in the Rub’ al Khali and in the Emirate of Sharjah. Barbed and tanged points are found in the Ja’alan, but are more frequent in the UAE. They have trihedral points and are found in Suwayh 1 and 3, and Ruwayz 1. Those in Suwayh 3 have a long straight convergent body and are related to points found at al-Ramlah 6 and al-Madar. Overall, the artifacts under discussion from SW Saudi Arabia show some similarity with the bifacial and barbed and tanged points described above.

The 'Suwayh facies' emerged during a period of great aridification. New shapes of points appear in the 'Habarut facies.' Blade production appeared, fishing equipment became standardised and new tools were made. During this period the open sea was conquered, and tuna fishing developed in the Sea of Oman and the Arabian Gulf. Trade networks for precious products continued during this period and seemed to intensify. New raw materials were introduced and new categories of finished goods were distributed – axes and adzes made from metamorphic rocks. The Suwayh facies constitute the first phase of the late Neolithic in the Oman peninsula. At about 3800-3700 BC, the second phase of this late Neolithic period brought to an end the large trade networks of the lithic industry. The use of pressure retouch in shaping arrowheads led archaeologists to the mistaken conclusion that the presence of these tools in southern Arabia was associated with the pre-pottery Neolithic in the Near and Middle East. Recent data shows this conclusion to be incorrect, and suggests that populations in Yemen were not in contact with contemporary Levantine populations (Charpentier, 1996). If this argument can be made for the Saudi Arabian assemblages it therefore follows that the arrowheads of SW Saudi Arabia may also have been developed independently.

Middle Holocene sites around the Gulf produced Mesopotamian style pottery called 'Ubaid ware', most of it dating from the Ubaid 3 period (Al-Masri, 1974). Research indicates that Ubaid sites in eastern Arabia fall within a single millennium, and were established on previously unsettled land. This view is corroborated by associated lithic assemblages, so there can be little doubt that the Neolithic demographic transition had swept across eastern Arabia by this time. The Comprehensive Archaeological Survey of the Kingdom of Saudi Arabia also demonstrated the existence of a more or less common Neolithic phase throughout most of Saudi Arabia with the exception of the variant culture, known as the Ubaid. The identification of this common Neolithic culture is mainly based on the discovery of lithic tools, such as arrowheads and blades, although at any one site these may not be enough to determine the specific levels of social organization or economic activity for that period. Whilst many scholars seek cultural correspondence with the known spread of Ubaid pottery and its associated domestication of animals and plants, it is also important to note the character of lithic tools at Abu Khamis (in eastern Saudi Arabia), such as Types B, C and D, which are similar to those recovered from the sites of Al-Majama (site 278) and Hima (site 419) (see fig. 8.5) (Al-Masri, 1974: 320-355). Although the radiocarbon dates from the Farasan shell middens fall towards the later end of the Ubaid period Neolithic sites of Saudi Arabia (Carter and Crawford 2010: Table IV.2), they might still be regarded as an equivalent culture in the western fringes of Arabia.

It is now appropriate to compare the lithics from the survey with the specific types from elsewhere in Arabia.

8.4.1.1 YEMEN

The above mentioned arrowheads from Saudi Arabia, namely Type A (arrowhead fluted from point, dated ca. 6000-5500 BC); Type B (bifacial arrowhead, dated 5000-4500 BC), and Type C (fluted bifacial tool, dated 4750-3500 BC) resemble the types recovered from Manayzah and Wadi Sana in Yemen. Specifically, these Yemeni examples look very similar to those recovered from Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4 (see fig. 8.6).

8.4.1.2 SOUTH EAST OF ARABIA

Type A, an arrowhead fluted from point, is similar to those recovered from Ra's al-Hamra and Wadi Wutayya in Oman, dated 5000-4500 BC**.** Type C, a fluted bifacial arrowhead, was recovered from Suwayh 1, and dated to 5000-4500 BC. Specifically these types are similar to the lithic types which were recovered from Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4 (see fig. 8.7).

Type A arrowheads fluted from point, and Type C, fluted bifacial arrowheads were also recovered from Suwayh 1 and Gabel Al-Buhais, dated to 5000-4500 BC. Specifically, they are similar to lithics types recovered from Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4 (see fig. 8.8).

8.4.1.3 THE LEVANT

It is now appropriate to consider comparisons with lithic from the Levant. Gopher (1994) introduced the classification of arrowheads of the Levant. The following section summarizes the main types:

A1: Abu Maadi Point: this arrowhead is fashioned on a small blade. There are two types: (i) a point of oval or rhomboid shape with a pointed, rounded, almost triangular base (tang); (ii) with a short, rectangular or knob-like form and a base worked bifacially with re-touch. The body and point have a regular or fine retouch; semi-abrupt retouch also occurs. This type was discovered at A.M 1 in southern Sinai, and similar types were found at Mureybat. A typical Abu Maadi point has a prominent blade, usually narrow and thin. Abu Maadi points dated to PPNA (See Fig. 8.9).

A2: el-Khiam Point: fashioned on a small blade, the el-Khiam arrowhead has a concave or flat base. Sub-types usually have one or more bilateral notches at the base of the tool. In some, a knob on the base divides the blade into two concave parts. The artefacts from Salibiya IV in the Jordan valley have unusual bases, lacking bilateral notches. Similar items were found at Michmoret 26 on the coastal plain and at Mureybet. El-Khiam points date to PPNA (see fig. 8.10) (Gopher, 1994).

A3: Helwan Points: fashioned on blades (rarely on a flake), this arrowhead has one or more pairs of bilateral notches along the body. The base is small, trapezoid, rectangular or amorphic and is set off at 90 degrees. It is semi-abrupt with flat flaking. The notches are made by regular or flat re-touch, as are parts of the body and point. It has flat flaking and appears in a variety of sizes. Sometimes it fashioned on broad blades; sometimes on bladelets. There is a sub-type without bilateral notches. At times the base is unformed, possibly because it is in a stage of preparation. Some of the sub-types resemble the el-Khiam points. Helwan points are dated to the PPNA.

A4: Jericho Points: fashioned on a straight or twisted blade. The base is triangular, trapezoid, elliptical or tongue-shaped and is set off at 90 degrees. Other types have an extra-long or thickening base. The body may be denticulate with downward barbs at one end, usually pointed or rectangular. The body, base and point are usually worked by a regular or semi-abrupt re-touch or by pressure flaking. A variation of the Jericho type is the A40. This has relatively large base with rectangular thickening and an additional small triangular or oval-shaped tang. The regular thickening is sometimes denticulate. Jericho points date to the PPNB (see fig. 8.12).

A5: Byblos Points: fashioned on a blade, and has a base set off at over 90 or 120 degrees. The base varies in form, but is usually no narrower than the body and features regular or semi-abrupt retouch or pressure flaking. The body and point feature regular or semi-abrupt re-touch. The blade appears in a variety of standards of workmanship and symmetry. Sub-types include rhomboid arrowheads, arrowheads with a pair of notches at the end of the body and arrowheads with a thickened base. This type dates to the first half of the 8th millennium BC (see fig. 8.13).

A6: Amuq Points: a leaf-shaped arrowhead fashioned on an elongated blade with an angle of contact exceeding 160 degrees and a tang which may be rectangular, trapezoid or pointed, straight or convex. It is fashioned by pressure flaking and the edges often show regular or semi-abrupt re-touch. There are two types; worked by pressure flaking, and pressure flaking only on the proximal third of the dorsal side and on a portion of the ventral. The term Amuq Point is a used here with a wider definition than that used in the Levant. This wider definition includes an oval or leaf-shaped arrowhead in various sizes and forms, not necessarily worked by pressure flaking. A further sub-type has a broad horizontal tang with pressure flaking. Amuq points related to the first half of the 8th millennium BC (see fig. 8.14) (Gopher, 1994). However, none of the above types appear in the SW KSA sites, an observation that supports the suggestion that the types from the survey area form part of a local tradition from southern Arabia.

As noted in Chapter 3, at Tell el-Kom there are huge numbers of flint tools, about 11,267 flint pieces, including flake and blade tools, which are the most common, and small numbers of scrapers. The date of lithics tool relates to middle and late Neolithic. However, there is no similarity with the artefacts recovered from the south-west of Saudi Arabia. Lithic tools found in several Neolithic sites in Jordan are distinguished by microlithic and bladelets dated to the Epipaleolithic (Gopher, 1994), also with no similarity to the lithic tools from the south-west of Saudi Arabia.

Overall, and in summary, from the distribution of archaeological sites on the arid margins of the Gulf Basin in Iran and Arabia, it is reasonable to assume that hunter-gatherer communities exploited the estuaries, lagoons, springs, marshes, rivers and flood plains within the oasis. There was a large wave of settlement during the

Holocene, which is clear evidence of an important demographic event around this time. As cold hyperarid conditions occurred around 24,000 BP, archaeological evidence of human habitation disappears from inland regions of Arabia. Archaeologists (Crassard, 2009; Delagnes et al., 2008; Fedele, 2009; Jagher, 2009; Rose and Usik, 2009; Uerpmann, Potts and Uerpmann, 2009) stated that the peopling of Arabia may have involved hunters and gatherers coming from the south, followed by herders from the north-west, using a variant of lithic technology. However, archaeological evidence does not support this theory because there is no overlap in lithic technologies, settlement patterns or subsistence strategies between contemporary sites in the Levant and eastern Arabia. This 'Levantine hypothesis' is largely based on the correlations between tanged unifacial Byblos points found in the Levant, and tanged unifacial Fasad points from Arabia. Recent evidence suggests that the Fasad points found in Arabia are drawn from a Southern Arabian lithic tradition which occurred earlier than the Levant Byblos points, and that the two traditions are not related. The Levantine arrowheads were of a wide variety of types, but the Fasad facies in Arabia were limited to a single point type (Rose, 2010). Rather the local bifacial lithics of the Jizan are markedly different from those of the Levant as discussed above.

3.5 RAW MATERIALS

The emerging evidence suggests great regional differences in the use of the land as well as raw materials. The desert interior was the home of hunter-gatherer groups, perhaps because of the existence of seasonal surface water, and possibly provided a habitat for wild cattle and unidentified equidae. The fauna provides the earliest reasonably certain evidence of the herding of cattle, including wild ass and camel in Tihama (Edens and Wilkinson 1998). The circulation of exotic goods is also apparent. Most of the raw materials in the chipped stone assemblages are of local origin. Obsidian is a secondary raw material in sites throughout the highlands and in the Rub-al-Khali. The distribution of obsidian throughout the inner desert region and into the Asir suggests the use of sources from southern Asir, while the circulation of obsidian over several hundred kilometers probably came from individual sources, some of which have been identified in Chapter 5. There was probably a separation between coastal and highland circulation networks, with coastal areas possibly having access to obsidian sources in East Africa. However, as discussed earlier, the limited quantities of obsidian from coastal sites suggests that this was not the case in Saudi Arabia. Evidence suggests that obsidian was transported over considerable distances, as were other materials such as chlorite/ steatite, sandstone and granite. Cowries and dentalium were transported from the Red Sea to sites from the Nejd to the Rub al-Khali, a distance of 400 to 500 kilometers. In some cases the material found and the distances they have traveled imply that they were used in a process of exchange (Edens et al., 1998).

There are a number of known obsidian sources within the Red Sea region, but few have been scientifically analyzed, and their provenance is unknown. However, the new survey and excavation activities undertaken by this research have shed new light on the distribution and antiquity of obsidian tools within Zone 2 of the south-west of Saudi Arabia and the Tihama coastal plain. Indeed, this region has yielded a large quantity of obsidian and the prehistoric circulation of obsidian in this region provides an important focus for future research. Relevant to the present research, Khalidi (2009) studied the small-scale prehistoric communities of the Yemeni section of the coastal Tihama, and examined the question of the movement of populations between Africa and Arabia, and Red Sea exchange. As noted in Chapter 2, there is much speculation about connections across the Red Sea during the Paleolithic, but the only definite evidence comes from the Middle Holocene and onward.

In the Yemeni Tihama obsidian was mainly used for manufacturing tools, with evidence of such tools dating back to the early sixth century BC. The Yemeni Tihama region, which lies on the Arabian coast of the Red Sea, possesses no obsidian sources, but to the east on the Yemeni plateau there are two major obsidian sources (Khalidi 2009). On the other side of the Red Sea on the Eritrean coastal plain there are at least five sources of obsidian, and a number of other sources lie beyond in the Ethiopian highlands (Khalidi 2009). The two obsidian sources in the Yemen are close to the sites of Jebel Isbil and Jebel Lisi in the central highlands. A third source, the site of Jebel Abyad, is in Saudi Arabia, and obsidian from these three sources has the characteristics of the peralkaline group from south-western Arabia and the Horn of Africa. Although the obsidian source at Jirab-al-Souf in Yemen has not yet been analyzed, the three obsidian sources in Eritrea were identified in a separate group by Khalidi (2009). There is a second Eritrean source in the vicinity of the Alid volcano, near Adulis, which became a major Red Sea port in the Aksumite period, but was probably used as a port in the second to third millennium BC as well, and it is quite possible that obsidian was exported from it (Khalidi, 2009). The third source in the southern Red Sea region lies directly across the Sea from Tihama. This entire volcanic zone has rich obsidian deposits and is associated with the prehistoric site of Beilul, which is characterized by circular stone-built tomb structures, rock art and obsidian debitage. The latter confirms the association between Eritrean prehistoric sites and the adjacent obsidian sources (Khalidi, 2009).

It is possible, however, that the systems of obsidian circulation in the south-west of the Saudi Arabia may have been be different from those in Yemen, as the survey has identified a number of workable obsidian sources within the coastal plain, Zone 2, and within the south-west corner of the Empty Quarter in Najran, Zone 4. These sources, at A and B, are very close to the sites of al Majama and Hima, and suggest that here local sources were used. Moreover, because there is a notable absence of obsidian from the coastal and Farasan sites, but obsidian is found on sites further inland, it is unlikely that obsidian came across the Red Sea from NE Africa.

8.6 TOWARDS A COMPARATIVE CERAMIC ANALYSIS

Most of the Neolithic ceramics recovered from this new fieldwork in the south-west of the Kingdom of Saudi Arabia were recovered from the sites of Al-Majama (site 278) and Al-Sihi (site 271) within Zone 2, with a minor number also coming from the Farasan Islands, Zone 1. Importantly, none were recovered from the Tihama Mountains, Zone 3, or the interior area, Zone 4. As already discussed in Chapters 4 and 5, the recovered ceramics were mainly of a red micaceous ware, some being wheel-thrown but poorly fired, consisting mainly of jars and bowls (see figs. 8.15 and 8.16). The decoration of ceramics from Al-Sihi (site 271) and Al-Majama (site 278) includes incised or impressed motifs, predominantly vertical or horizontal bands of incised dashed lines or impressed dots, finger impressed designs, sinuous (snake–design) strips, double sinuous strips, pendant triangles filled with incised lines or impressed dots, punctuated designs and plastic ribs with short incised lines (see fig. 8.17). Several sherds attributable to cooking pots were also identified in the ceramic collection. Although no complete forms were found, they may have been deep hemispherical or carinated in shape. Their bases were largely rounded or flat, and occasionally they have solid, horizontal lug handles, edge handles or pierced horizontal lugs. Many of these cooking pots could have been used for water collection, keeping perishable foods cold, or as storage.

Building upon earlier work by an Italian team (De Maigret 1990), Edens (1999) introduced a classification of Bronze Age ceramics. The Kharayb pottery is a development of the highland Bronze Age tradition, with changes in some vessel forms and in surface treatment. Platters and large shallow bowls are common forms, but the shape is variable, ranging from almost flat plates with straight sides to deeper shallow bowls with curved sides. Rim form also varies with rounded, squared and bevelled forms appearing. Rim diameter is generally in the range of 35 to 45 cm. Fabrics vary from pale to reddish brown, and are usually tempered with medium to coarse grit and some chaff. Surfaces are dark and generally unelaborated. Deep bowls, a deeper version of the platters and shallow bowl may be straight or gently curved usually 45 to 55 cm, but some are smaller. Rim size and fabrics used are the same as for the shallow bowls, indicating that bowls from both groups were used for cooking. Hemispherical bowls occur frequently. These are shallow, open vertical lipped shaped with a round base, generally 20 to 40 cm. The fabric is reddish brown, the surface dark and usually burnished on both faces. Horizontal lugs usually appear just below the rim. Hole-mouth jars are deepened and expanded versions of the hemispherical bowls. Spouts sometimes occur, and the jars are burnished with limited additional decoration (Edens, 1999).

The Kharayb site relates to the “bronze age” in Yemen, however the ceramic fabrics may be separated into three groups. Dark body, unoxidised core, tempered with coarse grit and chaff, a less common fabric with redder tints, unoxidised core, tempered with coarse grit and chaff: the least common fabric has darker colours, tempered with fine sand and a burnished surface. Kharayb fabrics resemble those at the nearby Yemeni sites of Sibal and Hammat al Qa in at least two ways; the presence of distinctive dark burnished fabrics, and the frequent use of chaff temper. In all five sites the range of fabrics include finer and coarser wares and different vessel forms, suggesting a similar functional and, perhaps, social framework at each site. There are two distinct fabric groups: those with abundant grit but little chaff; and a variety of volcanic sand and abundant chaff (Dhamar pottery). The lithography of grit corresponds roughly to the geography of the area. The more frequent use of chaff in the Dhamar may imply greater industrial activity in this area.

Deep bowls and basins are variants of the first group, but they differ in the steepness of the wall angle. The base is probably rounded. Hemispherical bowls have vertical rims and thin walls. Sometimes the rim gives the effect of an open-hole mouth jar, except for having sharp inward curvature in the middle and lower portions. Hole-mouth jars may be open or closed with thick gently curved walls and a rounded base. Necked jars are a mixed group, but their distinctive characteristics include low vertical collars; low flared necks; high flared necks and high vertical necks, narrow mouths, curved walls and sometimes rounded shoulders. Jars in this group have varying base forms. Heavy storage jars are another mixed group united by thick walls and heavy, out-turned rims. Generally they are relatively open, with gently curved, usually narrow walls (Edens, 1999).

The pottery from the Kharayb site and other nearby sites of the Yemen highlands belongs to a single tradition running from the early third millennium BC to the late second millennium. The unity is more apparent in vessel form while fabrics and surface treatment are more variable. The origin of this pottery tradition is not clear. The difference between the assemblages at RAQi (a site investigated by de Maigret et al. in the Khawlan area of Yemen) and Sibal are regional variants in a tradition that had developed by the mid-third millennium. Regional variants between Khawlan and Dhamar had already occurred, suggesting that the tradition has its roots in the Fourth Millennium BC, whereas the site of Hammat al-Qa represents an early-second millennium BC assemblage (Edens, 1999).

On the coast, the Malayba site is situated in the Wadi Tuban delta, north of Aden, and the vessels found there are hand-made but with finishing indicated by wheel marks. Most vessels are burnished with a few lines or a cross pattern design and include jars, bowls and necked vessels dating to the Bronze Age (Buffa 2007).

The Subir site of the Hadrami coast road has pottery made of locally fired clay and including bowls, lugs, ledges, handles and collared jars. Decoration is pebble burnished, incised pattern or wavy lines and the vessels also date to the Bronze Age (Zarins 1985).

The ceramics from Al-Sihi (site 271) and Al-Majama (site 278) look generally similar to the ceramics of Kharayb, Malayba and Subir in Yemen which dated from the third to the late-second millennium BC, which possibly dates Al-Sihi (site 271) and Al-Majama (site 278) ceramics to this range. The samples recovered from Al-Sihi (site 271) and Al-Majama (site 278) represent a unique corpus in the Kingdom of Saudi Arabia, and it is noteworthy that this type of material has only previously been recorded along the Red Sea coast and near Ras Tarfa (Zarins et al., 1981: 21). A similar ceramic corpus may be present at Adulis on the African coast, and ceramics from Al-Sihi (site 271) appear to resemble those ceramics found in north-east Africa during the second millennium BC; these parallels support the dates for the latest phase at Al-Sihi (Zarins et al., 1981: 21). This site may also be related to pre-Axumite materials found in Ethiopia, where ceramics may be compared with materials from Matara and from the Ona culture in Hamasen, suggesting that the Al-Sihi-Subir group mediated the transmissions of Kerma and ceramic traits from Ethopia, since these traits were not found in the Gash delta of eastern Sudan (Edens and Wilkinson, 1998: 105). However, because the forms and decorations of the ceramics from Sihi and Majama are rather generic, it is possible that some of these similarities may be more apparent than real.

8.7 THE ECONOMY OF THE KEY SITES.

Kennett and Kennett (2006) suggested that the development of an aquatic lifestyle along the Gulf shoreline in the Middle Holocene played an important role in the formation of southern Mesopotamia. In their model, the movement of population into the Gulf Basin, plus increased rainfall, created rich coastal areas and promoted the development of 'Ubaid communities. They continue by arguing that the onset of aridity around 6,000 BP forced the population into irrigation farming, and there was an explosion of settlement around the Gulf shoreline in the Middle Holocene. The characteristics of these settlements have great implications for social evolution in the Gulf Oasis. By 7,500 cal BP these groups had undergone a complete transformation and were on the edge of the Urban Revolution, which can be seen from their stone structures, pottery, date palm cultivation, animal husbandry, fishing, trade networks and boatbuilding (Kennett and Kennett, 2006). If a similar model can be applied to the Red Sea area, there is no obvious evidence for it except for the numerous shell middens of the islands and along the coastline.

In roughly 6,000 to 5,000 BP (the 'Dark Millennium') there is a virtual disappearance of all archaeological sites from some eastern parts of the Arabian Peninsula, possibly caused by the weakening of the Indian monsoon and high sea levels, which cut off all coastal areas of refuge. This decline in archaeological sites obscured much of the peninsula's Pleistocene heritage (Rose, 2010).

Clearly, changing sea levels played a key role in the development of coastal communities and during the Neolithic era we find in Farasan that people depended on fishing and shells in addition to fish. There is an abundance of these sources, and all of the people used to depend on the sea as the source for their living. As for settlements, there are only limited numbers of coral and coral structures, that might be used in building houses, and they could have been covered by branches of trees as a temporary home. As for buildings, they are all made of sea coral, and this means that all of them belong to an Islamic settlement era.

As for the coast, it is full of archaeological sites, especially shell mounds, which also contain pottery, in addition to stone tools with occasional building foundations. This area also includes the majority of archaeological sites, which are concentrated along the coast. As for the Jizan mainland, shell middens are less concentrated, and overall, the percentage of sites that can be traced back to the Neolithic are 5 % of total sites. This pattern could be due to the nature of this land, which today is formed of volcanic areas and agricultural land. Conversely the coast is penetrated by a group of large valleys, that are considered a good water source, which most of the population depend upon for drinking and irrigation, and which would have supplied the prehistoric populations with abundant water.

During the archaeological excavation and survey in Al-Sihi site, it was discovered that this site comprised a shell mound with evidence for artefacts associated with sea-fishing, as well as grinders, sinkers and different pottery tools, while there are no building foundations. Fishing and shell gathering appears to have had paramount importance to its inhabitants. The evidence to date suggests that the economy of the inhabitants of Al-Sihi was focused on collecting produce from the sea (fish and mollusca) rather than rearing domesticated species.

There are no human graves or human bones, which suggests, perhaps, that the settlements were seasonal and that the burial grounds were located elsewhere. Inland from the coast, extending to the mountain slopes, are numerous large vegetated valleys with cultivable land, which could provided a focus for settlement in the area. Although archaeological excavations and surveys at Al-Majama and Hima sites did not reveal any kind of building foundations in the area, there is evidence for some human bone concentrations in the area, and in other sites close by, which means that there is some kind of human burial in the area. It is possible that such inland cemeteries provide the burial grounds for the coastal settlements that lacked burials, so that these inland sites represent the inland sites of the same mobile communities. Alternatively, it could be argued that these sites were some kind of temporary settlement, for it is easy to pass from this place to the mountainous areas, to use caves as shelters and as temporary housing. As for the use of lithic tools, there are large numbers of these, especially arrowheads that had been used in hunting, in addition to grinders, that had been used in grinding crops; shells are not abundant in sites of the inland area. In addition to this there is faunal evidence for some kind of herding, which is considered to be one of the main economic activities, and that fishing is a secondary source of food. The presence of pottery and pottery ovens scattered all over the site of Al-Majama, means that there was some kind of settlement which must have been in use for significant parts of the year. Overall, it appears that most of the sites recorded may have been in use seasonally, and that a focus on shell collecting and fishing on the coast was balanced by a concentration on hunting inland, with some degree of herding and perhaps agriculture during later prehistoric phases.

8.8 GENERAL DISCUSSION

Recent evidence suggests that there is little connection between Arabian and African lithic cultures. It is possible that humans have occupied parts of Arabia for the past 100,000 years at least (Rose 2010), and there are many microenvironments on the Arabian subcontinent, some of which could have provided sources of food and water even during the worst periods of drought. At times, widespread environmental deterioration and global low temperatures resulted in reduced sea levels, thus exposing large areas of the continental shelf, perhaps leading to the formation of 'coastal oases'. The Gulf Oasis has been suggested as one of the largest sources of fresh water in southern Asia for most of the late Pleistocene and early Holocene, and it was probably home to a significant human population (Rose, 2010). This hypothesis challenges the belief that human populations emerged from Africa between 74 and 60 kya, and not only proposes the presence of a human population in southwest Asia at the Pleistocene-Holocene boundary, but suggests an ecologically driven mechanism that may have played an important part in shaping cultural evolution in the region. In the nearby areas of Gulf coastal region, more than sixty archaeological sites have appeared inland of the Middle Holocene shoreline and provide evidence of a prospering Neolithic population living by means of fishing, date palm cultivation and animal husbandry. Before the emergence of these sites there was only evidence of a few temporary hunter-gatherer camps. The middle Holocene sites were the settlements of an indigenous population displaced by the advancing shoreline (Rose, 2010). Whether such a model can be applied to the area of the Red Sea coast in the SW of the Kingdom of Saudi Arabia remains to be seen, but certainly the Holocene rise in sea level would have forced any populations from the Red Sea basin inland. Perhaps the concentrations of prehistoric shell middens are the remains of such populations.

8.9 CONCLUSION

As noted in Chapter 1, the aim of this thesis has been to define the nature, date, function and the characteristic features of the Neolithic of the south-west of the Kingdom of Saudi Arabia and, in doing so, investigate the relationship between coastal occupation and the interior. The next section will state the overall conclusions and suggest directions for future research.

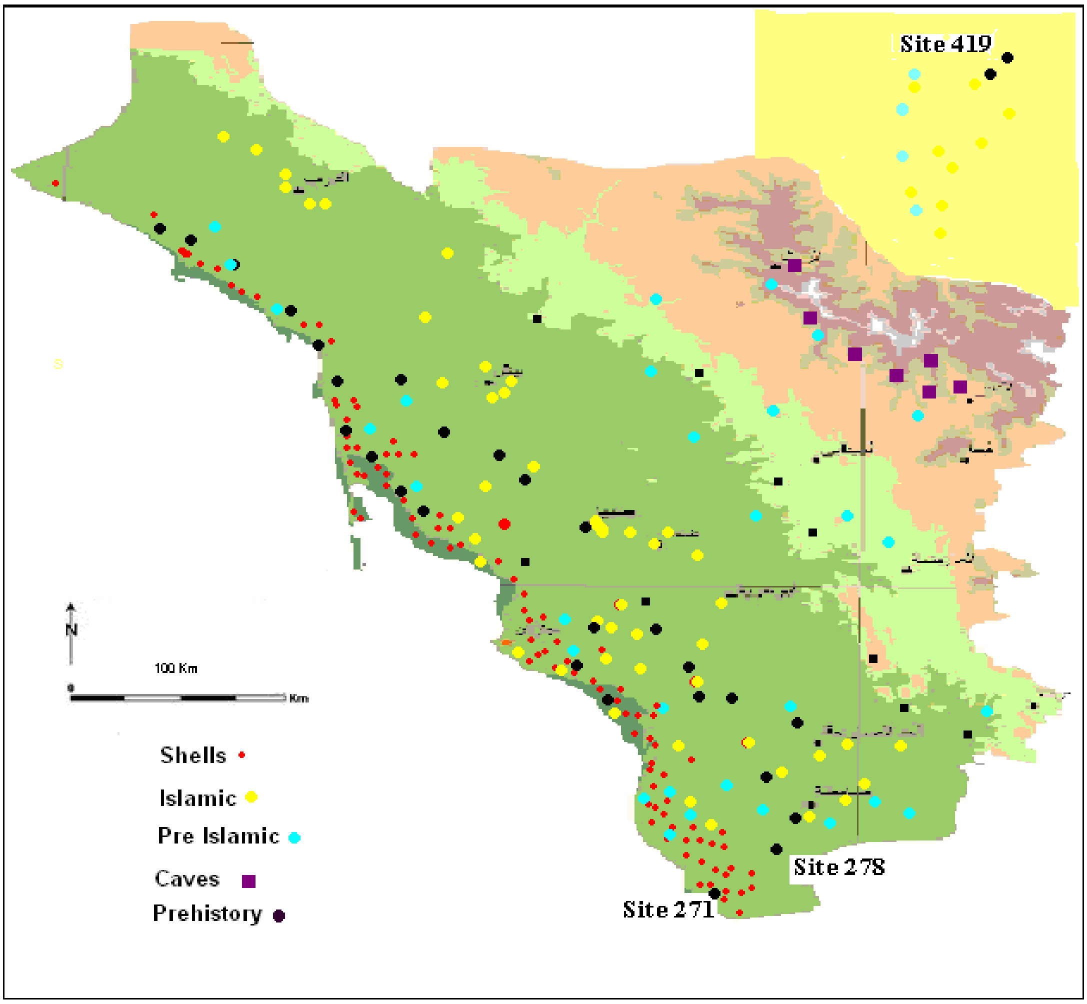
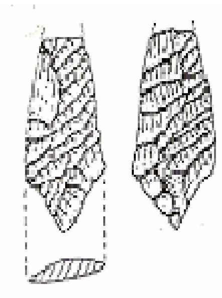
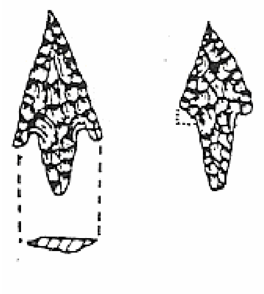


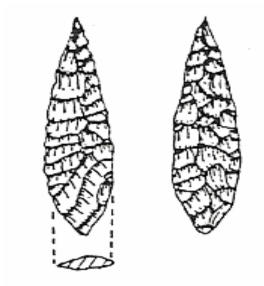
Fig. 8.1 Map showing the distribution of archaeological sites in the south-west of the Kingdom of Saudi Arabia (Map by Saad: Archaeology Deputy)



Type A: Tanged arrowhead fluted from point



Type B: Bifacial, barbed and tanged arrowhead



Type C: Fluted bifacial foliate arrowhead

Fig. 8.2 The arrowhead types from Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4 Drawn by Ali

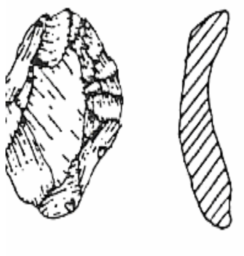


Fig. 8.3 Type D, scraper from Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4 Drawn by Ali

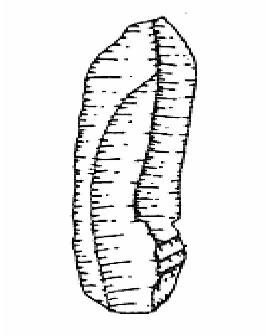
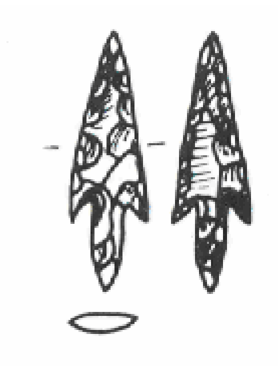
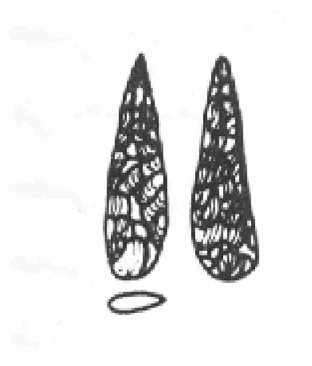


Fig. 8.4 Type E channel flake blade from Al-Majama (site 278) in the coastal plain, Zone 2, and at Hima (site 419) in the interior, Zone 4 Drawn by Ali



Type B:

Bifacial barbed and tanged arrowhead

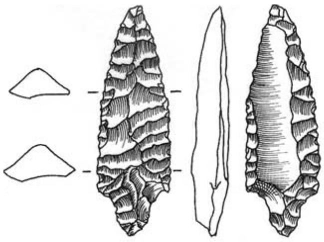


Type C:

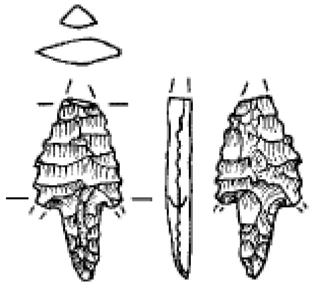
Fluted bifacial foliate arrowhead

Type D: Scraper

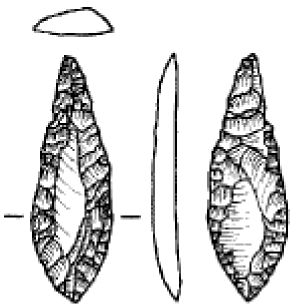
Fig. 8.5 The lithic tool types from Abu Khamiss site (from Al-Masri 1974)



Type A: Tanged arrowhead fluted from point



Type B: Bifacial barbed and tanged arrowhead



Type C: Fluted bifacial foliate arrowhead

Fig. 8.6 The types of lithic tools from Manayzah and Wadi Sana (from Crassard, 2009**)**

Type A:

Tanged arrowhead fluted from point

Type C:

Bifacial arrowhead

Fig. 8.7 The types of lithic tools from Ra’s al-Hamra and Wadi Wutayya sites in Oman (from Charpentier, 2003).

Type A:

Tanged arrowhead fluted from point

Type C:

Bifacial arrowhead

Fig. 8.8 The types of lithic tools from Suwayh 1 and Gabel al-Buhais sites in UAE (From Charpentier, 2003).

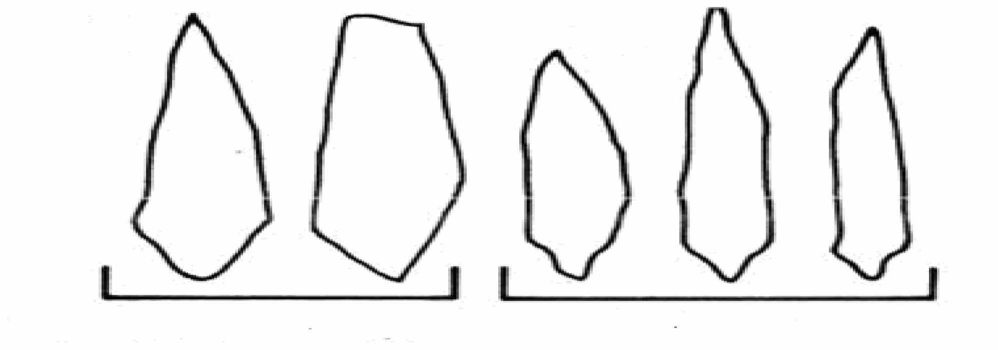


Fig. **8.9** Abu Maadi points(from Gopher, 1994).

Fig. 8.10 El-Khiam points(from Gopher, 1994).

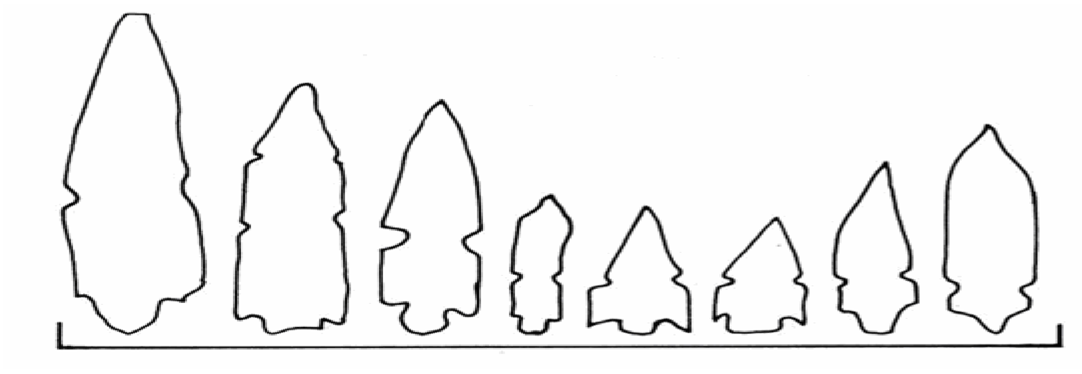


Fig. 8.11 Halwan points(from Gopher, 1994).

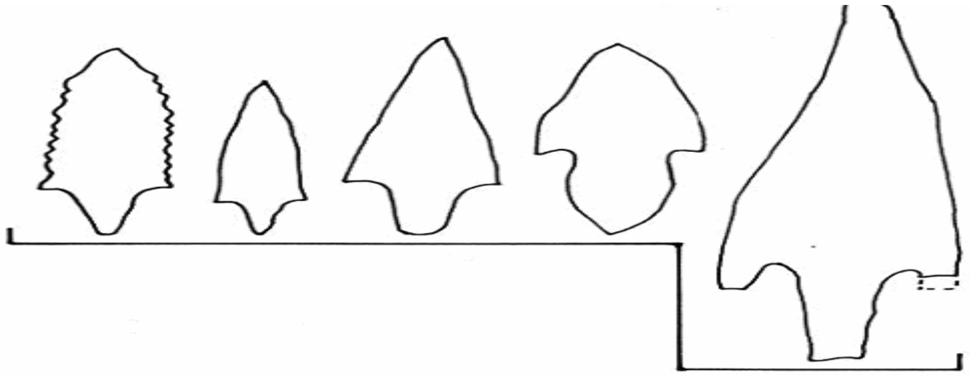


Fig. 8.12 Jericho points(from Gopher, 1994).

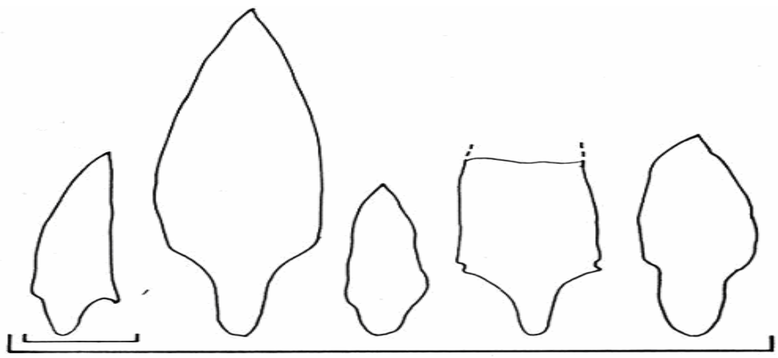


Fig. 8.13 Byblos points (from Gopher, 1994).

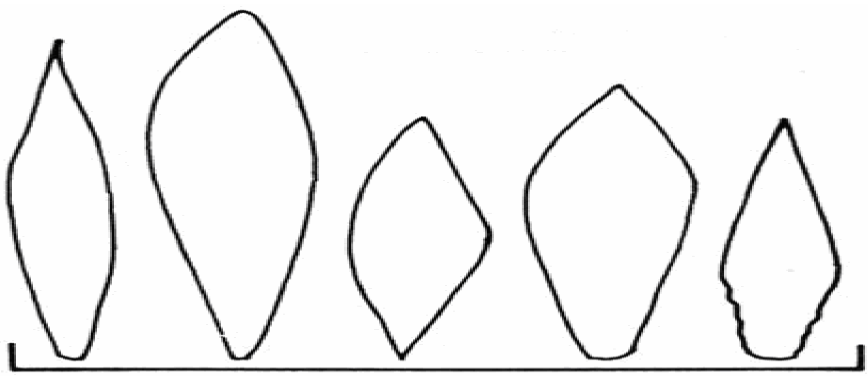


Fig. **8.14** Amuq points(from Gopher, 1994).

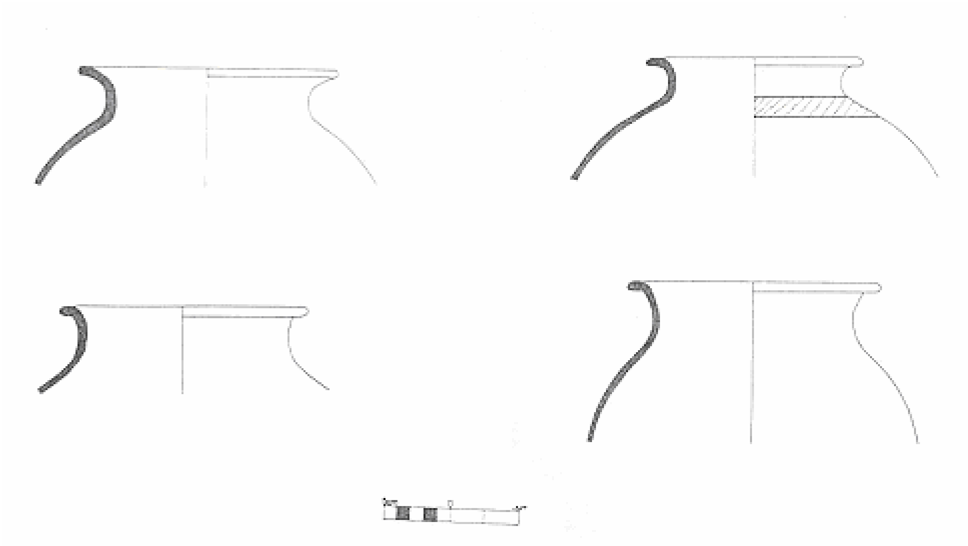


Fig. 8.15 Jars from Al-Majama (site 278) Drawn by Ali

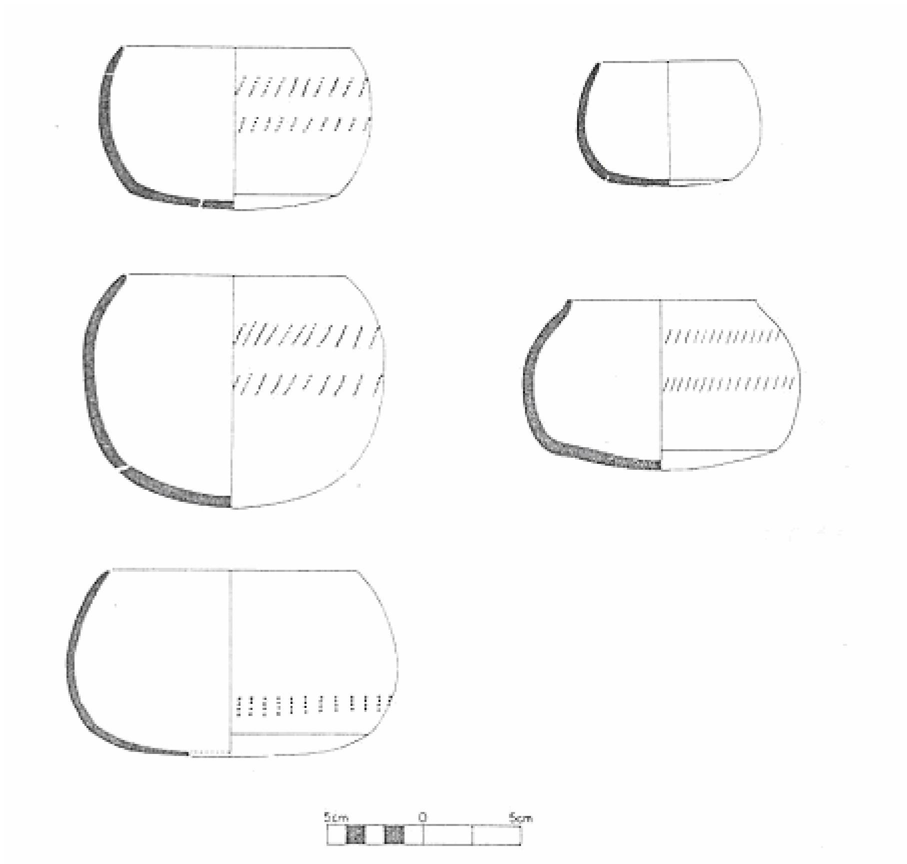


Fig. 8.16 Bowls from Al-Sihi (site 271) Drawn by Ali

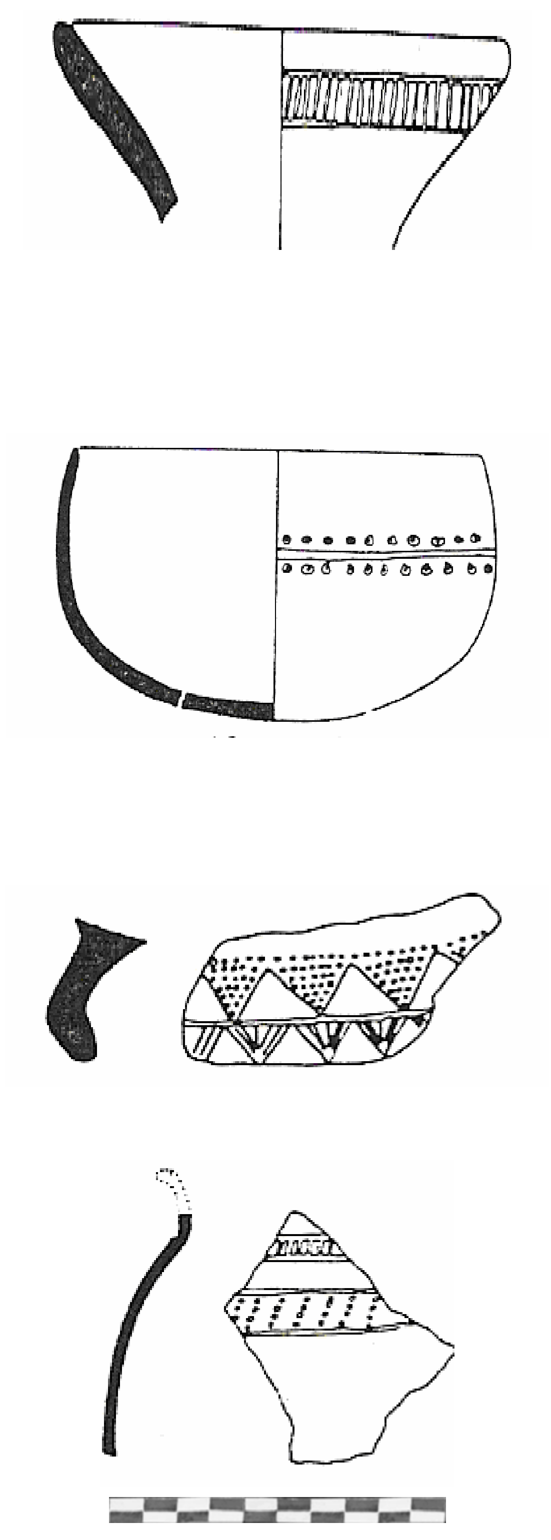


Fig. 8.17 Decorated sherds from Al-Majama (site 278) Drawn by Ali

CHAPTER 7: INTERIOR AREA (ZONE 4)

7.1 INTRODUCTION

Having introduced the geography and survey results of the Tihama Mountains, the purpose of the current chapter is to present the geographical characteristics of Najran and, in particular, the characteristics of the Hima sites and to attribute a function and date to their material culture. This is the last region, Zone 4, to be presented before the discussion and conclusion of this dissertation.

7.2 THE GEOGRAPHY OF NAJRAN

Najran lies in the south west of the Kingdom of Saudi Arabia on the eastern part of the Arabian Shield between 17 and 20^{o} north, and 43 and 52^{o} east. Most of its area is at an altitude of between 1100 and 1700 metres above sea level and it may be divided into three main parts. The first part is the Najran Valley, of which Wadi Najran represents the main settlement region. Stretching from the mountains to the west and extending to the east, it gradually expands before reaching its delta in the Empty Quarter Desert (Mahdi 2002). There are residential settlements, villages, farms and gardens on both banks of this valley where there is abundant ground water. Agriculture includes cultivation of wheat, barley, corn and fruits, especially citrus, and vegetables (Mostafa 2000). The second part of the Najran is south of the Asir Mountains and north of Yemen and is surrounded by three areas that represent the eastern part of the Arabian Shield. The land slopes gradually to the east and is penetrated by deep valleys which provide water during the rainy season to the Wadi Najran Valley. Other mountains such as Al-Kawkab mountain and Al-Qarrah mountains lie to the north-west of Wadi Najran, while Al-Aridh mountains lie to the east of Wadi Najran, to the south of the Empty Quarter (Mostafa 2000). The third, and final, area is the desert where Wadi Najran ends and it covers a wide area that extends east to the Sultanate of Oman. This area includes large areas of mobile sand dunes which have been formed by fluctuations in climatic conditions over thousands of years. Dune sand derives significantly from the wadi sediments washed into the lowlands during moist episodes; it was then resorted by wind when atmospheric conditions were dry and winds strong. The sands were also produced through the abrasion of sand stones of the surrounding mountains into small particles that were then distributed by moving wind to form what is known as the Empty Quarter (Dabbagh et al. 1984) (Fig 7.8). The dune formation probably occurred in the Late Glacial Maximum period, when conditions were drier. This sand sea, the biggest desert in the world, comprises linear dunes, and several kinds of transverse dunes including mega-barchans and mega-barchanoid ridges. This desolate, arid and sandy region today provides a very difficult landscape for human survival as the following description, summarized from Edgell (2007), illustrates.

The area occupied by inter-dunes is greater than the more impressive dunes and there are also large areas of sand sheet. This desert lies in a sedimentary basin with a structural axis from north-east to south-west and is bordered by the Hadramawt-Dhofar Arch. The northern end of the basin opens into the Persian Gulf through the UAE but is constrained on the north-east by the Oman Mountains and in the north-west by the Eastern Interior Homocline and the Qatar Arch. The topography of the Rub' Al Khali rises gradually from the south-west from less than 50 metres to over 900 metres to north. There are few outcrops of underlying sedimentary strata except in the south-west, where the Jurassic scarps of the Bani Khatmah-Al Munbatih and a low Cretaceous scarp of Jaladah interrupt the linear dunes, and around the Umm as Samim in Oman where some dunes rest on Miocene sediments. Other dunes to the east rest on limestone. In the west and south-west sandstones are occasionally exposed in the inter-dunes, and sandstones and pebbly conglomerate are found between dunes in north-western Dhofar. The Al Arid Jurassic scarp and the scarp of Bani Khatmah has caused the formation to the south-west known as Al Mundafan (Edgell 2007: 128). The dunes in this desert can be defined as linear, transverse and solitary. The sand is mainly siliceous consisting of quartz and feldspar and is light yellow to reddish yellow in colour. Many linear dunes are sharp crested but often asymmetrical and dunes occur along the flanks of many of them. There is a uniformity of spacing in these dunes but there are many different types of linear dunes within this desert. The differences are not just in height and spacing but also in the nature of the secondary dunes on their surfaces. Crests of linear dunes are rarely level. Areas of different types of linear dunes often occur in juxtaposition. Dimensions of the large linear dunes are 20-160 metres high; 0.2-1.5 kilometres wide with a spacing of 0.5-3.5 kilometres. Linear dunes are also found in the north-central part of the desert, and in the area east of Sabkhat Matti. Linear dunes of this type also occur in the north central desert. Those in Al Mirhad are generally smaller. Approximately ten percent of the Rub' al Khali is covered by linear dunes. Plumate dunes, also called feather dunes are another category of linear dunes and occur when the sand supply is insufficient. Small crescentic dunes form a single dune ridge as at Ash Shuqqan south of Jabrin. Hooked dunes have one or several crescentic initial parts turning into a straight shaft. These dunes are caused by variable wind directions. Linear belts of pyramidal dunes are another type of pyramidal dune and are arranged in lines because of the winter monsoon.

The highest dunes of the Rub' al Khali are the mega-barchans, which are over 120m in height and cover a large area of the eastern desert. They are in the form of giant crescents with slip faces on their sides and are so numerous that barchans or barchanoid ridges have developed on their windward slopes. These ridges are among the highest dunes in the world and the oldest in Arabia dating back to the Pleistocene era and have been stable for the last 2,000 years. The inter-dune corridors separating them are from 1 to 5 kilometres wide and the mega-barchans cover an area of approximately six percent of the Rub' al Khali. In the northern area barchanoid dune ridges also occur and in the southern UAE they form a large dune field. There are at least seventy barchanoid dune ridges in the Al Liwa area and they are slowly advancing south-eastwards (Edgell 2007: 132). The area of barchanoid dune ridges in the Rub al Khali is estimated to be 3,500 square kilometres, roughly 0.5 percent of this desert. Small barchanoid dune ridges also occur on the southern fringes of the Rub' al Khali. Barchans – isolated crescentic sand dunes with their horns directed downwind – are quite common in the Rub' al Khali, and mega-barchans occupy a large area in the east and are one of the most striking dune types of that desert and can be as high as 230 metres. They are stable dunes, commonly linked, so that they usually form mega-barchanoid ridges. They often have a network of smaller sigmoidal dunes, smaller barchans or barchanoid ridges on their surfaces.

Another type of dune is the *akle* type which are small, irregular and transverse. Giant pyramidal dunes, known as star dunes stand up to 180 metres high. They are formed from the convergence of several dune ridges and are relatively stable. Many dune ridges branch out from dome dunes and their surfaces are often covered by small barchanoid dune ridges or a honeycomb pattern of small dune ridges. Dunes on the southern border of the Rub' al Khali are long parallel dune ridges separated by narrow corridors. Slip faces of dunes are found in the area north of the Hadramawt Arch. In the area near where Wadi Hazar opens into the southern Rub' al Khali there is an area of smaller dune massifs, usually dome dunes. Dikakah, or vegetated dune areas are found in small patched in the Rub al Khali and there is a sizeable area which lies south west of Sabhkat. This area consists of low sand hills anchored by vegetation. Sand sheets are also common in the Rub' al Khali and cover large areas near the UAE/Saudi border as well as in an area farther to the east. It is estimated that 23.24 percent of the Saudi desert is covered by sand sheets and sand streaks. The age of the great dunes of this desert may be estimated because of the presence of late Pleistocene lake bed deposits. Fauna, water buffalo and hippopotami lived in these lakes roughly between 36,300 and 17,460 years BP (McClure 1976). The Rub' al Khali desert is still an active region of sand movement and the shape of the dunes is constantly changing. It is into this mosaic of dunes, wadis, and intermittent lakes that Neolithic peoples settled. The main site under consideration (Hima) is not, however, in the deep desert but near the edge of the mountains (Edgell 2007: 140).

7.3 CLIMATE

The temperature in Najran varies according to the location, ranging between 6 and 37°C during the year. The climate tends to be colder during winter, while during summer, although hot, it is reasonably temperate for Saudi Arabia. The average temperatures are probably 5°C warmer in winter and 3°C lower in summer. The daily air temperatures are 20-30°C in March and 25-35°C in June with average temperatures of 40°C in October and 20°C in January (Al-Boq 2001). The average rainfall during the year is 83 millimetres. It is dry in summer and autumn whereas winter rainfall average 60 millimetres, and there is around 20 millimetres in the spring (Fig 7.1). One of the most important sources of water in the area comes from the mountain runoff during winter and summer, and groundwater within the basalts and volcanic strata results in springs and seepages in wadi beds as well as intermittent lakes from local water tables in the sands, runoff from dunes and flash floods from wadis (Mostafa 2000).

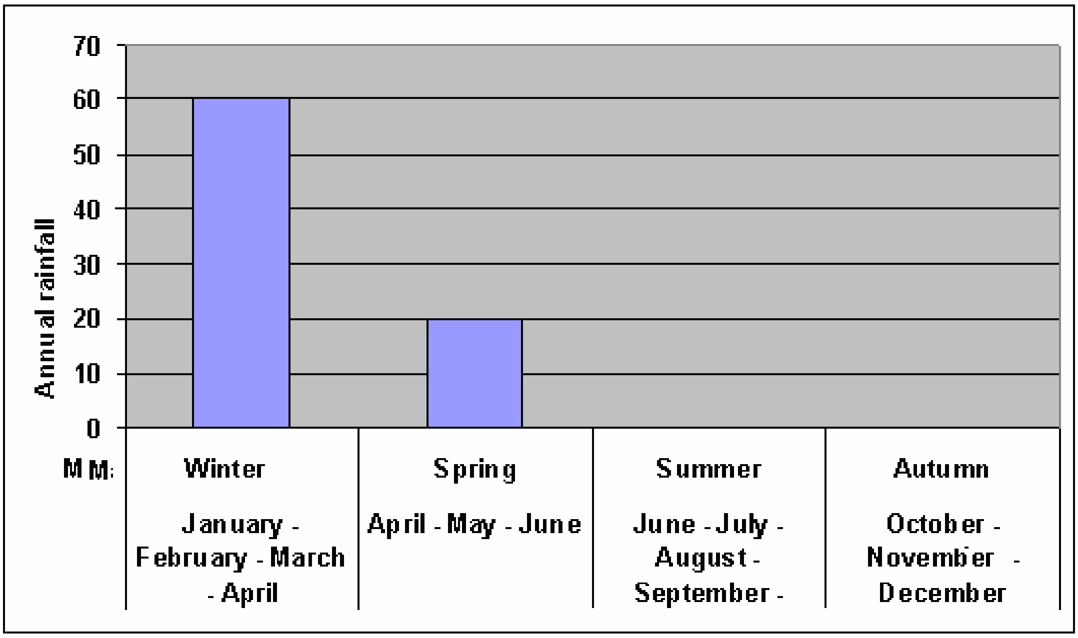


Figure 7.1: Graph showing annual rainfall in Najran (mm)

7.4 HUMAN AND NATURAL ENVIRONMENT

The total area of Najran is about 365,000 square kilometres and it is bordered on the east by the Eastern Region, on the west by Asir; to the north by Riyadh and along the south by the Republic of Yemen. Najran is the capital of this area, and it includes seven provinces: Sharora, Al-Kharkhair, Yadma, Habona, South Badr, Thar and Khabbash (Dabagh 1984). Today, Najran is inhabited by mobile pastoralists who occupy the desert areas between a small number of sedentary oases. The Bani Al-Harith bin Kaab was the main tribe during the pre-Islamic era and during the third Hijri century, Bani Al-Harith and Hamdan bin Zaid co-settled in the area of Najran. Later, the Yam tribe, who are a part of the family of Hamdan bin Zaid, became the most populous of the tribal people living in this area. This tribe is scattered all over Wadi Najran and Habona, and it has strong links with Ajman and Al-Murra in the eastern part of the Kingdom of Saudi Arabia. As for the Bani Al-Harith, their numbers have dwindled, but a large number of them still live in Najran (Abu Fawaz 2004). Traditionally, the people of Najran used to be divided into rural and urban settlers, each with their separate and different lifestyles. The urban population live a stable life dependent on farming, industry, and trade, while the rural population live on herding cattle, and travelling from one area to another looking for good grazing for their animals. This latter is the lifestyle of Bedouin all over the Arabian Peninsula but the differences in lifestyle between rural and urban people in this area may be viewed as a kind of economic integration, as the Bedouin are the source of meat, wool, and leather, while the sedentary and urban societies are the source of agricultural and industrial products in addition to other consumer items. The total population of this area has witnessed considerable growth during the last fifty years, and reached a total of 385,588. At that time jobs in the public sector had become the major activity of the majority of the population in addition to trading, industry, farming, and grazing (Saleh 2003).

7.5 SURVEY AND EXCAVATION

Previous studies of Najran have demonstrated that indicators of early human settlement may be traced back to the finds in Shoaib Dahda in the western part of Najran Valley. Here, stone tools traced back to the Oldowan culture (2.5 to 2 million years ago), an early stage of the Old Palaeolithic era, were identified by their characteristic large-sized stone tools, blades, and hammers, and two-sided primitive tools (Al-Amin 2003). Humans continued to inhabit the area during the Acheulean era, 1.7 millions - 250,000 BP, hunting game and collecting food. Tools from the early stage of the Acheulean era were very simple and limited compared to tools found in the next stage and it is possible that some of these could be represented by the oval and round knives, as found at sites discovered in Hima (Al-Amin 2003). During the middle stage of the Acheulean, dual-headed, speared, and multi-surface tools, in addition to other tools resembling balls, daggers, and dual-blade knives were in use. All have been discovered in more than one site in Tathleeth Valley, Hima, and south of Zahran Al-Janoub. Similarly, the late stage of the Acheulean era, known for oval- and round-shaped small knives made by simple hammering, have also been found in Hima (Naeem 1995). There is also evidence of occupation dating to the Middle Paleolithic, between 250,000 and 40,000 BP, as indicated by the presence of Mousterian tools from Hima and its mountain valleys (Abass 1998). Finally, evidence has also been found of occupation in the Late Paleolithic, between 40,000 and 10,000 BP and then into the Neolithic era (Al-Amin 2003).

7.6 ARCHAEOLOGICAL SURVEY

The Comprehensive Survey in 1982 recorded nine sites; in contrast, research undertaken by the author discovered and investigated a total of 52 archaeological sites, including 26 Islamic sites, comprising the foundations of a number of substantial structures. The 10 pre-Islamic sites also included building foundations and ceramics and included two Palaeolithic sites. A single Neolithic site was identified, the other 13 sites being of unknown date (Fig. 7.9) (See Appendix table 5).

Najran Region	Islamic	Pre-Islamic	Neolithic	Palaeolithic	Unknown	Total
Number of archaeological sites	٢٦	١٠	1	2	13	52

Table 7.1 Table showing the type of archaeological site in Najran

7.7 EXCAVATIONS AT HIMA (SITE 419)

As noted above, a single Neolithic site was identified during the new survey of this region in 2007. This site is known as Hima, a term which refers to a volcanic area which is flat and contains a large number of stones. The Comprehensive Archaeological Survey originally recorded the site in 1981 (Zarins 1981) and it occupies an area of flat land, covered with and surrounded by sand on both the northern and western parts. Hima occupies an irregular depression about eight kilometres across, surrounded by a low plateau of basalt volcanics. The volcanic rocks are permeated by joints and fissures that accumulate ground water which is then tapped by the wells of Bir Hima. The depressions open out to the south west into a broad valley that ultimately drains towards the Rub al Khali. Sand and volcanic stones covered most of the area, however there is a dry lake and a wadi nearby. The site includes several separate rock mounds and scatters of sand, tools and stone . The core of the site measures about 400 by 600 metres but looser scatters of artefacts extend over an area as great as five square kilometres. It is notable that there is no bone or pottery on the site. A point at the centre of the site was selected as a reference point and Trench 1 was laid out to the north of this central point. Measuring an area of five by five metres, it was excavated to a depth of 0.5 metres. Trench 2 was then laid out to the east of the central point, and was excavated to a total depth of 0.5 metres, sub-divided into 10cm deep spits. Each spit was sieved to distinguish artefacts from non-artefacts. Surface collection Square 3, measuring five by five metres, was laid out to the south of the central point, with a total area of 5x5 m, and Square 4, also five by five metres, was laid out to the south-east. Square 5, measuring five by five metres was selected on the eastern part of the central point (Fig. 7.11).

7.7.1 TRENCH 1

Surface collection at Trench 1 (Fig. 7.12) resulted in the collection of a group of stone tools, including arrowheads and fragments, in addition to some fragments of stones. Spit 1, when excavated, produced no artefact collections but its soil contained both small and large stones(Fig. 7.13). The excavation continued through a depth of 20cm and at the depth of 30cm some large natural stones were removed. At spit levels 4 and 5, there were no artefacts. In summary, artefacts were only found on the surface (Fig. 7.14).

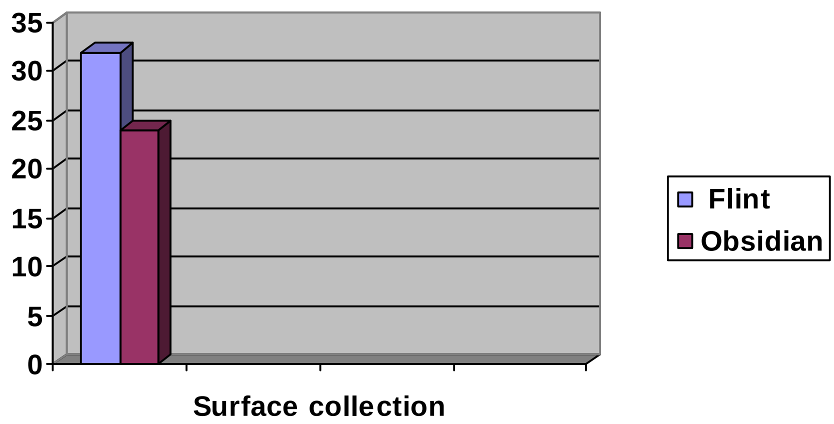


Fig 7.2 Graph showing the numbers of flint and obsidian artefacts from Trench 1, Hima (site 419)

7.7.2 TRENCH 2

The surface collection at Trench 2 yielded a large group of sandstone objects, in addition to a small number of spearheads, and other fragments (Fig. 7.15). Below the surface, Spit 1 was dug to a depth of 10cm and yielded a small number of artefacts and fragments in a context of very smooth and clean sand. Spits 2 and 3 encountered a large number of stones (Fig. 7.16), in addition to more recent charcoal at the northern end of the trench. Spits 4 and 5 produced no significant collections (Fig. 7.17) and Fig. 7.3 shows the number of artefacts recovered from the trench.

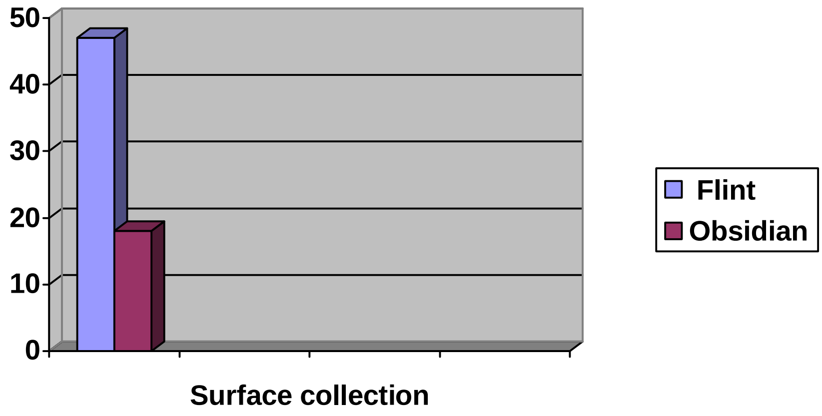


Fig 7.3 Graph showing the numbers of flint and obsidian artefacts from Trench 2, Hima (site 419)

7.7.3 SQUARE 3

Square 3 lies to the south of the site, 600 metres from Trench 1 and 30 metres from Trench 2. Its surface collection contained various types of stone artefacts, fragments, and blades (Fig. 7.18)

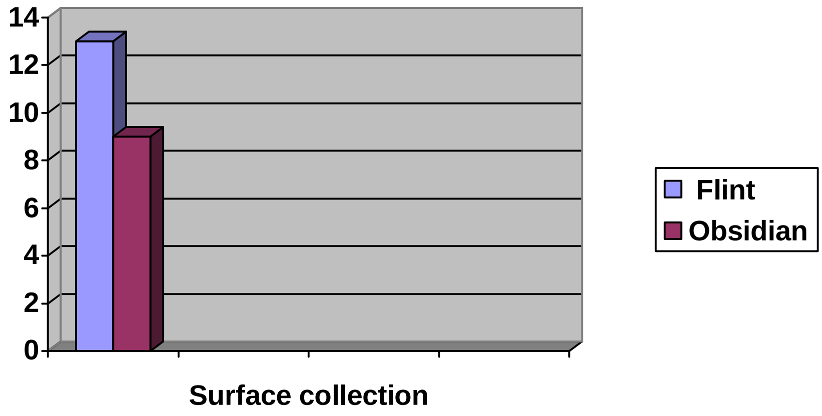


Fig 7.4 Graph showing the numbers of flint and obsidian artefacts from Square 3, Hima (site 419)

7.7.4 SQUARE 4

Square 4 lies in the eastern part of the site, 120 metres from Trench 1 and 20 metres from Trench 2. Its surface collection contained a group of fragments, blades, and spearheads, in addition to quartz (Fig 7.19).

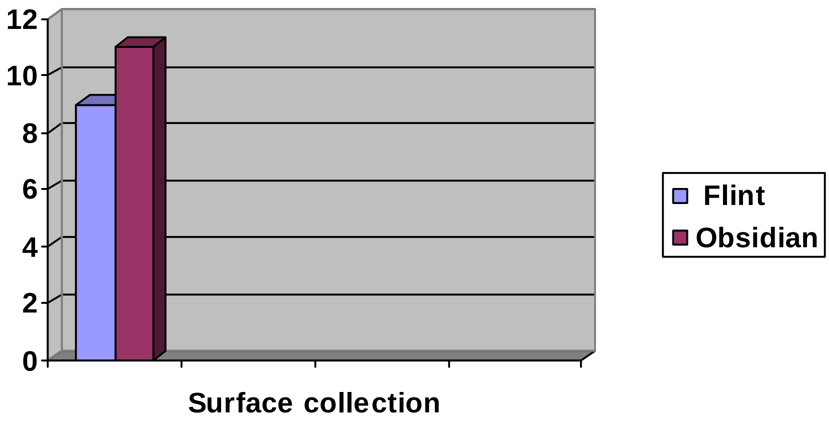


Fig 7.5 Graph showing the numbers of flint and obsidian artefacts from Square 4, Hima (site 419)

7.7.5 SQUARE 5

Square 5 lies about 50 metres from Trench 1 in the eastern part of the site and its surface collection included a group of fragments, blades, and arrowheads (Fig 7.20).

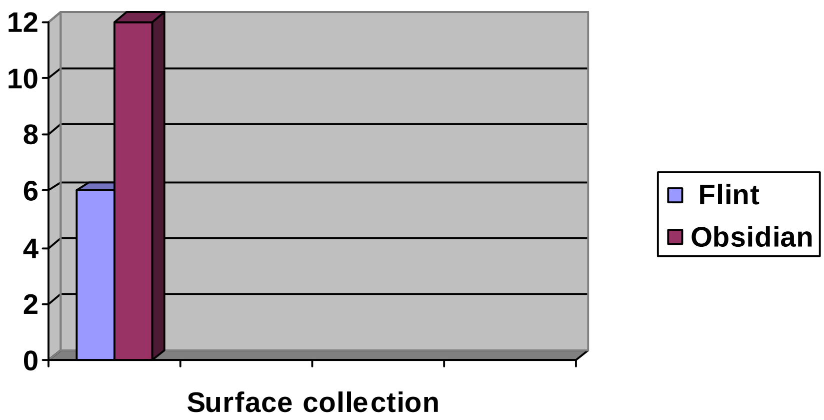


Fig 7.6 Graph showing the numbers of flint and obsidian artefacts from Square 5, Hima (site 419)

7.8 MATERIALS ANALYSIS

Most of the artefacts at Hima were found on the surface and it is apparent that the soil matrix within which they originally occurred has been blown away by the wind - the artefacts therefore form a "lag" deposit, and lack stratigraphic context. It is quite possible that several archaeological phases may therefore be superimposed at the site. No ceramics or bone were recovered from the site.

7.8.1 LITHIC ARTEFACTS

We started by separating artefacts from non-artefacts and all the artefacts were numbered and photographed. The artefacts are distinguished by showing intentional flaking and flakes included the core, core fragments, flakes, and/or blades, tools, retouched blades, or flakes. Consideration was then given to the raw materials' technology and during the survey, as well as the excavation of the two trenches, a moderate number of stone artefacts were collected. These came from the surface and the tested units of the sites. The chipped artefacts included cores, debitage and finished tools, arrowheads, axes, and ground stone. Some un-worked stone and weathered pieces were also recovered, but these were excluded from the analysis. The soil was screened to identify the presence of debitage and the collection is here described according to site subdivision. The raw material utilized includes 65 percent flint and 35 percent obsidian (Fig. 7.7). Flint was more common than obsidian in Trenches 1 & 2 and in Square 3, whereas obsidian predominated in Squares 4 and 5. The raw material was worked into flakes and blades and several cores and core fragments were recovered. Retouched tools included arrowheads, axes, blades, and retouched flakes. The majority of the retouched tools were arrowheads and included both tanged and untanged arrowheads. Pressure flaking was common. Most of the arrowheads were complete, but a few were broken, and fewer were unfinished. Most of them were made on blades. Among the tool-kit were blades, backed flakes, axes, large and small scrapers, thumb scrapers, lunates and spearheads. The lithic tools included 24 scrapers (Fig. 7.21), 53 Fluted bifacial foliate arrowheads (Fig. 7.22), 14 tanged arrowheads fluted from the point (Fig. 7.23), 8 blade projectile points (Fig. 7.24), 23 circular scrapers (Fig. 7.25) and 14 bifacial ovates (Fig. 7.26) (Table 7.2 and see Appendix 61-65).

Trench no	Square 1	Square 2	Square 3	Square 4	Square 5	Total
Scrapers	7	8	3	2	2	**22**
Retouched flakes	12	8	11	12	10	**53**
Arrowheads	٢٢	١٨	٣	٥	٢	**٤٩**
Bifacial Arrowheads	6	3	1	3	1	**13**
Blade projectile point	6	2				**8**
Circular scraper	5	8	5		5	**23**
Bifacial ovates	10	4				**14**
Fragment	٣٣	17	٢٦	٢٧	٢٥	**98**

Table 7.2 Table showing major lithic types recovered from Hima (site 419)

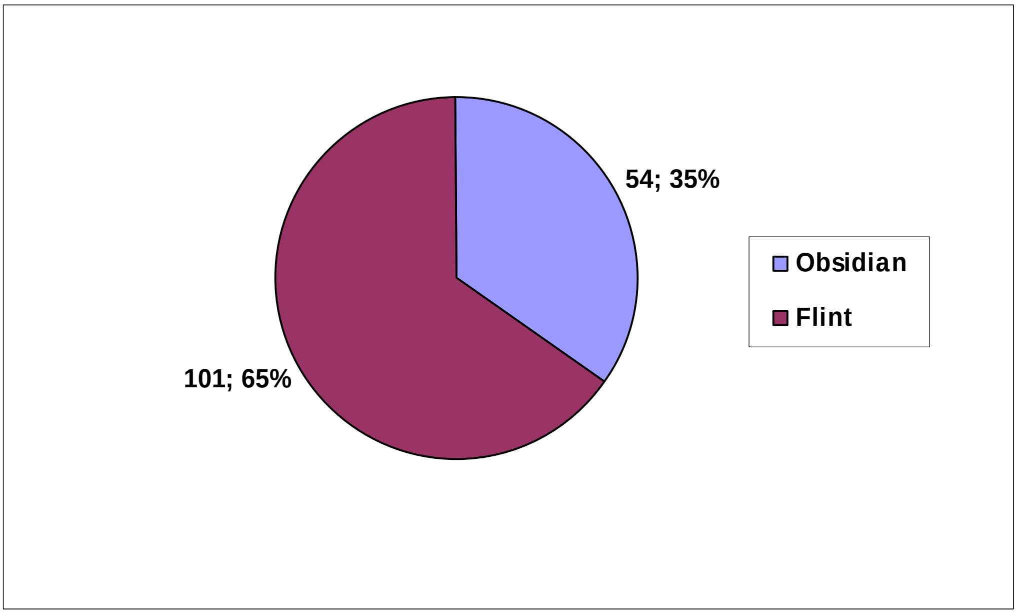


Fig. 7.7 Pie chart showing the percentage of raw materials from Hima(site 419)

7.9 CONCLUSION

It is notable that although there are a large number of prehistoric sites known within the Najran, the survey only identified a single Neolithic site (site 419). It is suggested that there are other sites within neighbouring areas and in Asir stone buildings, associated with stone tools of the Neolithic type, have been recovered as have similar tools from sites within the Empty Quarter. The similarities between these sites and Hima suggests that this site may date to the later Neolithic of the Kingdom of Saudi Arabia, although it is possible that the surface assemblage includes earlier material as well. It is clear that Neolithic arrowheads were manufactured from both flint and obsidian and, in addition to blades, other lithics include scrapers, bifacials, fine chips, flakes, and other cutting implements were made of stones, as well as hammer stones. The raw materials appear to have been sourced from the area around Hima, which contains volcanic rocks. Hima may be considered one of the larger sites associated with the establishment of large numbers of settlements during the moist stage of the Neolithic era between 5000 and 4000 BC. However, the very badly disturbed nature of the site makes it extremely difficult to draw any further conclusions. Having now presented the new survey and excavation data from the four zones under study, the next chapter will focus on the settlement and artifact patterns thus identified and the extent to which the aim and objectives of the dissertation have been met.

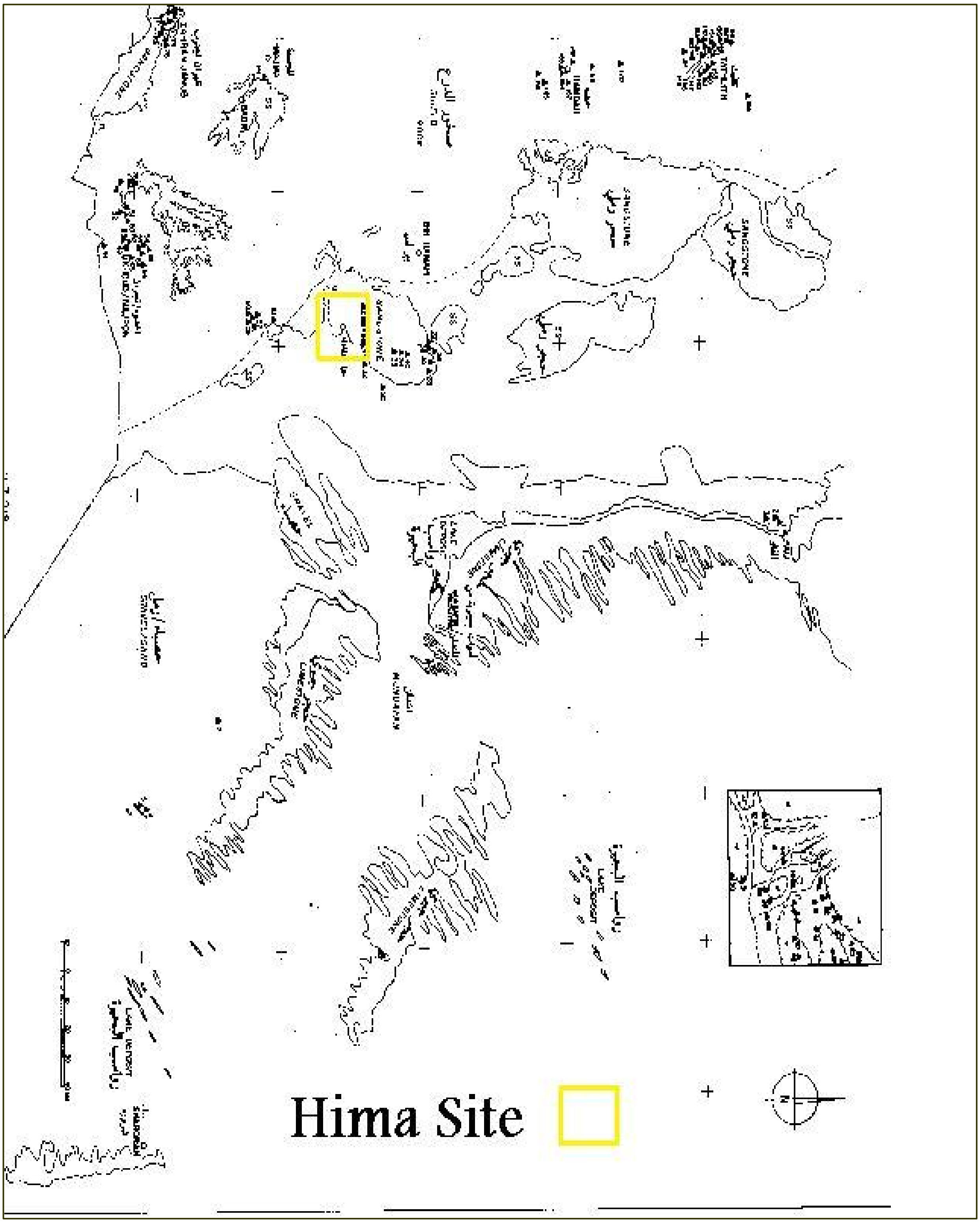


Fig 7.8 Najran region and Hima(site 419) (After Zarins 1981)

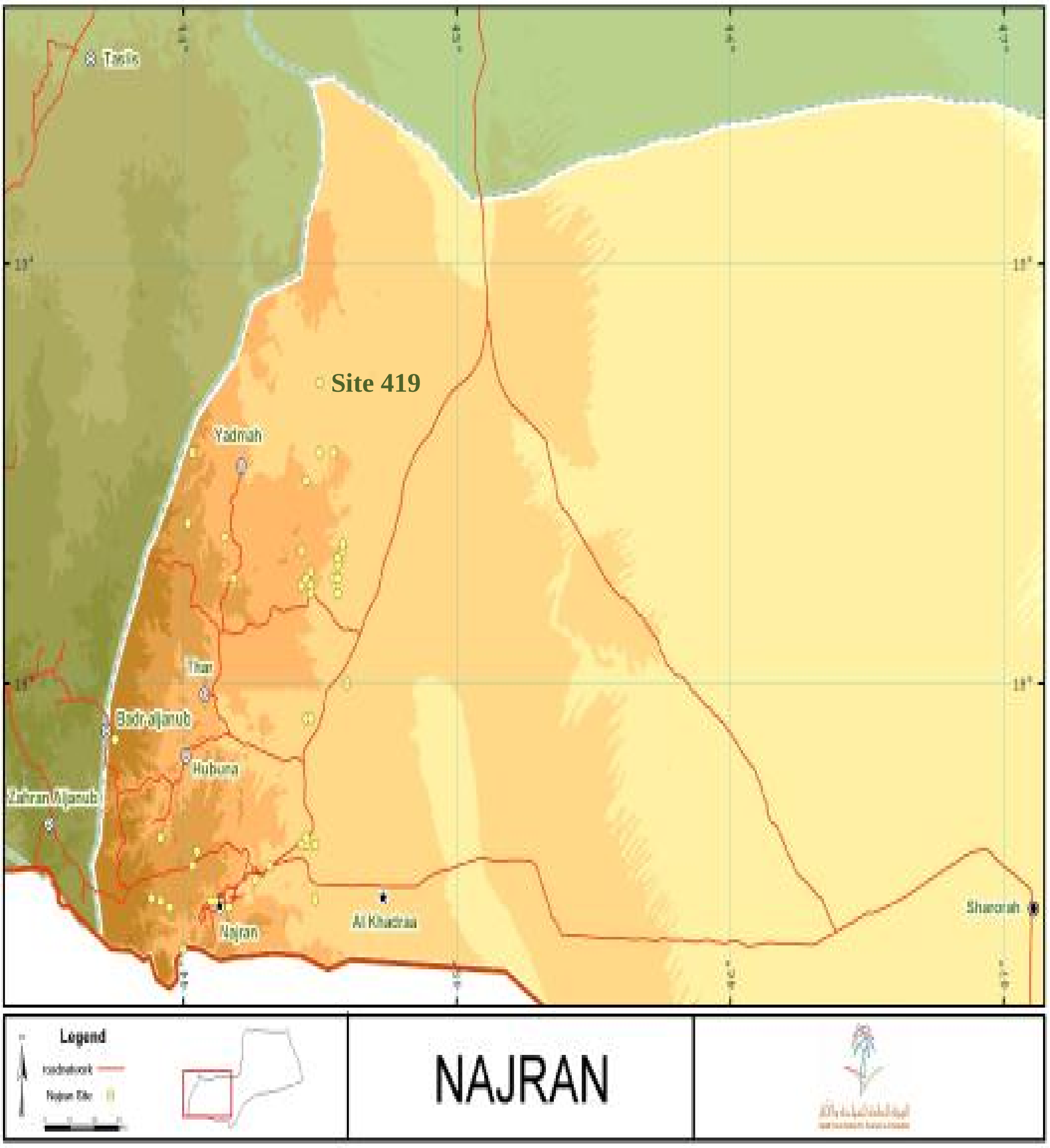


Fig 7.9 Archaeological sites in the Najran region

Fig 7.10 Hima (site 419) photo by Alghamdi

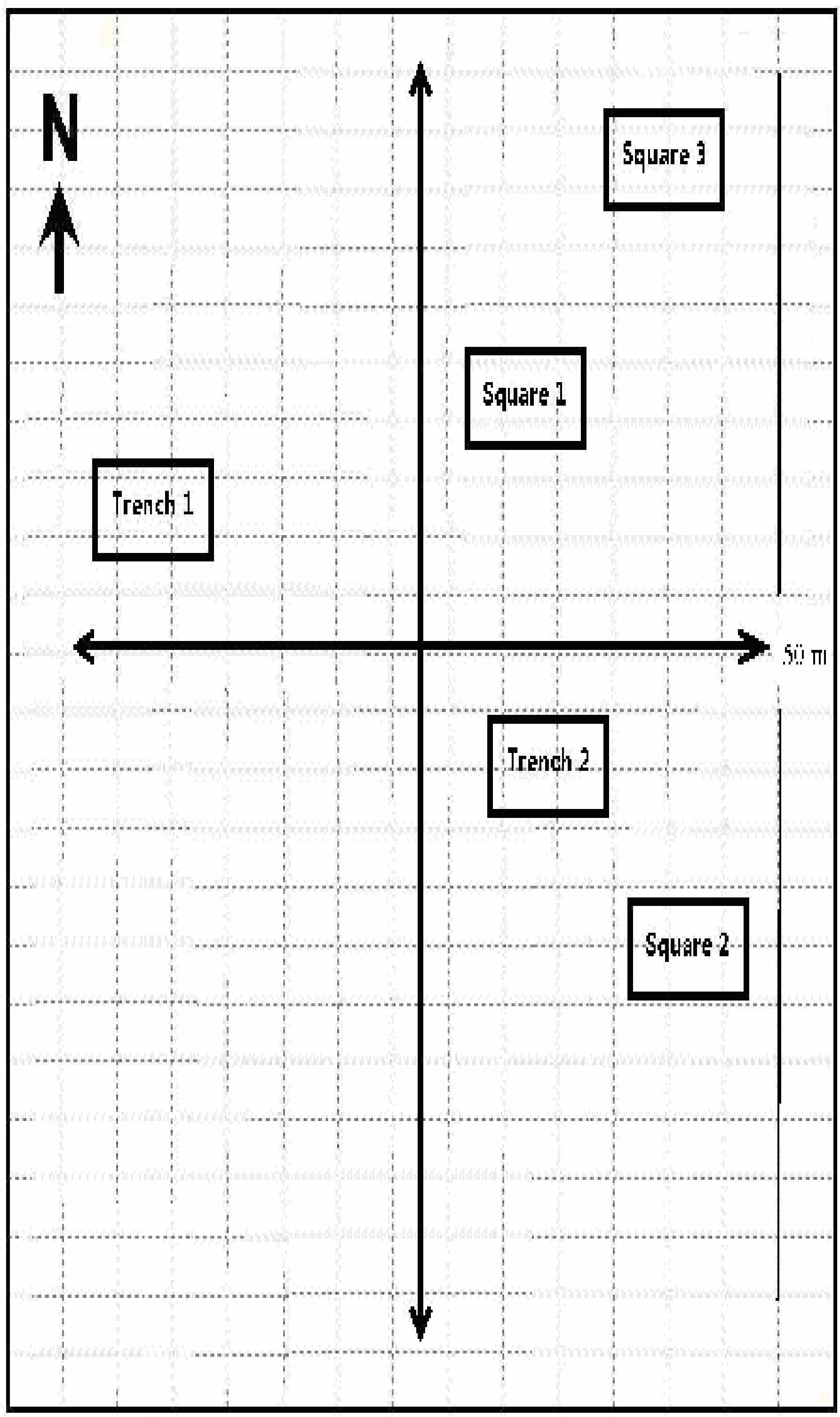


Fig 7.11 Plan of the site of Hima (site 491) showing the distribution of trenches and sample squares.

Fig 7.12 Trench 1, Hima(site 419) photo by Alghamdi

Fig 7.13 Trench 1, spit 1, Hima(site 419) photo by Alghamdi

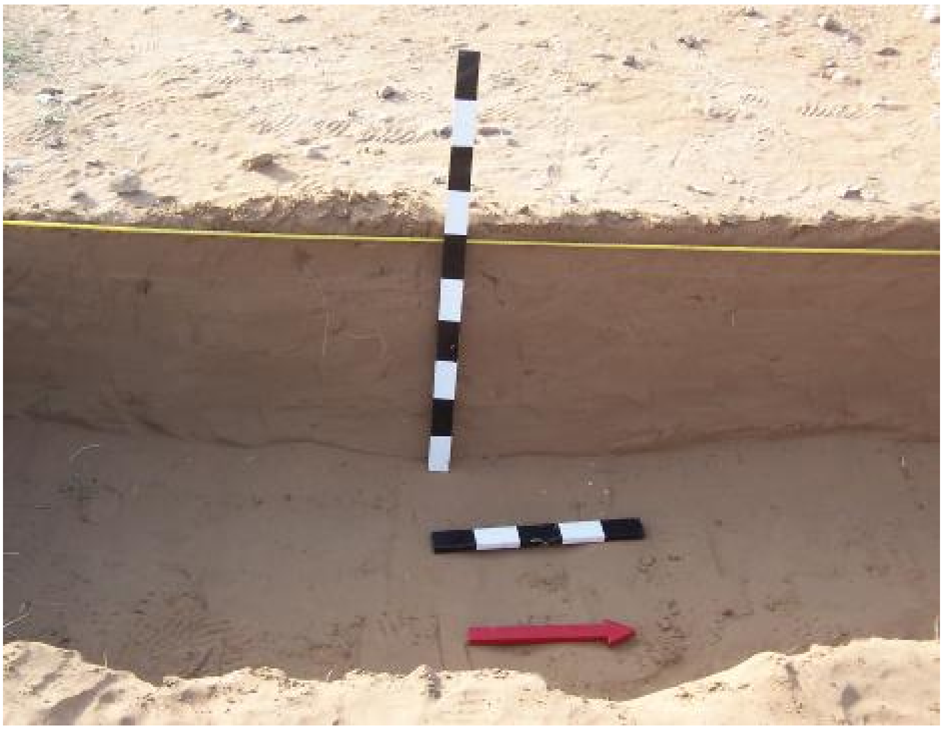


Fig 7.14 Trench 1, section, Hima (site 419) photo by Alghamdi

Fig 7.15 Trench 2 Hima(site 419) photo by Alghamdi

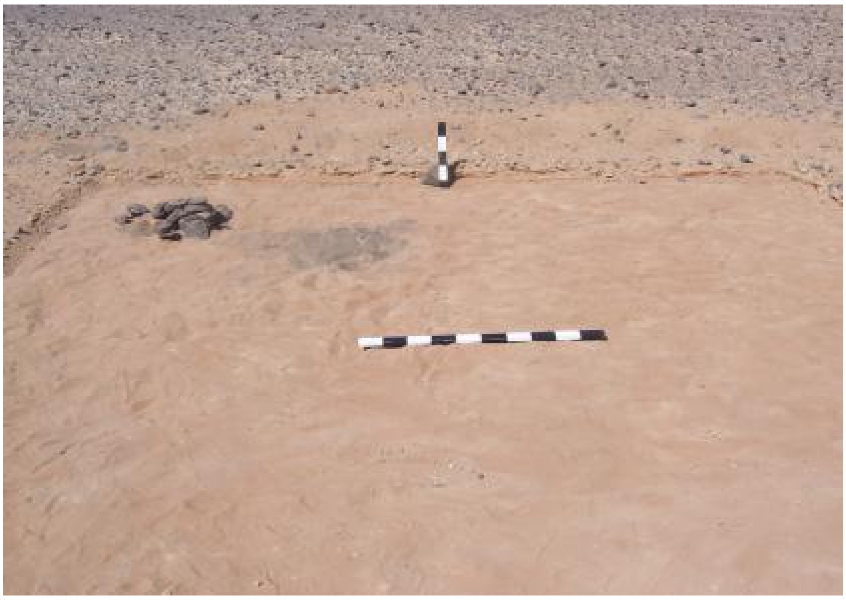


Fig 7.16 Trench 2, spit 2, Hima(site 419) photo by Alghamdi

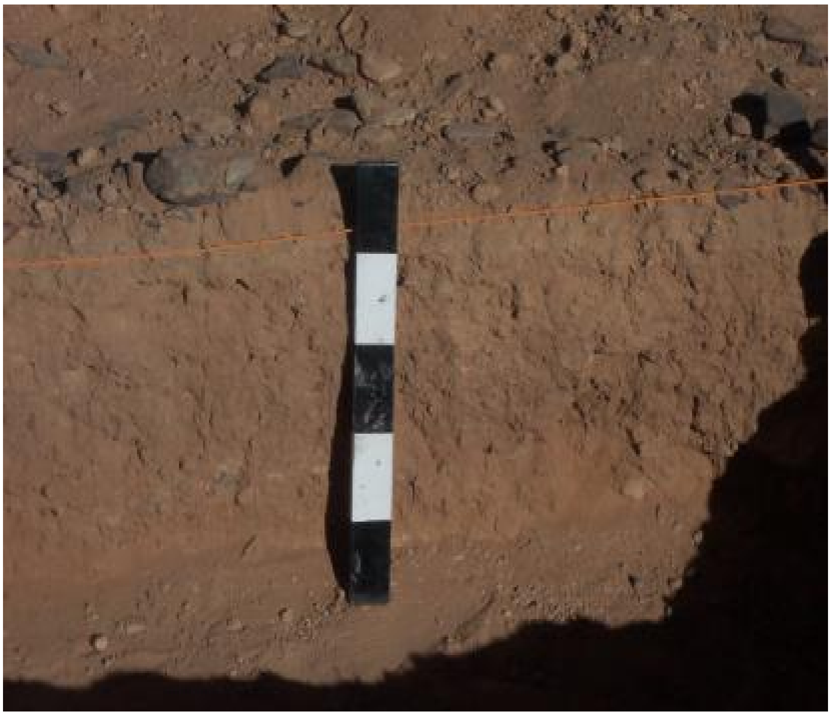


Fig 7.17 Trench 2, section, Hima(site 419) photo by Alghamdi

Fig 7.18 Square 3, Surface collection, Hima(site 419) photo by Alghamdi

Fig 7.19 Square 4, Surface collection, Hima(site 419) photo by Alghamdi

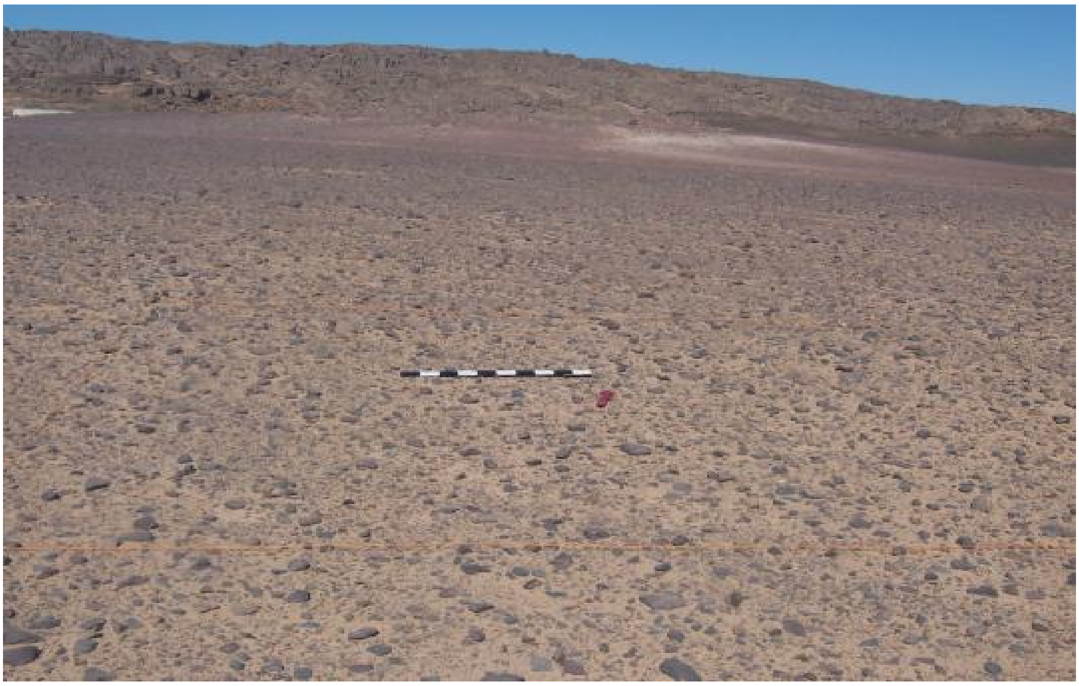


Fig 7.20 Square 5, Surface collection, Hima(site 419) photo by Alghamdi

Fig 7.21 Trench 1-2 and Square 4-5, Scraper, Hima(site 419) Drawn by Ali

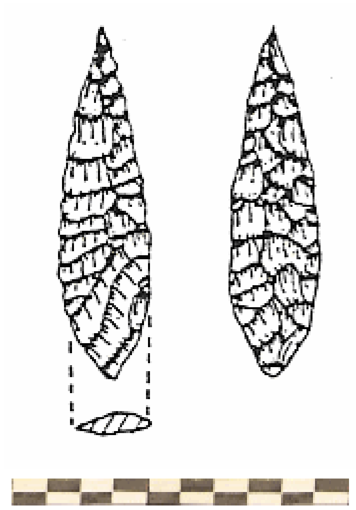


Fig 7.22 Trench 1-2 and Square3-4, Fluted bifacial foliate arrowhead , Hima(site 419) Drawn by Ali

Fig 7.23 Trench 1-2, Tanged arrowhead fluted from point , Hima(site 419) Drawn by Ali

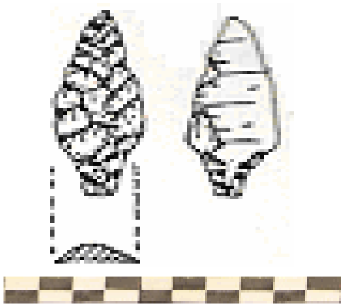


Fig 7.24 Trench 1-2,   Blade projectile point, Hima (site 419) Drawn by Ali

Fig 7.25 Trench 1-2 ,   Circular scraper, Hima(site 419) Drawn by Ali

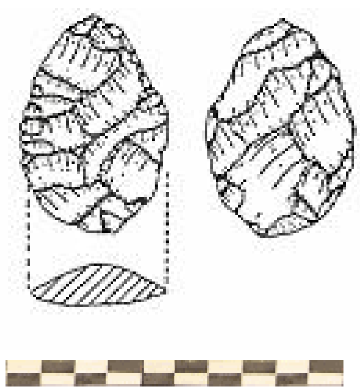


Fig 7.26 Trench 1-2,   Bifacial ovate, Hima(site 419) Drawn by Ali

CHAPTER 6: TIHAMA MOUNTAINS (ZONE 3)

6.1 INTRODUCTION

Having thus introduced and presented the geography and archaeology of the Farasan Islands and the Jizan plain, the purpose of Chapter 6 is to present the results of the new fieldwork in Zone 3, the Tihama Mountains. As will become clear, the archaeological sequence of this zone is less clear due to the absence of deep deposits or large mounds. Indeed, the archaeological resource of this zone is largely restricted to rock art presenting a challenge to the dating of sites and application of relative chronologies to the various preserved sites.

6.2 GEOGRAPHY OF THE AREA

The Tihama Mountain range is situated on the eastern edge of the Red Sea rift valley and its development began in the Oligocene Age and has continued up to the recent geological period (Alrethi 2004). The geological history of this area dates back to a period long before the development of the recent tectonic pattern with the deposition of Precambrian eugeosynclinal sedimentary and volcanic rocks. These rocks, now metamorphosed and heavily denuded, form the truncated upland of today's Arabian Nubian shield complex, and were affected by several Precambrian orogenic and plutonic events before the cratonisation occurred. The Precambrian series is exposed all along the north-eastern flank of the Red Sea (Alrethi 2004). The Tihama Mountain range is formed from three sedimentary formations that are known as Hanifa, Khums, and the Paleozoic formations of the last Mesozoic era (Alzahrani 2006). During its geological history, the area was exposed to a series of tectonic movements that led to some distortion in the succession of tectonic layers, which led to the construction of complex formations within plate edges. These are represented by high mountains and deep valleys (Alzahrani 2006). The most prominent of these formations is found in the deep valley of the Baysh Syncline. This convex, or low feature, occurs in what is known as the Baysh convex layer in Tihama province. In addition there are concave layers, the most famous of which is Tihama Mountain, whose peak reaches a height of 2043 metres above sea level (Alzahrani 2006).

This area witnessed the extension of a number of rock formations, the best known of which is the Sabia formation, of sand, limestone, dolomite, and other kinds of volcanic rocks. The Baysh Group consists of igneous volcanic rocks with basalt; and metamorphic rocks formed of marble and rock particles, penetrated by layers of igneous rocks. All of these penetrate the Baysh Valley from the east. The Al-Wajid Formation is made up of layers of sand, and gray stone, and white and brown, harsh and fine granular rocks, intersecting other layers, formed of quartz with silica, penetrated by fine layers of granular rock at the lower part, and a small amount of clay on the top (Freyer 1985). At about 400 metres is the Abu Hasan Formation, the thickness of which on occasions reaches the thickness of the Al-Wajid Formation at Abu Hasan Mountain, and is made up of formations of sand and rocks below thick layers that cover the whole Arabian Shield, and link it to the African continent (Alzahrani 2006). In addition, igneous and metamorphic rocks lie over the sandy unconformity of the Baysh Group. The irregular Al-Khums formations lie on the Al-Wajid and consist of layers of white and gray rocks. The thickness of the Al-Khums Formation over Tihama Mountain reaches approximately 70 metres. They are made up of sandy rocks, and other layers of sedimentary rocks from the Arabian Basin in the east. They cover the total area of the Arabian Shield and date back to the Jurassic era, and lie on rocks which make up the Hanifa Formation (Freyer 1985). Finally, the Hanifa Formation, whose elevation is 5249 feet above sea level, is made up of alternate layers of limestone, penetrated by shallow layers of clay and mud formations on the upper side of the formation that contains grey sand layers. The thickness of the Hanifah Formation reaches approximately 50 metres and consists of clay and sand stones and other kinds of sedimentary layers that may be traced back to the Arabian Sedimentary Basin in the east. These cover the whole area of the Arabian Shield to the west and date back to the Jurassic era (Alzahrani 2006).

6.3 CLIMATE

The climate of the Tihama mountains is cold in winter and moderate in summer; the average temperatures are probably 1^{o}C warmer in winter and 1-2^{o}C lower in summer than in the plains to the west. The daily air temperatures are 20-28^{o}C in June and 11-12^{o}C in March with average sea surface temperatures of 28^{o}C in October and 20^{o}C in January (Al Boq 2001). The rainfall in winter is 400mm, in spring is 100mm, in autumn 50mm, in summer 10mm, which makes it one of the wettest parts of the Kingdom of Saudi Arabia (Alzahrani 2006).

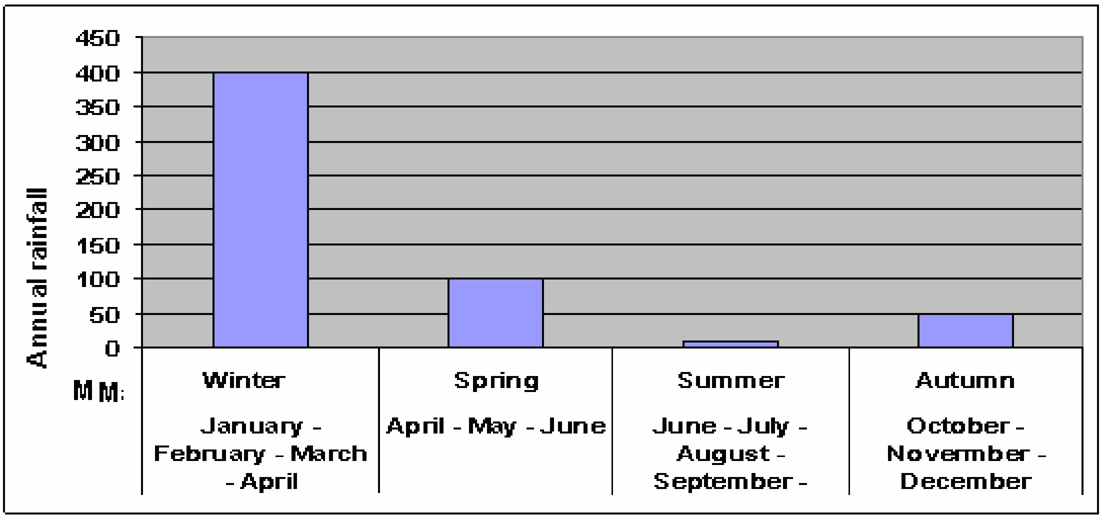


Figure 6.1: Graph showing annual rainfall in the Tihamah Mountains in mm

6.4 HUMAN AND NATURAL ENVIRONMENT

Tihama Province is located 120 kilometres to the north-east of Jizan and covers an area of 100 by 100 kilometres and supports a population of 10,000 people (Mahsn 1989). As the province is mountainous, agriculture is very simple and farmers within the Tihama and Shaqra ranges depend solely on rain to grow their crops. As a result, one can observe the presence of rain-fed terraced fields, but these features can also result in the depletion of the archaeological record because the construction of terraces can destroy archaeological sites (see fig 6.2) (Alrethi 2004). From the point of view of the province's economy, most of the population is engaged in keeping cattle and farming and traders from other areas come to purchase their products (Ascope 2006). As noted above, the Tihama Mountain range reaches a height of 2014 metres above sea level and the Tihama Plain extends in a circular shape surrounded by high mountains on all sides. The area inside this circle is made up of deep valleys, and rugged mountains and can only be reached in a specially adapted car, with an experienced driver who has full knowledge of mountain roads. In addition, the mountains feature very steep cliffs that are difficult to climb, and it is very difficult to construct roads in this area, making access extremely limited (Alzahrani 2006). Despite this restriction, large numbers of people live in the mountains and belong to six large tribes: Al-Muthiqi, Al-Shiah, Al-Maqsod, Al-Musaiqir, Al-Wabran, and Al-Salma. Their villages are very traditional and they build houses from locally available stone and clay, with bare walls and floors. Their environment offers well-vegetated areas with diverse plants and perennial water sources (Alrethi 2004). And some have suggested that this verdant area would have provided abundant resources for hunter-gatherers and early agriculturalists (Freyer 1985).

6.5 SURVEY

As noted in Section 1.3.1, Zone 3 was surveyed by following the main road by car and interviewing local people. In addition, the main lines of paths leading to mountain peaks were followed in order to survey the area by the field team. As it was already clear that the region was rich in rock art, transparent sheets were carried for tracing and each example of art was photographed, numbered and catalogued. Notes were also made of the techniques of execution, superimposition, as was as the degree of patination on them. Many of the recorded figures were depicted by pecking rocks which resulted in grooves, pits, cuts or gashes whilst other figures were made by pounding or battering with a pestle, and in some cases rock surfaces were scratched and abraded or rubbed by stone to create an image on the dark patinated rocks. As this new category of artefact had been identified, it was now necessary to develop and design a developmental methodology to provenance and date the art. The Comprehensive Survey of the Kingdom of Saudi Arabia identified that rock art is one of the most prominent of Arabia's ancient archaeological remains and in the middle of the last century, the Museums Agency began to document and analyse the rock sculptures of the Kingdom as part of a comprehensive research plan. This programme discovered hundreds of locations which contained a huge wealth of rock art in most of the areas of the Kingdom and the initial reports showed that this study provides much new useful information (Khan 1993). However, it was also true that in the 1960s, archaeologists did not record and photograph such sites adequately and tended to concentrate on the most accessible sites where they could focus on collecting traditional artefacts and, as a result, rock art remained relatively unexplored.

This situation changed largely due to work of Anati, who started to research the rock art of Central Arabia and developed a comprehensive classification of styles and relative dates which was then applied by later workers to other regions of the Kingdom of Saudi Arabia. Anati's work was wholly based on photographs and his method was to divide the art into generalised and flexible periods (Anati 1972) (Table 6.1). He recognised a total of 35 styles (1972), but some of his classification appears ambiguous and seems to depend on the shape and outlines of figures rather than on decoration and the modification of traits. Indeed, it would be possible to suggest that Anati's definition of styles is easy to understand but does not reflect the complexity of the material and, as he did not always use scales in his photographs, it is not always possible to know the size of the figures, their size relative to other figures, and how the depth of pecking could be determined. It is also not clear on what criteria Anati based his dating as the lack of local archaeological sites means that he could not always correlate his dating with the archaeology of the region. Nor do we always know how he classified rock art into different chronological phases (Anati 1972): according to Anati, each style has its own peculiar figurative approach and cultural differences between styles which may indicate the presence of different human groups. However, he does not always discuss these differences or mention what cultures or beliefs are shown in the different styles. However, whatever, the weaknesses of Anati's methodology, it is a centrally utilised approach that provides some wider connections to other regions within the Kingdom.

Table 6.1 lays out the approximate chronological classification employed by Anati (1972), stylistic periods being based upon the following criteria:

Period	Date
Islamic	After 622 AD
Literate	650 AD. – 1,000 AD
Late Hunting and Pastoral	500 – 1200 BC
Middle Hunting and Pastoral l	1,000 – 2,000 BC
Middle Hunting and Pastoral ll	2,000 – 3,000 BC
Middle Hunting and Pastoral lll	3,000 – 4,000 BC
Early Hunting and Pastoral	4,000 – 6,000 BC
Early Hunters	Before 6,000 BC

Table 6.1 Classification of rock art according to Anati (1972).

For the purposes of this study, the term petroglyphs refers to figures depicted by pecking rocks, resulting in grooves, pits, cuts, or gashes. Other manufacturing approaches include fabrication by pounding or battering with a stone and, in some cases, the rock surface was scratched, abraded and rubbed by a stone to create an image on the dark rock or painted on the rocks.

6.6 ARCHAEOLOGICAL SURVEY

Unlike Zones 1 and 2, the Tihama Mountains were not included within the Comprehensive Survey of the Kingdom of Saudi Arabia, thus this new survey has produced unique data from the region. Site 1, the first cave in the area, was recorded at a distance of 10 km from the main area. It is a small cave, measuring about 10x7m, and its roof is covered with a layer of black smoke. There are rock drawings of animals, and humans inside. Near the cave painted on the vertical side of the mountain are drawings that represent deer together with another representing a deer under his mother. Site 2 comprised eight palm prints, seven of a right hand and one of the left hand of red ink close to two graves. Site 3 comprised a series of deeply etched figures, including a horseman carrying swords and spears, deer and other human figures. Site 4 consisted of rock drawings of geometric shapes and humans under a painted rock. In addition, we also recorded the presence of a grave at Site 5, two natural water cisterns and a painting and pecked figure of goats and humans with painted outline of hands at Site 6. Finally, we recorded a group of rock art paintings in the shape of geometric motifs and dots in a group of ten caves on the eastern and northern side of the mountains .

Types of sites	Pecked	Painted
Site 1		١
Site 2		١
Site 3		
Site 4	١	١
Site 5	٢	١
Site 6	٣	
Total	٦	٤

Table 6.2 Types of rock art site in the Tihama Mountains (Zone 3); the numbers indicate the number of images at each site.

The locality recorded as Site 1a comprised a rock shelter measuring about 10 by 7 metres with a roof covered in soot from fires. Its walls were decorated with painted depictions of animals and humans. Near the cave was Site 1a, a large boulder measuring about 6 by 4 metres and contains a human figure painted in red ochre on the vertical face of a hill (Fig. 6.3). The figure is shown with a prominent body, an oval shaped head wearing a crown-like headdress, with right arm raised upwards and left arm downwards, holding some object, probably a lance, in the right hand. Such painted figures are rare, and extremely so in the rock art of southern Arabia. The figure probably represents a prominent personality, perhaps a king or a dignitary, however, the figure gives the impression of a dynamic and important person in a dancing attitude. Such figures, pecked and engraved, are also located at Al-Fao and Hima and they are associated with the Thamudic (early Bedouin) and South Arabic (Musnad al-Janubi) rock art, and thus the painted figure could tentatively, and relatively, be attributed to between 800 and 500 BC, which is related to the Literate period of the early first millennium BC to the 7th century AD. This dating is based on the association of these human-like figures with Thamudic and South Arabic inscriptions which are already dated and some times mentioned the name of a deity *Kahl* (Khan 1993).

A second nearby rock, Site 1b, measured about two by two metres and contained a number of small-bodied and long-horned ibex figures, pecked and painted in red on the vertical face of a hill (Fig. 6.4). Ibex, although rare, are still found in the mountainous areas of the Kingdom of Saudi Arabia and were commonly hunted animals. Although the date of these figures is unknown, representatives of ibex are common in both South Arabian sculpture and rock art, therefore a date to Anati's Late Hunting and Pastoral period between 1200 and 500BC, or somewhat later, seems plausible (Table 6.1).

Site 2a a rock measuring about six by two metres was decorated with an unidentified animal, probably a long-horned ibex figure (Fig. 6.5). Several other ibex figures are pecked and engraved on the same rock, as is commonly found on other rock art sites in southern Arabia. This corpus of figures may be relatively dated to between 800 and 500 BC, therefore again suggesting a date with Anati's Late Hunting and Pastoral period.

Site 2b comprised a rock measuring about three by three metres decorated with palm and hand stencils made by spraying or blowing red colour on the vertical surface of a rock shelter (Fig. 6.6). In addition, there are two rows of painted arms, with open palm and stretched fingers, all representing the right hand, with the exception of one single left hand located on the extreme left of the panel, perhaps meant to represent a woman's hand. Although petroglyphs of hands and palms are located on several sites in the Najran area, within the Tihama mountains such coloured, painted hands are unique and are only found at this site. The date of this site is unknown. Overall, hand prints are a common element in Saudi Arabian rock art and many hand and palm prints are located in Najran area as well as in the north of Saudi Arabia. Palm prints exactly like Tihama are located at the entrance of a cave located at Janin in the Hail area, in the north of Saudi Arabia, but these are pecked and not painted. However, hand prints are a universal phenomenon and are found in many counties of the world (Khan 1993).

Site 3, is similar to the rock at site 2, but measuring about two by two metres, is decorated by two images of hands in their natural form and shape depicted in two different styles (Fig. 6.7). The right hand is painted completely, while the left hand was placed on the rock and painted from outside. Between the two hand prints, a leaf-like form is painted and a row of human figures depicted in different forms and attitudes, in addition to different geometrical motifs and tribal symbols, (or *wusum*), carved under the figures. Related to other similar figures located in the Najran area, the site may be attributed to between 800 and 500 BC.

Site 4a comprises images of several mountain goats and human figures depicted by deep pecking and engraving on the surface of a rock measuring about six by four metres (Fig. 6.8). One or two of the figures are waving spears or sticks and are interpreted as hunters. No colour was applied and the figures are very well preserved due to their deep pecking. The date of this site is unknown. Site 4b in the vicinity of this rock, measuring about four by three metres in size, contains an ibex and an unidentified figure depicted by partial pecking on the vertical surface of a hill (Fig. 6.9). The date of this site is unknown.

Site 5, on a rock measuring two by three metres, contained deeply pecked human figures with upraised arms, probably involved in some dancing or religious rite (Fig. 6.10). The date of this site is unknown.

Site 6 a small rock measuring two by two metres is decorated with geometric motifs painted in red with dots inside representing a cellular pattern (Fig. 6.11). This may represent children's activity or have some unknown function because such motifs are unique to the area and are not found elsewhere in the Kingdom of Saudi Arabia. The date of this site is unknown.

6.7 CONCLUSION

In clear contrast to the Yemen highlands, where numerous Neolithic and Bronze Age sites have been recorded, the new survey failed to identify any new Neolithic sites. This difference may be a result of different survey techniques employed as it may be that a number of the caves identified in the Tihama range were inhabited during the prehistoric era or were used as shelters. However, it is clear from the survey that there was no association between sites with rock art and Neolithic pottery and stone tools artefacts. This may be because local inhabitants of the region were unaware of what such objects might look like but it may also indicate that sites with rock art were simply representing special points in the landscape and were not occupied for extended periods of time. Whilst the rock art appears to focus on hunted species, this does not necessarily mean that those who created them were hunter gatherers, indeed, the sport of hunting is one which is popular amongst the mountain's inhabitants even today, and has a very long tradition in southern Arabia. The next chapter will introduce the results of the survey within the final zone of this study, the Najran.

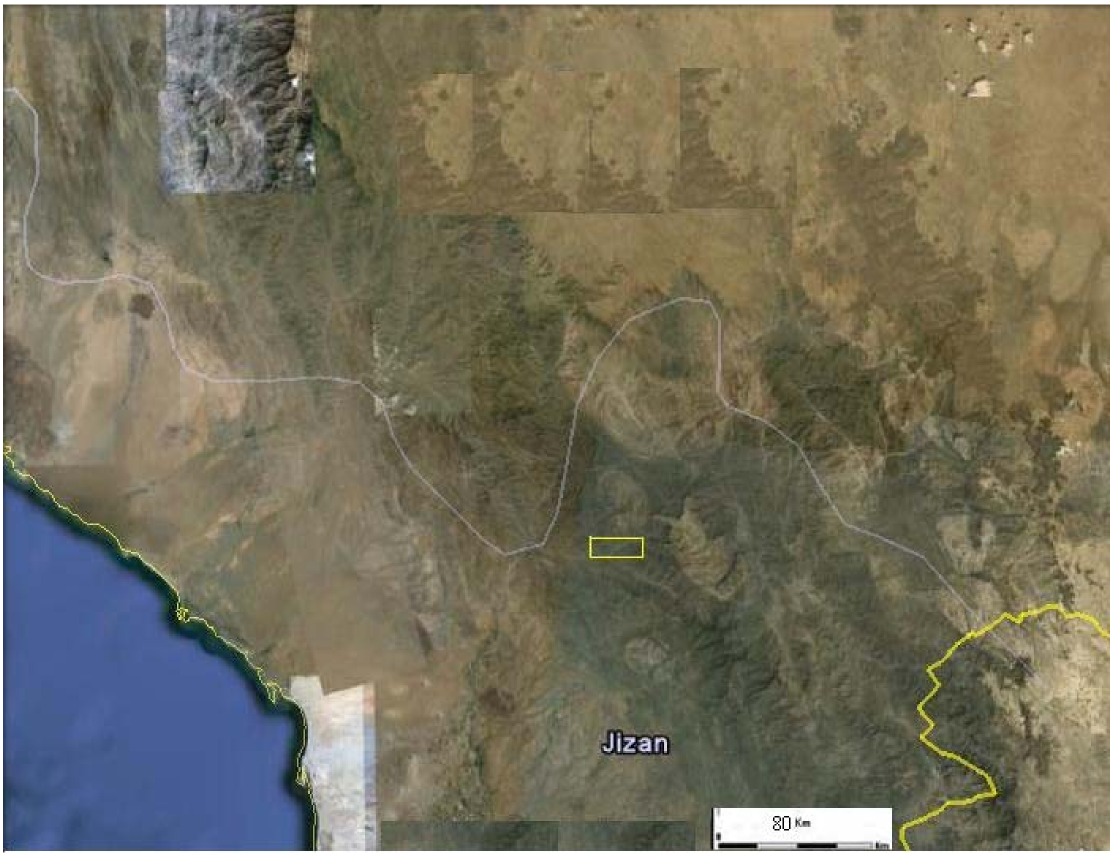


Figure 6.2 The area of study within the Tihama mountains

Figure 6.3 Painting of a woman wearing a crown, Site 1a, Tihama Mountains photo by Alghamdi

Figure 6.4 Painted representation of ibex, site 1b, Tihama mountain photo by Alghamdi

Figure 6.5 Pecked shape of animal, site 2, Tihama mountain photo by Alghamdi

Figure 6.6 Painted outline of hands, site 2, Tihama mountain photo by Alghamdi

Figure 6.7 Painting and pecked figure of goats and human with painted outline of hands, site 3, Tihama mountain photo by Alghamdi

Figure 6.8 Pecked figure of human hunter, site 4 Tihama mountain, photo by Alghamdi

Figure 6.9 Pecked figure of ibex, site 4, Tihama mountain photo by Alghamdi

Figure 6.10 Pecked figure of humans, site 5, Tihama mountain photo by Alghamdi

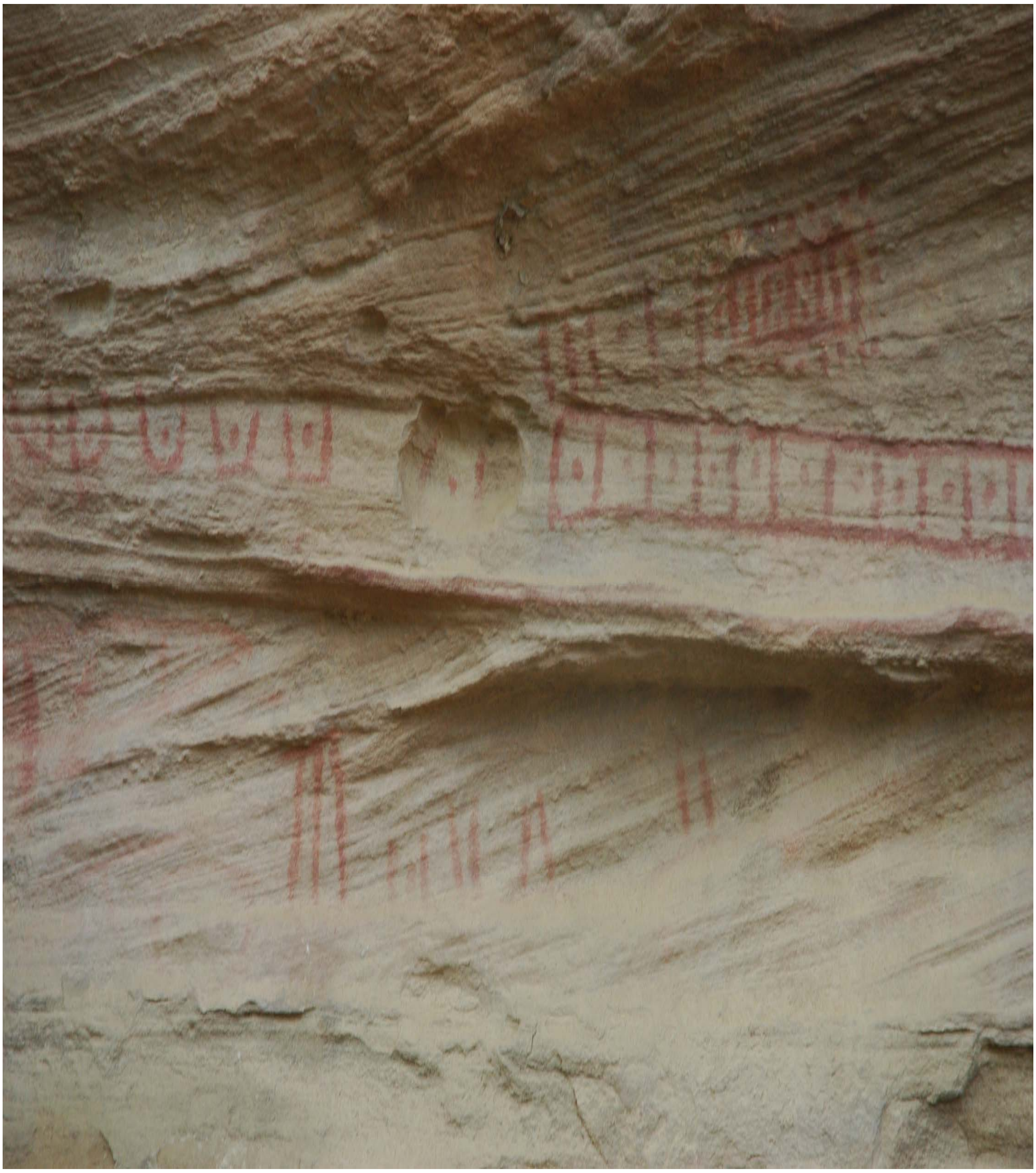


Figure 6.11 Painting shape of Geometric motifs dots, site 6, Tihama mountain photo by Alghamdi

CHAPTER 5: THE COASTAL PLAIN (ZONE 2)

5.1 INTRODUCTION

Having introduced the geography and results of the archaeological survey and excavation of Zone 1, the Farasan Islands, Chapter 5 will now present the geography and archaeology of Zone 2, Jizan - the coastal plain. In particular, this chapter will examine the artefacts and sequence of the two major sites studied in this thesis Al-Sihi (site 271) and Al -Majama (site 278), and attribute a function and date to their material culture. It should be noted that the author’s master dissertation focused on an analysis of the former which had been reinvestigated by the author’s (2006). Although the Al-Sihi was largely presented in 2006, some of its features are critical to our understanding of Al -Majama and thus its most important aspects will be re-examined and some sections abstracted from the author’s Bradford University master dissertation and reproduced (Al-ghamdi 2006).

5.2 THE GEOGRAPHY OF THE COASTAL PLAIN

The plain of Jizan is roughly 40 kilometres wide and is made up of alluvial deposits with some overlying sand dunes and coastal marine (*sabkhah*) deposits along the coast (Almohamdi 1998). It slopes gently and regularly from 100 metres down to sea level and its only hills are four small volcanic cones near Sabya and Abu Arish in the east and the salt dome of Jizan in the west. To the north, the plain is enclosed by metamorphic rocks of the basement complex and the enormous basaltic eruptions of Al-Birk Plateau. Southward, the Jizan Plain continues into Yemen as the Tihama coastal plain to the southern end of the Red Sea. Several important intermittent wadis traverse the plain of Jizan and are fed by the summer and spring rains, particularly in the ‘Asir Mountains region, and their floodwater spreads over the plain in many small streams where they provide moisture for seasonal agriculture or pasture (Almohamdi 1998). Only the upper courses of the wadis in the mountainous area are permanent, forming narrow and steep valleys with gorges in the volcanic zones. The sediments brought by the wadis are very coarse-grained in the eastern part of the plain but they become thinner and very fine-grained in the huge deltas at their mouths. The border between the plain and the sea consists of a typical regular sandy shoreline which follows the structural lines of the Red Sea depression. The coast line is unclear and shifts, depending on tides and seasons. It forms periodically-flooded *sabkhahs* which contain salt and gypsum - the result of evaporation (Zotl 1984). Many volcanic intrusions, dyke swarms, and flows, which occurred during the development of the Red Sea rift, are characteristic of the Jizan Plain and several small volcanic cinder cones, which are still remarkably well preserved, confirm that volcanic activity continued until recent geological times (Zotl 1984). The topographic division of the area lies to the east of this wide coastal plain, and may be called the ‘mountainous’ or ‘hilly’ Tihamah, and appears as a mountainous range that extends from the north to the south. It has notable variations in height and is some 700 metres high at Um Al-Qimam, while only 133 metres above the sea level elsewhere (Hossam 1998).

5.3 CLIMATE

The meteorological records from Jizan, on the mainland, indicate that the annual mean temperature for April to October averages over 40 ^{o}C, that the January mean minimum was 30 ^{o}C and, finally, that the July mean maximum is 45.7 ^{o}C the humid all year round (Al Boq 2001). The coastal plain receives less than 200mm of rain per year, while in other locations of the Jizan there are higher levels of rain. This total comprises 100mm during winter, 400mm in spring, 15mm in summer finally 20mm in winter (Fig. 5.1) (Hossam 1998).

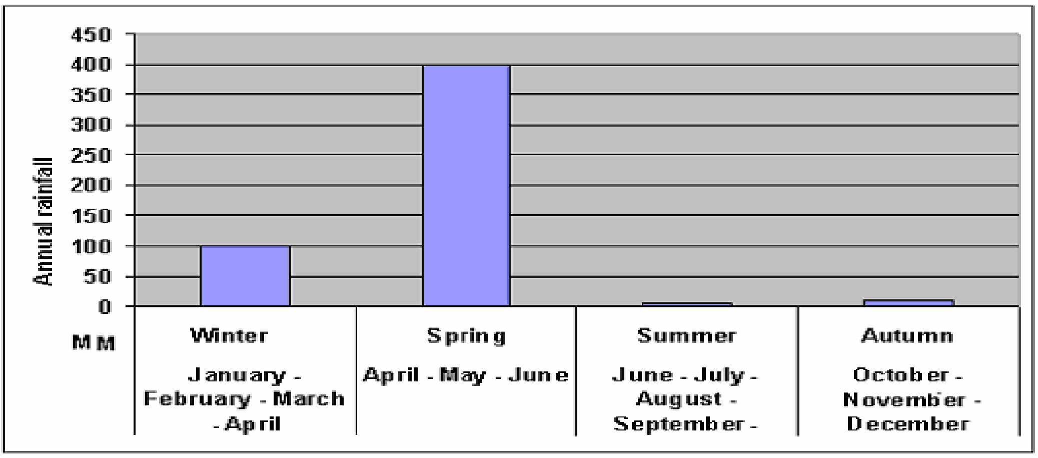


Fig 5.1 Graph showing the annual rainfall (mm) in the Jizan

5.4 HUMAN AND NATURAL ENVIRONMENT

The total area of Jizan is around 12,000 square miles, and it is the most densely populated region of the Kingdom of Saudi Arabia with a total population of around one million according to the 1993 population census. Of these people, about 56,565 live in Jizan city, 35,148 individuals in Abu Areesh, 34,951 in Sabia, 17,697 in Samta and 17,379 in Jizan (Hossam 1998). In addition to its towns and cities, there are many small villages on the coastal plain, agricultural areas, and peaks linked by a network of paved and unpaved roads (Nasser 2003). The inhabitants of Jizan are known for their traditional specializations in fishing, agriculture, goat herding, and handicrafts and is an exporter of sorghum, vegetables, and fruits, such as figs and mangos. The region remains somewhat isolated, due to the topography of the eastern mountains, but it is a fertile contrast to the Tihamah (Othman 1996).

5.5 SURVEY AND EXCAVATION

During the Comprehensive Archaeological Survey of the south west of the Kingdom of Saudi Arabia, the site of Al-Sihi (site271) was discovered in 1981 in addition to a further ten sites, although they were mainly in the northern part of the plain (Zarins et al. 1981). Whilst at Al-Sihi, the team recognised characteristic ceramics and tools of the Neolithic period in addition to several stone structures, some of which may probably be attributed to this era, while others are related to successive and ceramic-using periods (Zarins et al. 1981). When he made these attributions, he was aware that the term ‘Neolithic’ not only referred to practising a certain style of life way but also to a specific period of time which may be dated to the fourth and second millennia BC (Zarins et al. 1980: 21). As noted in Section 1.3.1 the survey of Zone 2, the Jizan, involved the recording of every shell midden and artefact scatter identified on the transect’s course, giving it a number and a GPS reading recorded. All identified archaeological sites were analyzed, described and located using a GPS unit and artefacts were collected. Whilst Al-Sihi (site 271) has already been excavated, it was only necessary to excavate a second site and the site of Al -Majama (site 278) was selected.

5.6 ARCHAEOLOGY SURVEY AND EXCAVATION

As noted above, the Comprehensive Survey of the Kingdom of Saudi Arabia only identified 11 sites when they surveyed Zone 2 in 1981 (Zarins et al. 1981). In contrast, the new survey of 2007 discovered a total of 203 archaeological sites. Rather similar in morphology to those middens of the Farasan Archipelago, most of these sites have marine shells associated with them and many form mounds of substantial size although some appear to be sand dunes with lenses containing ceramics, bone and stone objects. In other places, natural mounds, dunes and hills had a thin cover of artefacts and waste, less commonly this material was stratified with the sand. As in Zone 1, several sites contained decorated and glazed ceramics, related to later phases of occupation in the Islamic period. There are also foundations on some of the archaeological sites and more massive sites include graves executed in a style group similar to those on archaeological mounds contain pre-Islamic ceramics (Table 5.1). The survey also covered a number of large volcanic mountains on the sides of which are volcanic holes vents, which are an important sources of obsidian in the west of the Kingdom of Saudi Arabia. Finally note should be made of a mountain crater lake with castle from the pre-Islamic era (See Appendix 2 table 1). Of the seven prehistoric sites, the biggest were Al-Sihi and Al – Majama (site 278), of which the former was excavated in 2005 and the latter in 2007 (fig 5.10).

Types of site	Prehistoric	Pre-Islamic	Islamic	Shell mounds	Total
Number	**17**	**7**	**27**	**152**	**203**

Table 5.1 Sites identified in the survey of the Jizan coastal plain

Overall, survey of the coastal plain was conducted by the methods of vehicular survey, which although only capable of recognizing the main sites, resulted in significant new discoveries.

The archaeological methodologies adopted for this investigation at Al-Sihi and Almajama included field survey, excavation and post-field analysis. The survey involved walking over the site in straight lines with a 10 metre distance between each line. The major aim of the survey was to collect as much information as possible about the research area and the distribution of artifacts across each site. The survey included a more intensive random sampling, which involved the selection of excavation trenches and squares for surface collection. To access the significance of the sites and its sequence more intensely, the survey made a complete surface collection of several of these squares and test excavations for the remaining the trenches.

Because a vital part of the site's assessment was the collection of representative samples of artefactual and non-artefactual material remains from the surface we were able to use the stratigraphic sequence of the trenches to relate the surface finds to verified archaeological periods The present author laid out the 10 metre grid system, baselines and arbitrary baselines with iron pegs from a pre-existing datum point and bench marks.

The digging method started by collect and isolating the artefacts which include ceramics, lithic tools and shells from the surface then continued digging from spit 1, at 10 cm intervals and sieving and collecting isolate the materials until the base of the sequence was reached.

5.7 EXCAVATION AT AL-SIHI (SITE 271) See fig 5.10

The site of Al-Sihi (site 271) is located in the south west of Saudi Arabia on the Red Sea, 40 kilometres from the Saudi-Yemeni border and 70 kilometres south of Jizan (Zarins 1981). It covers an area of some 250 by 2500 metres and was identified during an archaeological survey of the Red Sea coast, which identified numerous middens of domestic rubbish and shell heaps, of which Al-Sihi is the largest. On account of its size and the large quantities of ceramics on the site, it was excavated by Zarins in 1982 and he recorded that the main characteristics of its ceramics were a red interior, almost orange, colour with a paste mixed with rough sand. The site was dated by Zarins to the second millennium BC, and allocated to the Neolithic period (Zarins et al. 1985). Subsequent field work has indicated that the site is a large shell midden situated on a fossil coquina berm bounded on the north by dunes and the south by the sabkha and shoreline with the shore some 60 metres away. The distance of the site from the current seashore varies between 200 and 25 m and the site follows the embayment of the coast. A sand beach lies at the base of the midden berm and there are extensive mudflats on the shoreline. Over the last 100 years ground water was plentiful and obtained from hand-dug wells (al-Ghamdi 2006). Due to the wealth of artefacts lying on the surface of the site, a number of areas were subjected to intensive surface collecting and excavation, the locations of which are shown in Fig. 5.11.

5.7.1 TRENCH 1

Trench 1 was located to the north of the centre point of the site and measured 2 metres by 2 metres. We excavated the trench in 0.1 metre spits and throughout the sequence, from Spit 1 to Spit 10 (Fig. 5.12), we found a sequence which contained small and abraded shells, fish bones, ceramics, lithic fragments, grinding, sinkers and pounding stones, large numbers of oysters, a stone ring and a fragment of stone (Figs. 5.13). The exposed soil in this area of the site was dark and there was a notable decline in the density of artefacts as the trench became deeper (Fig. 5.14). Spits 11 and 12 were excavated but failed to reveal any cultural material (Fig. 5.15). Further details on the stratigraphy may be found in Al-ghamdi (2006: 32)

Fig 5.2 Graph showing the number of artefacts from Trench 1 at Al-Sihi (site 271)

5.7.2 TRENCH 2

Trench 2 was located to the south of the centre point of the site, where surface materials included stone artefacts, pottery and marine shells (Fig. 5.16). Spit 1 yielded sea shells, oysters, stone tools and pottery, as well as charcoal and shell bones and the excavation continued until Spit 14 where there was a concentration of shell on the eastern side of the trench (Al-ghamdi 2006:33). Artefacts declined in Spit 15 and had disappeared by Site 16, and although a further spit was cut, Spit 17, it yielded only virgin sand (Fig. 5.17).

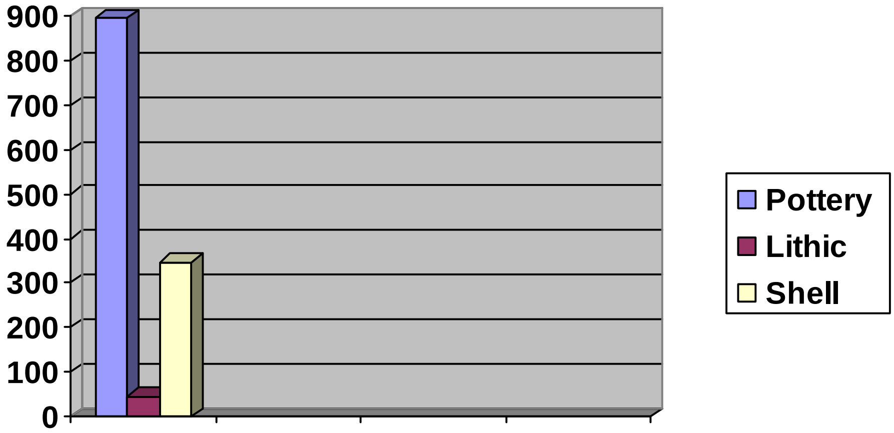


Fig 5.3 Graph showing the number of artefacts from Trench 2 at Al-Sihi (site 271)

5.8 MATERIALS ANALYSIS

5.8.1 CERAMICS

The corpus of ceramics from Al-Sihi is entirely made up of sherds, there being no complete forms. The potsherds collected from the surface represent the latest phase of occupation of the site and much of the material is wind-eroded and sand-blasted. Almost all the potsherds are wheel-made and show clear wheel rotation marks and most are of a red micaceous clay, though small amounts of brown and black wares occur. They have a temper of fine sand or grit but limestone or shell may also have been used and there are no inclusions of organic matter. As most of the sherds have grey or black cores, it may be concluded that firing was inefficient (Tables: 5.1 - 5.6)(Al-ghamdi 2006). The sherds were all weighed and recorded in grams. The sherds can be classified into four main types: one jar (Fig: 5.18) and three bowl forms. (Figs 5.19, 5.20 & 5.21); and most of them had pierced holes at one end. It is difficult to ascertain their function but they could have been used for water collection, to keep food cold, or as some kind of trap. Most of the sherds show red or black slips on the exterior surfaces, the most common colour being red. Decoration includes incised or impressed motifs, predominantly vertical or horizontal bands of incised dashed lines or impressed dots, finger impressed designs, snake-design strips, double sinuous strips, pendant triangles filled with incised lines or impressed dots, punctate designs and plastic ribs with short incised lines (Fig: 5.22) as summarized from Al-ghamdi 2006.

Trench 1	Period	Spit	Rims	Base	Handles	Rim and Handles	Body sherds
1	I	1	630	461	60	120	340
1	I	2	320	0	83	37	356
1	I	3	83	112	64	0	67
1	I	4	22	0	0	0	87
1	I	5	240	83	117	0	301
1	II	6	201	44	86	0	43
1	II	7	94	13	0	0	0
1	II	8	113	18	21	32	66
1	II	9	18	0	0	0	43
1	II	10	0	0	0	0	210
1	II	11	0	0	0	0	67
		Total	1721	691	431	189	1580

Table 5.2: Weight of ceramics from Trench 1, Al-Sihi (site 271) (gms)
(After Al-ghamdi 2006)

Trench 2	Period	Spit	Rims	Base	Handles	Rim and Handles	Body sherds
2	I	1	340	160	83	0	41
2	I	2	280	110	30	0	60
2	I	3	331	210	0	25	170
2	I	4	211	132	44	0	49
2	II	5	124	65	0	0	98
2	II	6	111	88	43	0	44
2	II	7	46	62	43	0	86
2	II	8	234	111	96	0	44
2	II	9	340	211	93	0	77
2	II	10	304	80	0	0	86
2	III	11	201	113	0	0	133
2	III	12	176	76	0	0	201
2	III	13	173	88	93	0	107
2	III	14	80	67	0	0	104
2	III	15	48	0	0	0	171
2	III	16	130	0	0	0	97
		Total	3002	1559	516	25	1568

Table 5.3: Weight of ceramics from Trench 2, Al-Sihi(site 271) (gms)
(After Al-ghamdi 2006)

Square	Period	S.C	Rims	Base	Handles	Rim and Handles	Body sherds
3	I	S.C	341	112	87	109	210
4	I	S.C	210	130	01	0	131
5	I	S.C	173	74	0	0	53
6	I	S.C	249	113	210	0	167
7	I	S.C	430	131	33	0	82

Table 5.4: Weight of ceramics from the surface collection at Al-Sihi(site 271) (gms)
(After Al-ghamdi 2006)

Spit	Period	Bowl A	Bowl B	Bowl C	Jar
1	I	23	44	35	47
2	I	34	32	37	57
3	I	41	24	51	73
4	I	0	0	0	77
5	I	0	0	43	57
6	II	33	51	62	41
7	II	24	0	0	0
8	II	34	57	0	21
9	II	35	0	0	0
10	II	37	32	46	78
11	II	0	0	0	0
Total		261	240	284	441

Table 5.5: Bowl and jar forms in Trench 1 (gms)Al-Sihi (site 271)
(After Al-ghamdi 2006)

Spit	Period	Bowl A	Bowl B	Bowl C	Jar
1	I	34	0	75	113
2	I	67	42	51	144
3	I	45	73	24	95
4	I	25	31	0	74
5	I	95	0	66	131
6	II	64	71	33	81
7	II	35	25	41	20
8	II	75	48	82	98
9	II	33	54	76	131
10	II	41	34	49	72
11	III	63	81	45	76
12	III	35	54	61	93
13	III	12	43	32	45
14	III	33	21	0	0
15	III	0	0	0	0
16	III	0	0	0	0
Total		657	577	684	1137

Table 5.6: Bowl and jar forms in Trench 2 Al-Sihi (site 271) (gms)
(After Al-ghamdi 2006)

Square	Period	Bowl A	Bowl B	Bowl C	Jar
1	I	35	47	34	76
2	I	65	57	76	68
3	I	45	37	87	98
4	I	45	64	63	34
5	I	56	48	65	88

Table 5.7: Bowl and jar forms in surface collection Al-Sihi(site 271) (gms)
(After Al-ghamdi 2006)

5.8.2 LITHIC ARTEFACTS

Worked stone was rarely found at Al-Sihi and was of poor quality and it may be suggested that the inhabitants did not rely on the manufacture of stone tools as theirs was a fishing-based economy. The few flaked artefacts that were found were made of obsidian, and fragments included a few core fragments, flakes and retouched tools. All finished tools were made from secondary flakes and were of poor quality, probably due to the workmanship rather than the availability of raw materials. The absence of harpoons, spears and hooks suggests that fish were caught in nets and traps. Net sinkers were found, the largest one made of sandstone, perforated to allow a line to be attached. A few ground polished stone artefacts made of sandstone were recovered. They include fragments of grinding stone and of querns, grounders and pounders. It is possible that the pounders were used for processing fish (Al ghamdi, 2006). The key types of artefacts are sinkers (Figs: 5.23 - 5.19), grinders (Figs: 5.24 & 5.25), hammers (Figs: 5.26 & 5.27).

Trench	Period	L grinders	Weight	U grinders	Weight	Hammers	Weight
Trench 1	I	0	0	0	0	0	0
Spit 1	I	3	1232	1	98	0	0
Spit 2	I	0	0	0	0	0	0
Total		3	1232	1	98	0	0

Table 5.8: Grinders and Hammer stones in Trench 1 Al-Sihi(site 271) (gms)
(After From Al-ghamdi 2006)

Trench	Period	L grinders	Weight	U grinders	Weight	Hammers	Weight
Trench2 Spit1	I	0	0	2	1354	1	453
Sq3	I	1	156	3	1232	3	1243
Sq4	I	2	210	0	0	5	2143
Sq5	I	2	324	1	213	0	0
Sq6	I	1	256	2	323	0	0
Sq7	I	0	0	1	237	0	0
Total		6	946	9	3359	9	3839

Table 5.9: Grinders and Hammer stones in Trench 2 and survey Al-Sihi (site 271) (gms) (After Al-ghamdi 2006)

Trench	Period	Sinkers	Weight	Others	Weight
Trench 1					
Spit 1	I	1	98	4	343
Spit 2	0	0	0	0	0
Spit 3	0	0	0	0	0
Total		1	98	4	343

Table 5.10: Sinkers and others weights in Trench 1 Al-Sihi (gms) (After Al-ghamdi 2006)

Trench	Period	Sinkers	Weight	Others	Weight
Trench 2	0	0	0	0	0
Spit 1	I	2	354	3	204
Total		2	354	3	204

Table 5.11: Sinkers and others weights in Trench 2 Al-Sihi(site 271) (gms) (After Al-ghamdi 2006)

Trench	Period	Sinkers	Weight	Others	Weight
Sq 3	I	1	193	5	564
Sq 4	I	0	0	2	67
Sq 5	I	2	342	4	238
Sq 6	II	1	69	3	161
Sq 7	II	1	122	3	98
Total		5	726	17	1128

Table 5.12: Sinkers and others weights in surface survey Al-Sihi (site 271) (gms) (After Al-ghamdi 2006)

5.8.3 FAUNAL REMAINS

The site yielded large quantities of shells; molluscs make up the highest proportion and appear to have been used for food. and The shells can be divided into four types: *Bursidae, Stombidae, Fasciolaria trapezium* and *Thais mancienell* which live at depths of between 5 and 10m (Fig: 5.28 to 5.33) and further details are to be found in Al-ghamdi (2006: 46).

5.8.4 FLORA

There is no evidence of macroflora and no reason to assume that the inhabitants of Al-Sihi practised agriculture.

Spit	Period	*Bursidae*	*Stombidae*	*Fasciolaria*	*Thais mancienell*
1	I	18	20	15	20
2	I	0	0	19	10
3	I	0	14	10	30
4	I	0	10	0	0
5	I	20	0	10	0
6	II	0	0	0	0
7	II	31	9	9	0
8	II	0	0	0	0
9	II	0	0	0	0
10	II	0	0	0	0
11	III	0	0	0	0
12	III	0	0	0	0
13	III	0	0	0	0
14	III	0	0	0	0
15	III	0	0	0	0
16	III	0	0	0	0
Total		69	53	63	60

Table 5.13: Shells in Trench 1 Al-Sihi (site 271) (gms) (After Al-ghamdi 2006)

Sq S.C	Period	*Bursidae*	*Stombidae*	*Fasciolaria*	*Thais mancienell*
3	I	10	6	0	20
4	I	50	34	0	0
5	I	20	67	39	13
6	I	0	88	32	0
7	I	91	69	10	0
Total		١٧١	٢٦٤	60	33

Table 5.14: Shells in Trench 2 Al-Sihi (site 271) (gms) (After Al-ghamdi 2006)

Spit	Period	*Bursidae*	*Stombidae*	*Fasciolaria*	*Thais mancienell*
1	I	20	30	17	13
2	I	9	10	11	20
3	I	0	0	0	20
4	I	0	0	0	0
5	I	20	14	15	13
6	II	0	0	0	0
7	II	21	0	10	0
8	II	0	0	0	0
9	II	0	0	0	0
10	II	0	0	0	0
11	II	0	0	0	0
Total		70	54	53	66

Table 5.15: Shells in surface collection Al-Sihi(site 271) (gms) (After Al-ghamdi 2006)

5.9 AL -MAJAMA (SITE 278)

The site of Al-Majama (site 278) lies to the south of Jizan, 15 kilometres in land from the Red Sea coast, and covers an area of about 200 by 200 metres. It is a very large site and the artefacts are not concentrated in one place but are scattered everywhere. In addition, the scatter covers a number of high sand dunes - the height of some of which is about 2 metres. The artefacts are distributed throughout the site, some of them are covered with sand and the others are on the surface and these range from slag or fragments of furnaces for firing pottery, as wasters were found inside them as well as a number of failed firings. The latter are particularly clustered on the northern side. An area, some six kilometres from Al-Majama village, was selected for excavation as there was clear surface evidence of prehistoric occupation with scatters of obsidian arrowheads, big stone tools, grinders, ceramic and a few shells. The centre of the site was selected for Trench 1, with an area of 5 x 5 metres; with Trench 2 30 metres away but also with an area of 5 x 5 metres. Square 3 was then chosen 30 metres from the southern side, and finally Square 4 was chosen with a distance of 50 metres from Trench1 in the north. As with the other excavations, all surface features and artefacts in the area of the trench were registered and collected, and were followed by excavation in 0.1m spits (Fig 5.34). It is interesting to noted that despite being no more than 15 kilometres from the sea, there were no shell or fish bones recovered from either the excavations or surface collection.

5.9.1 TRENCH 1

As noted in Section 5.11, the centre of the site was selected for the location of Trench 1 and its surface yielded large numbers of stones and a small amount of ceramics (Fig. 5.35). Digging was began with Spit 1, and we recorded a small number of finds, mainly bones and some human teeth (Fig. 5.36). Work in Trench 1 continued with Spit 2 which was dug to a depth of 20 centimetres, and finds were relatively few compared with Spit 1 (Fig. 5.37). These included bones, ceramics, and stone tools. After that, Spit 3 was dug to a depth of 30 centimetres with a small number of finds noticed (Fig. 5.38). However, in the south-west corner of the square a large number of charcoal fragments were found, and a sample taken from them. There were no further finds, and an experimental trench was dug at a distance of half a metre to the west of Trench 1. This lay on the western side of Trench 1, and contained small pieces and fragments of stone debitage, which are thought to indicate a location for the manufacture of stone tools. Excavation of the trench continued to a depth of 0.50 metres (Fig. 5.39) and a few stone tools, ceramics, and human bones were recovered before the excavation stopped at 1 metre (Figs. 5.40). Two ceramic furnaces or kilns were identified at a distance of 10 metres from the Trench.

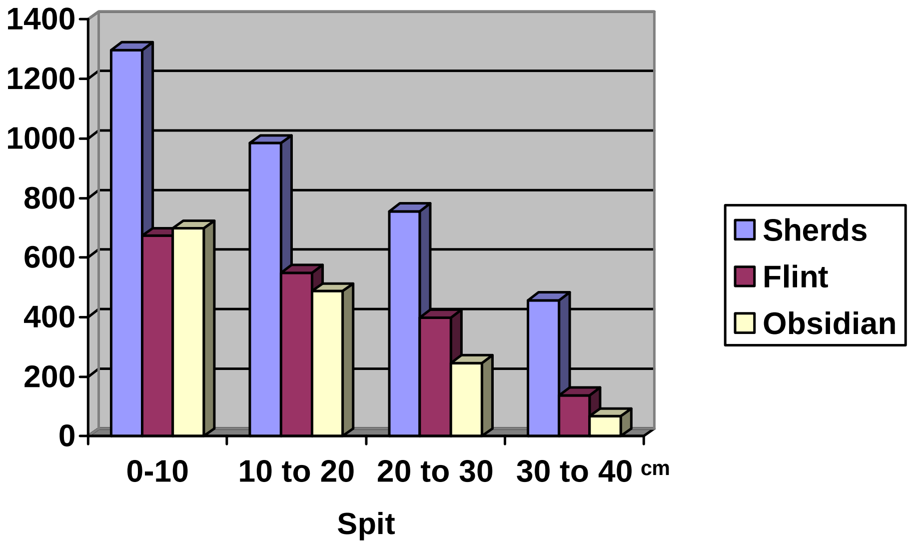


Fig. 5.4: Graph showing the number of artefacts at Trench 1, Al-Majama (site 278)

5.9.2 TRENCH 2

Trench 2 measured an area of 5 x 5 metres and was found to contain a large number of stone tools and ceramics (Fig. 5.41). The surface collections yielded ceramic, stone tools, quartz, obsidian, arrowheads and human bones. Then, digging Spit 1 to a depth of 10 centimetres yielded numerous stone tools and ceramics (Fig. 5.42). The process of digging continued in Spit 2 to a depth of 20 centimetres, with fewer finds (Fig. 5.43). Excavation continued in Spit 3 to a depth of 30 centimetres (Fig. 5.44) and a number of small fragments of arrowheads were recovered (Fig. 5.45). Excavation continued to a depth of one metre but as no further cultural material was recovered, the process of excavation was terminated (Fig. 5.46).

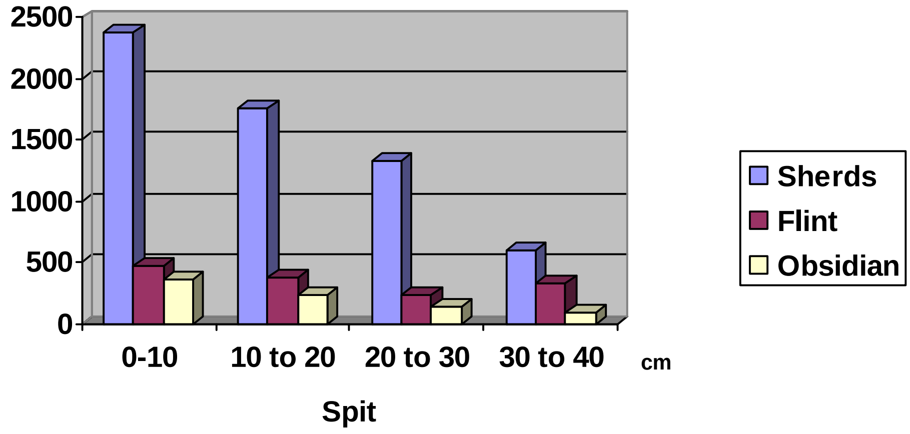


Fig. 5.5: Graph showing the number of artefacts at Trench 2, Al-Majama (site 278)

5.9.3 SQUARE 3 SURFACE COLLECTION

In addition to the two trenches, Square 3 was laid out to the south of Trench 1 at a distance of 30 metres. Measuring 5 by 5 metres, recorded artefacts included stone tools, ceramics, human bones, and quartz (Fig. 5.47). As in the excavation, there were significantly more ceramics than lithics .

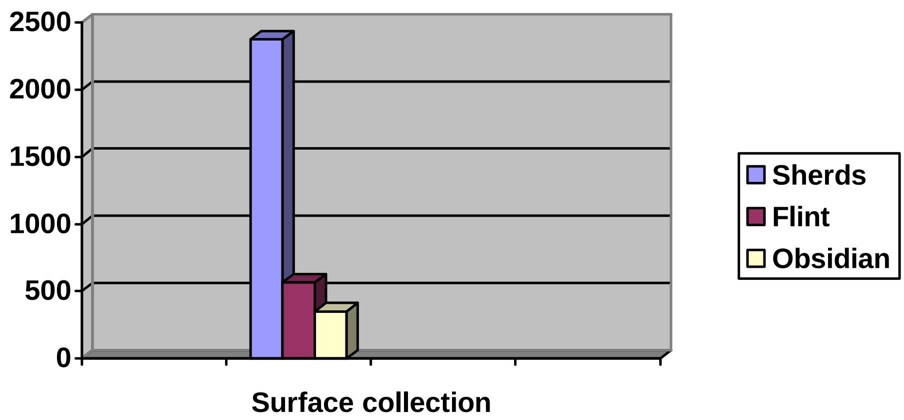


Fig. 5.6 Graph showing the number of artefacts in Square 3, Al-Majama (site 278)

5.9.4 SQUARE 4 SURFACE COLLECTION

Square number 4 was selected because of the considerable variation in surface artefacts and was located 50 metres from Trench 1, to the north-east. Its area of 5 by 12 metres yielded a large number of ceramics and fragments of stone tools (Fig. 5.48). Fired clay and charcoal was recovered from an area of 2 by 3 metres within the square, including, a scattering ceramic slag with various colours of red, gray, black, brown. Some of the material appears to have been burned, others have not, and they are of different sizes.

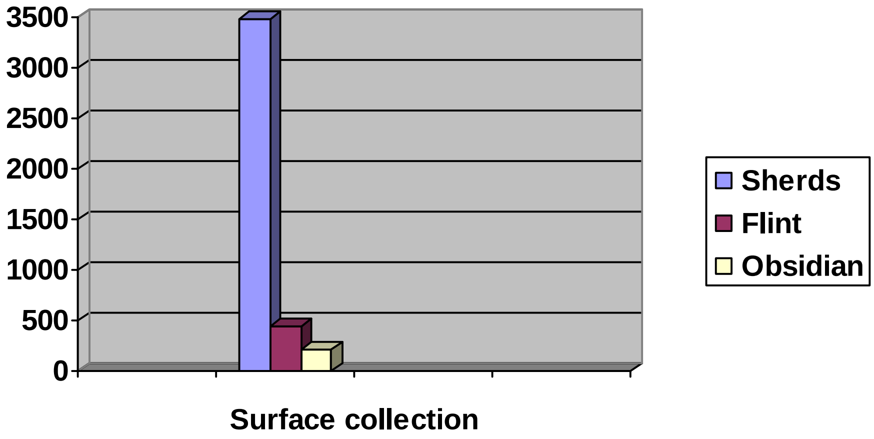


Fig 5.7: Graph showing the number of artefacts at Square 4, Al-Majama (site 278)

5.10 MATERIALS ANALYSIS

This section introduces the artefact categories of ceramics and stone tools from Al-Majama. It considers their distribution within the site, as well as the chronological sequence of trenches I and II. This evidence, when combined, allows us to begin to understand the economic and subsistence organisation of the site and begin to formulate models for its links with other settlements, as well as to make suggestions as to its age.

5.10.1 LITHIC ARTEFACTS

First isolating artefacts from non-artefacts, each object was numbered and photographed before analysis. As noted previously, lithic artefacts were distinguished by their intentional flaking, however those flakes include core fragments, flakes and/or blades, tools, retouched blades or flakes. However, consideration must also be given to raw materials, technology and function. From the surface, and the tested units of the site, a significant amount of stone artefacts were collected, including chipped artefacts such as cores, debitage and finished tools, arrowheads, axes and ground stone. Some un-worked stone and weathered pieces were also recovered by mistake, but these were later excluded from the analysis. The soil was also sieved to ensure that debitage, if present, was also recovered. The raw materials utilized included flint, obsidian, granite, sedimentary rocks, igneous rocks, quartz, and metamorphic minerals. These were distributed among the units with or without clear difference in occurrence. Retouched tools recovered included arrow heads, axes, blades and retouched flakes and the majority of the retouched tools were arrowheads, including tanged and un-tanged. The raw material was worked into flakes and blades and several cores and core fragments were recovered. Near the area of the study there are numerous volcanoes and volcanic rocks, distributed in the central and north of Jizan over wide areas. Because of the availability of obsidian in these volcanic areas, it was easy for the inhabitants of this area to take advantage of the abundance of obsidian and use it in making their tools, without the need to import material from other locations. The resource of the obsidian and flint rocks, and other types of the rocks found in the location, lies approximately 15 kilometres east of Al-Majama.

As noted above, the finished tools were mostly arrowheads, ranging in size and shape. Some were tanged, others were not but pressure flaking was common. Most of the arrowheads were complete, but a few were broken and some unfinished. Most were made on blades and among the tool kits were blades, backed flakes, axes, scrapers - including large and small and some thumb scrapers, and spearheads. Tools include four Palaeolithic axes (Fig. 5.49), 14 fluted bifacial arrowheads (Fig. 5.50), 10 bifacial arrowheads (Fig. 5.51), 15 projectile points (Fig. 5.52), 18 arrowheads fluted from point (Fig. 5.53), 14 bifacial projectile points (Fig. 5.54), 13 bifacial fragments (Fig. 5.55), 9 circular scrapers (Fig. 5.56), 5 blades (Fig. 5.57), 3 awls (Fig. 5.58) and 7 side scrapers (Fig. 5.59).

5.10.2 GROUND STONE OBJECTS

The 27 ground stone artefacts recovered from the site were found mainly in Trenches 1 and 2. Most are complete and are oval or egg-shaped pestles, measuring between 3 and 11 centimetres in length. The raw material used was sandstone and the general lithic tool kit points to a community whose economy was based on hunting wild animals with some gathering of plant foods (Fig. 5.60).

5.10.3 CERAMICS

The methodology applied for collecting ceramics from the sites considered in this thesis is the same as that applied for the rest of the material from the other zones of the study. In each case, the collection was sorted into rims, bases, and body sherds, in addition to ceramic forms, rims and bases, raw material, temper, surface treatment and decoration were considered. Although the site consisted of stratified deposits only 1 m deep, a total of 5400 potsherds were collected from the tested units belonging to three stratigraphic levels. The ceramics from each level were kept separate, and the collections from the surface were also separated. After washing, a few sherds were excluded either because they were too small or because they were too highly weathered for classification. General observations show that there was little diversity in the clay or the temper in the sherds from all levels, and that there was no change in raw material throughout the levels. The raw material utilized was silty clay, probably sourced from near the site and tempered with sand. The vessels were smoothed on both surfaces, and some were even burnished. Few were glazed, and they seemed to be imported or of a later date. The vessels appear to have been formed by coiling, as can be seen from the coiling lines. In cross-section the colour varies from brown to gray with cores sometimes of black to gray. The corpus includes a number of bases, rims and handles but the majority were body sherds, averaging in size from small to large and with walls ranging from thin to thick. The vessels were well-fired, as can be seen from the cores when broken. A high percentage of sherds were undecorated, and the few that had been decorated used a variety of techniques, such as impressing and combing. This resulted in a number of motifs, such as lines and bands. The decoration is limited, although a few sherds were decorated in grooved straight lines, sometimes made in geometric designs, such as a punctuate series of dots or small pricks incision (Fig. 5.61). As the collection is only made of broken sherds, it is rather difficult to comment on their functions. Core diagnostic forms are discussed below.

5.10.3.1 BOWLS

The types of bowls recovered may be divided in to three types. Type 1 vessels, with rounded bases, constitute the largest category and they are distinguishable by having solid, horizontal lug handles and ledge handles (Fig. 5.62). Type 2 are low bowls with rounded bases and out-curved necks and rolled rims (Fig. 5.63) and Type 3 are open bowls with pierced decoration and thin walls, whose base then continues into a small stand (Fig. 5.64).

5.10.3.2 JARS

Jars were the most common forms in the sample of potsherds under study and included examples with ring bases, and either closed forms with sloping short necks and globular bodies or open and closed jars with vertical lips (Fig. 5.65).

5.10.3.3 CUPS

There were few cups and these had either rounded or perforated rounded bases (Fig. 5.66).

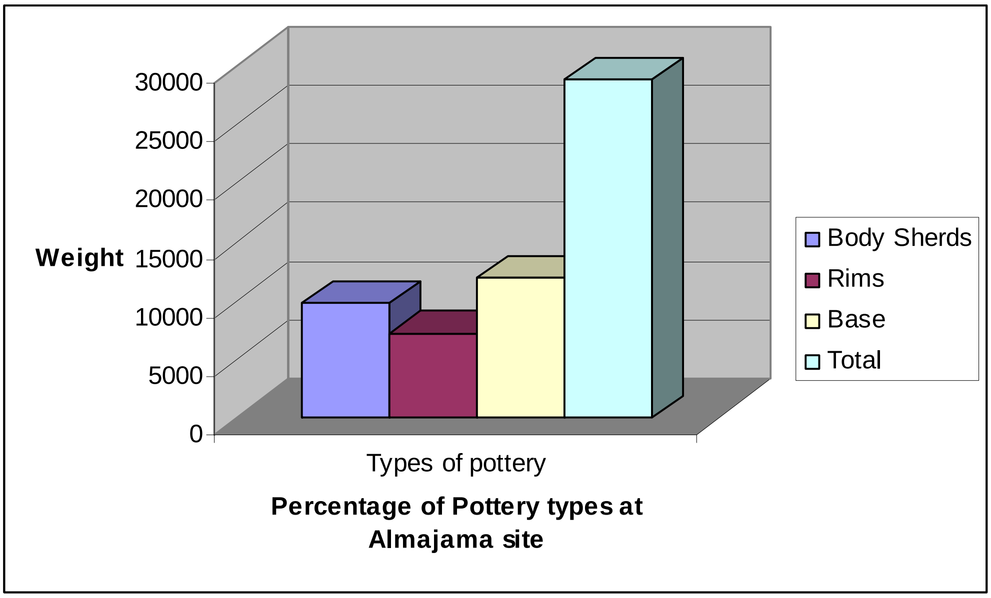


Fig 5.8 Weight of Ceramic Forms (gms) from Al-Majama(site278)

5.11 CONCLUSION

These two new sets of fieldwork data now allow us to start to characterise the nature and date of the Neolithic sites of the Jizan plain. It is clear that the first site investigated, Al-Sihi, was a coastal fishing site consisting of a large shell midden covered by shell, fishbone and potsherds. Artefacts and faunal remains vary in concentration from one area to another and there were few flaked tools but many objects of ground stone, perhaps used in the shellfish processing. The ceramics from Sihi were predominantly wheel-made, but poorly fired of red micaceous ware; the main forms were jars and bowls. Although the lower levels are attributed to the late Neolithic, the levels dominated by wheel-made ceramics post-date the Neolithic, being either late second millennium BC or somewhat later.

Much of the site is attributed to the late Neolithic and the ceramics found at Al-Sihi represent a unique corpus in the Kingdom of Saudi Arabia, which has only been recorded before in small amounts at two sites near Ras Tarfa on the Red Sea coast. It appears that the Al-Sihi ceramic tradition is a coastal one and that the material is most often found on beach shell middens. It has been noted that it also has a generic resemblance to several groups of second millennium BC ceramics in north-east Africa or to pre-Axumite materials in Ethiopia and that this site may represent ~~is~~ a link between Arabia and Africa (Zarins 1981). However, no specific parallels were noted in the ceramics excavated as part of this project. The earliest ceramics from Al-Sihi can be dated to the third millennium B.C and the site seems to have been fully developed at that time, but they are of unclear origin and uncertain connection with inland Neolithic sites. Analysis of the material found at Al-Sihi has provided new data relating to the site's environmental, economic and chronological context. There is evidence of shellfish gathering and fishing, and ovoid and sub-rectangular crushing platforms were probably used, together with hammer stones, to open shellfish. Net sinkers were found but there were few worked lithic tools. The ceramic vessels were probably used for cooking, water storage and cooling. Stone, rather than metal tools, suggests that much of the site of Al-Sihi has correctly been attributed to the Neolithic and represents the remains of communities who moved seasonally between the coast for fishing during the winter, and inland for grazing during the summer (Al-ghamdi 2006). Certainly, the evidence so far suggests that the economy of Al-Sihi was focused on collecting produce from the sea rather than on domesticated or hunted species.

In parallel, the site of Al-Majama also appears to have no clear levels or settlement layers, despite having deposits to a depth of 1.50 metres, with artefacts concentrated mainly on the surface. Again, as with Al-Sihi, there was no indication of building foundations which suggests that the site was more of a seasonally occupied settlement. In terms of artefacts, Al-Majama's ceramics are locally made, and there is abundant manufacturing slag; the clay source is from different locations in the site, which contained some kinds of sand suitable for use as temper. Concluding that the ceramics from Al-Majamah are similar to those from Al-Sihi, the Farasan Islands and at Subr on the Aden-Lahej Road along the Hadrami coast, east of Aden (Zarins et al., 1981: 27), one might initially attribute Zarins' earlier chronology for such an assemblage of between 2550 and 1500 BC (Zarins et al., 1985: 50). However, Al -Majama appears to be a much earlier site as Spit 3 yielded three arrowheads alongside charcoal with radiocarbon measurement to 9730±60 BP (See table 5.16).

Indeed, the stratigraphy of the site appears to be consistent with at least two major levels. The early date of 9730 + 60 BP appears to represent an early phase of Neolithic occupation, whilst the large amount of pottery and kilns are clearly from a later phase of the site. The high ratio of obsidian to flint, thirty-four to forty-four percent, suggests a local obsidian source, which is supported by the presence of volcanoes in the region which are suppliers of the raw material. In conclusion, the new fieldwork has demonstrated the presence of a much earlier phase of Neolithic occupation, one consistent with seasonal or temporary camping and hunting, and a later phase more closely attributable to the occupation at Al-Sihi and the sites on the Farasan Islands. The following chapter will introduce the results of the fieldwork in the Zone 3 of the study, the Tihama mountains.

Lab No.	Provenance	Sample Material	Conventional Radiocarbon age BP	Cal BC
Beta-255383	Al-Majama Spit 3 30cm	Charcoal	9730±60	9220

Table 5.16 New radiocarbon measurement from Al-Majama (site 278) Spit 3 .30cm

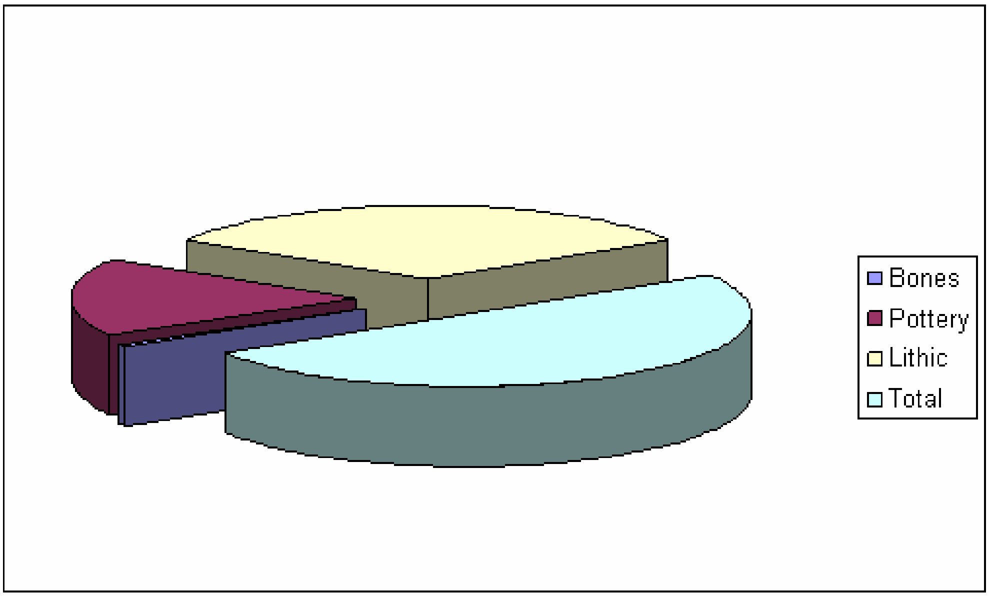


Fig 5.9: Pie Chart showing artefact percentages at Al-Majama (site278)

Fig. 5.10 Map showing archaeological sites of the Jizan plain (After Archaeology Deputy Riyadh)

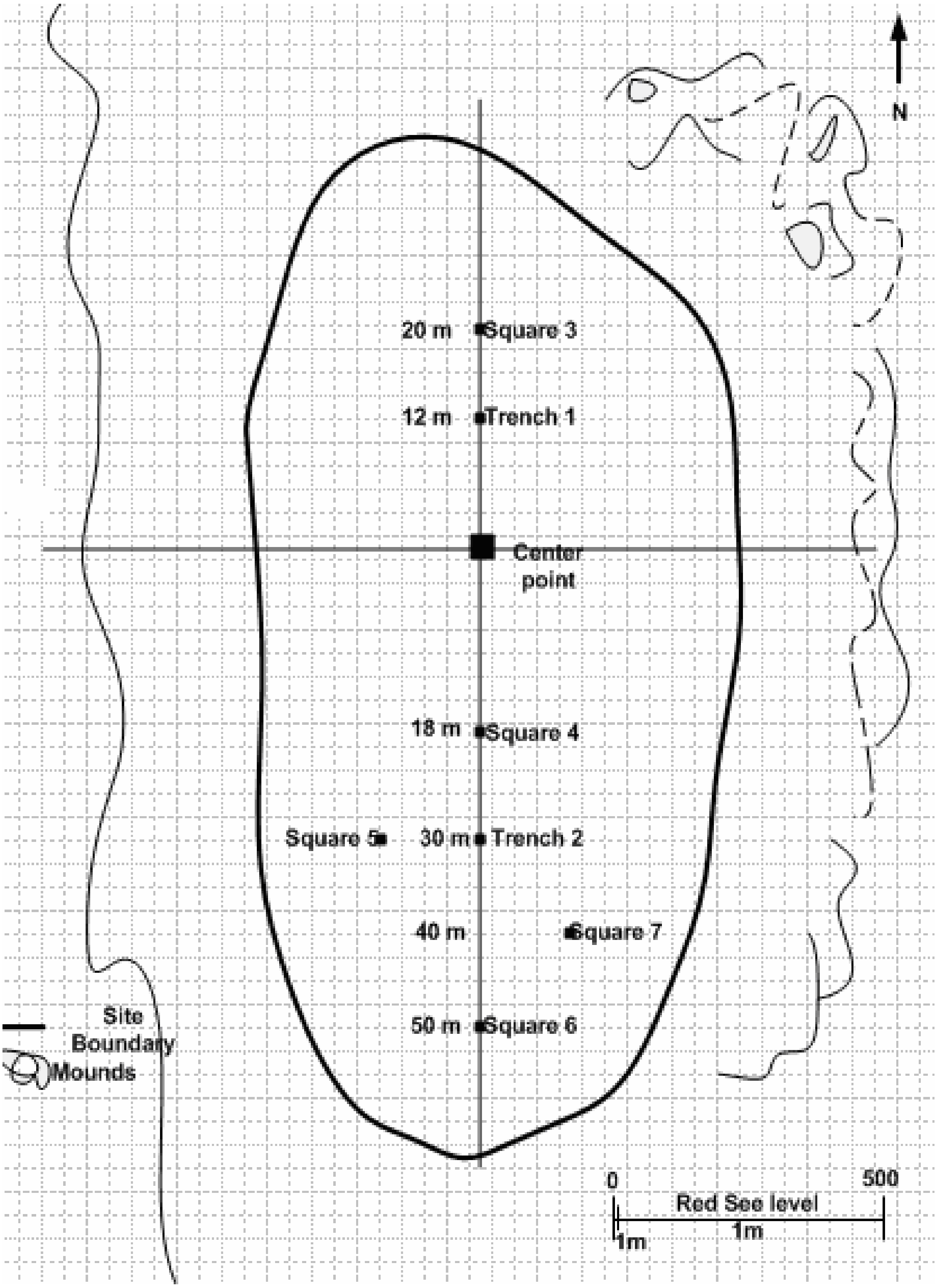


Figure 5.11: Plan of the site of Al-Sihi (site271) showing the distribution of trenches and sample squares. (After Al-ghamdi 2006)

Figure 5.12: Trench 1, spit 1, Al-Sihi (site271) photo by Alghamdi

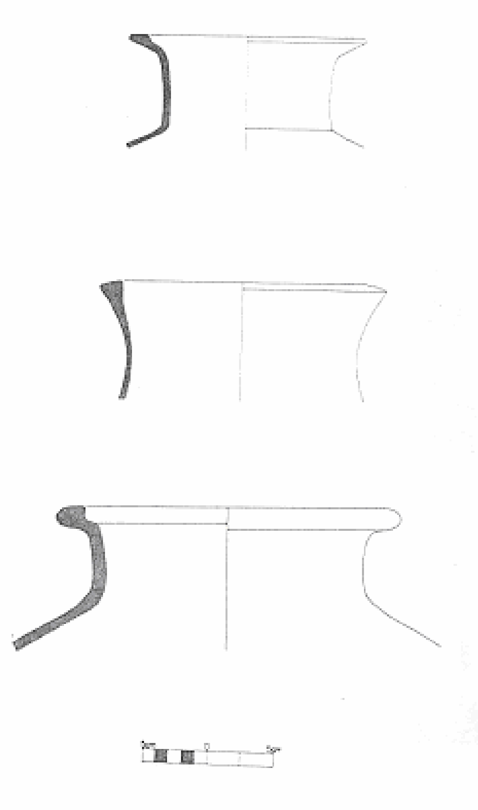
Figure 5.13: Trench 1, spit, 5 Al-Sihi (site271) photo by Alghamdi

Figure 5.14: Trench 1, spit 8, Al-Sihi (site 271) photo by Alghamdi

Figure 5.15: Trench 1, spit 10, Al-Sihi (site 271) photo by Alghamdi

Figure 5.16: Trench 2, spit 2**,** Al-Sihi (site 271) photo by Alghamdi

Figure 5.17: Trench 2, spit 8, Al-Sihi (site 271) photo by Alghamdi



Figures 5.18: Jars . Al-Sihi (site 271) Drawn by Ali

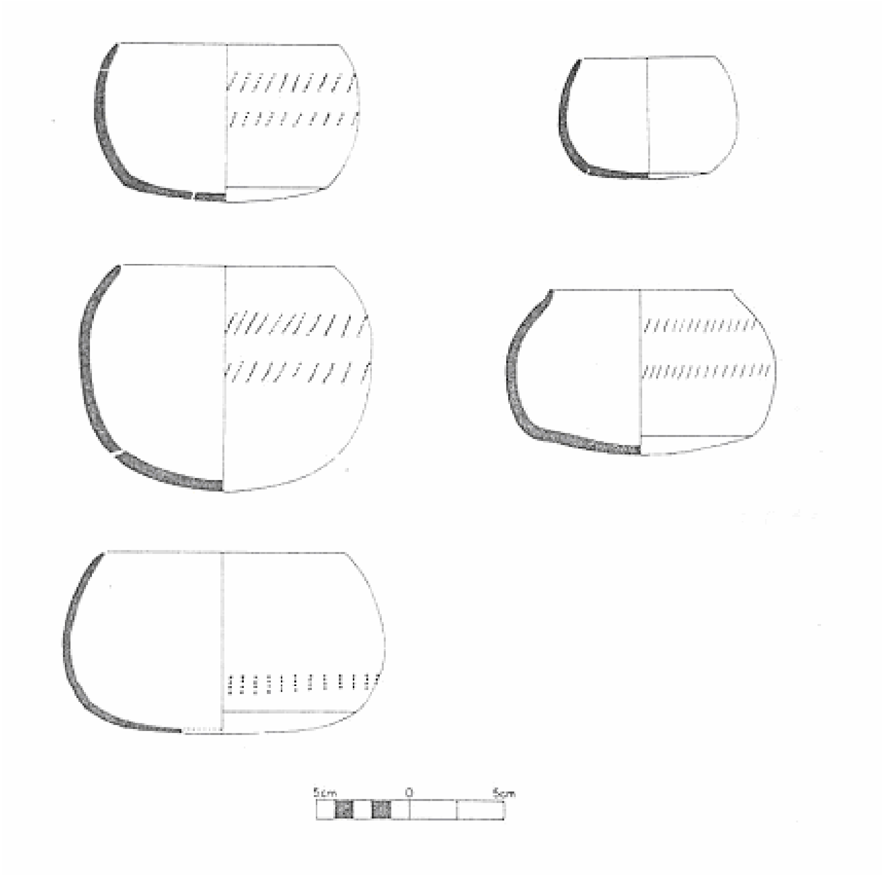


Figure 5.19: Bowls Form A . Al-Sihi (site 271) Drawn by Ali

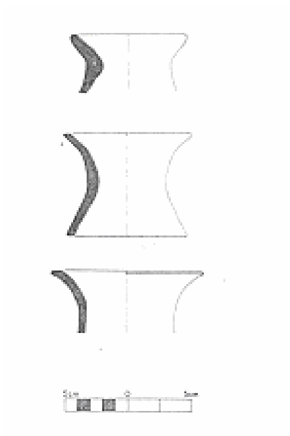


Figure 5.20: Bowls Form B Al-Sihi (site 271) Drawn by Ali

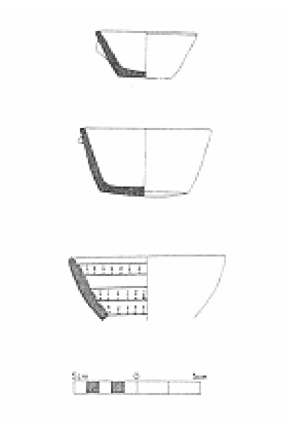
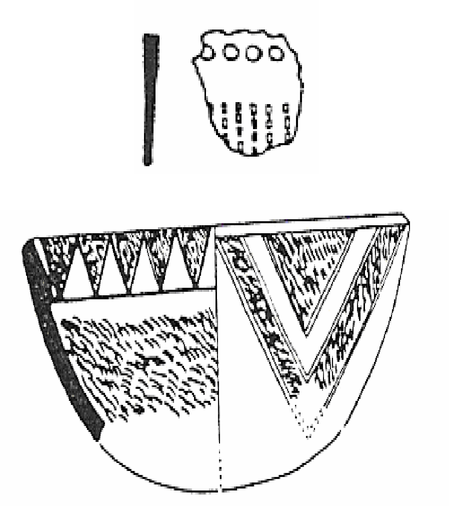


Figure 5.21: Bowls Form C Al-Sihi (site 271) Drawn by Ali



Figures 5.22: Decoration .Al-Sihi (site 271) Drawn by Ali

Figure 5.23 Stone tools sinker, Trench 1, spit1, Al-Sihi (site 271) photo by Alghamdi

Figure 5.24 Sinker,Trench 1, spit 1, Al-Sihi (site 271) photo by Alghamdi

Figure 5.25 Stone tools sinker,

Trench 1, spit 3, Al-Sihi (site 271)

photo by Alghamdi

Figure 5.26 Stone tools grinder,

Trench 2, spit 2, Al-Sihi (site271)

photo by Alghamdi

Figure 5.27 Stone tools grinder, Trench 2, spit 3, Al-Sihi (site271)

photo by Alghamdi

Figure 5.28 :Stone tools hammer, Trench 1, spit1, Al-Sihi (site271) photo by Alghamdi

Figure 5.29:Stone tools hammer, Trench 2, spit 2, Al-Sihi (site271) photo by Alghamdi

Figure 5.30: *Bursidae* , Trench 1, spit 1, Al-Sihi (site271) photo by Alghamdi

Figure 5.31 *Stombidae*:, Trench 2, spit 1, Al-Sihi (site271) photo by Alghamdi

Figure 5.32 : *Fasciolaria*, Trench 2, spit1, Al-Sihi (site271)
photo by Alghamdi

Figure 5.33: Thais *mancienell*, Trench 2, spit1,Al-Sihi(site271)
photo by Alghamdi

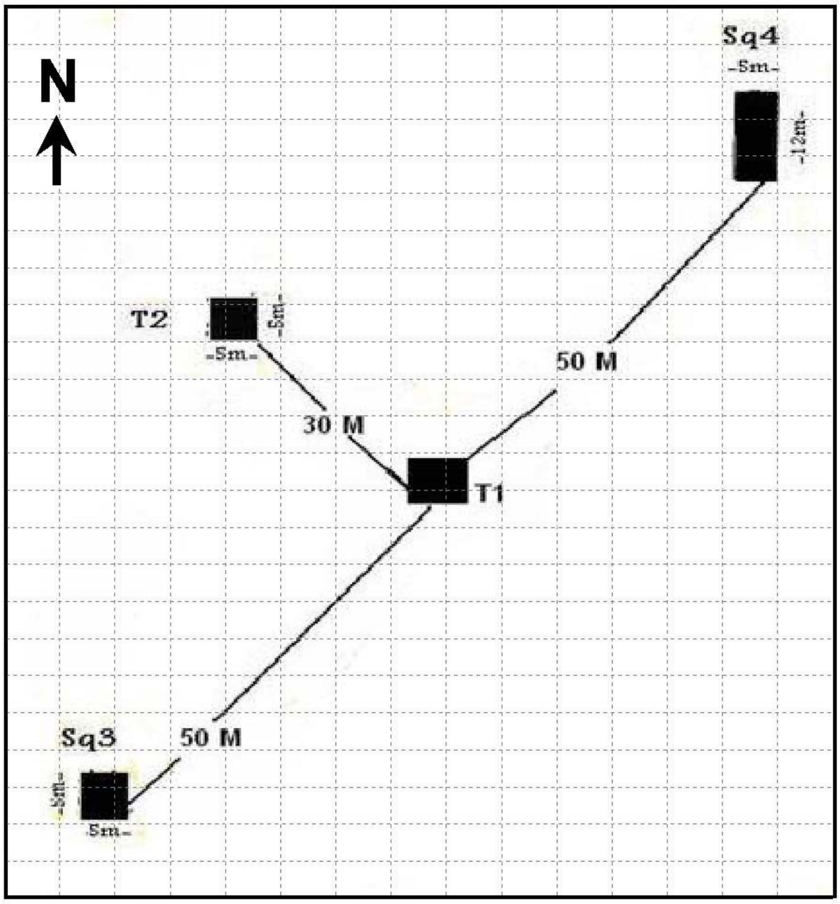


Fig 5.34 The layout of excavated trenches at Al-Majama (site278)

Figure 5.35 Trench 1**,**spit1, Al-Majama (site278) photo by Alghamdi

Figure 5.36 Trench 1, spit1, Al-Majama (site278) photo by Alghamdi

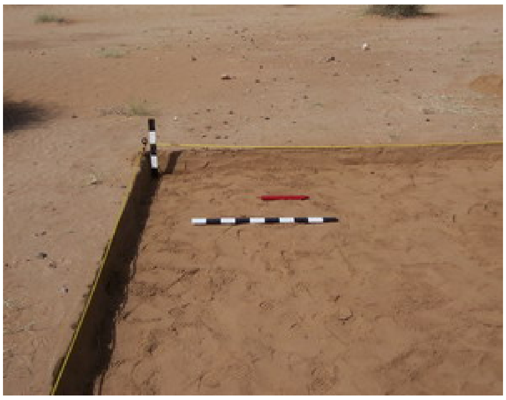


Figure 5.37 Trench 1,spit 1, Al-Majama (site278) photo by Alghamdi

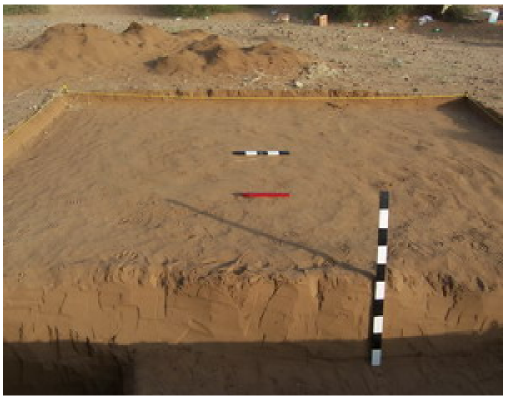


Figure 5.38 Trench 1, Spit 5, Al-Majama (site278) photo by Alghamdi

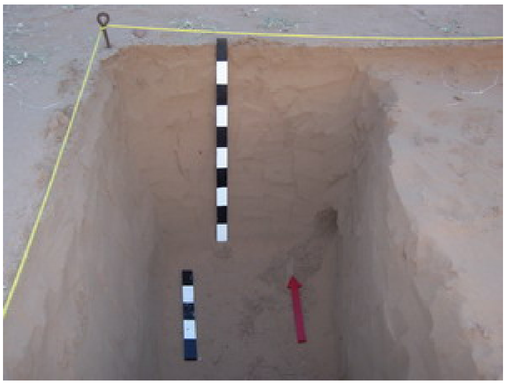


Figure 5.39 Trench 1, spit 10 (1m), Al-majama (site278) photo by Alghamdi

Figure 5.40 Trench 1,section, Al-Majama(site278) photo by Alghamdi

Figure 5.41 Trench 2,Al-Majama (site278) photo by Alghamdi

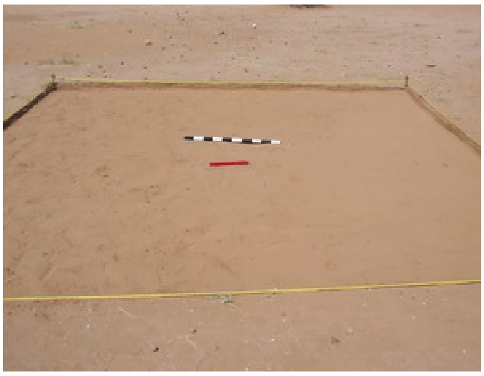


Figure 5.42 Trench 2, spit 2,Al-Majama (site278) photo by Alghamdi

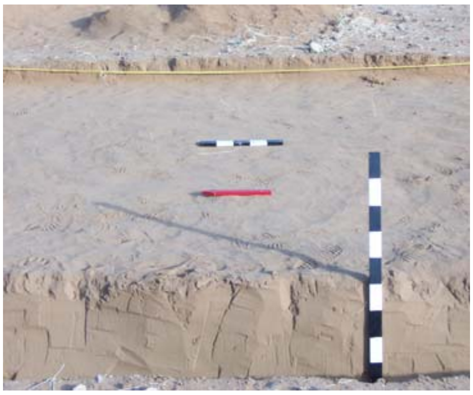


Figure 5.43 Trench 2, spit 4,Al-mjama (site278) photo by Alghamdi

Figure 5.44 Trench 2, spit 7, Al-Majama (site278) photo by Alghamdi

Figure 5.45 Trench 2, spit 10,Al-Majama (site278) photo by Alghamdi

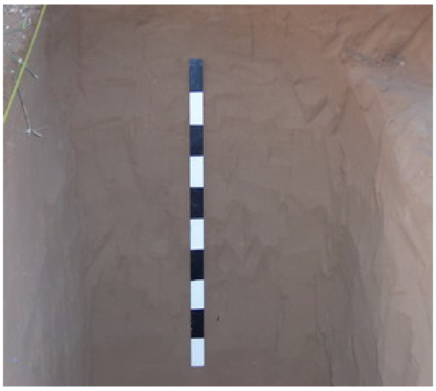


Figure 5.46 Trench 2, Section, Al-Majama (site278) photo by Alghamdi

Figure 5.47 Square 3, Surface Collection, Al-Majama (site278)
photo by Alghamdi

Figure 5.48 Square 4, Surface Collection, Al-Majama (site278)
photo by Alghamdi

Figure 5.49 Palaeolithic Axes. Surface Collection, Trench 1, Al-Majama (site278) photo by Alghamdi

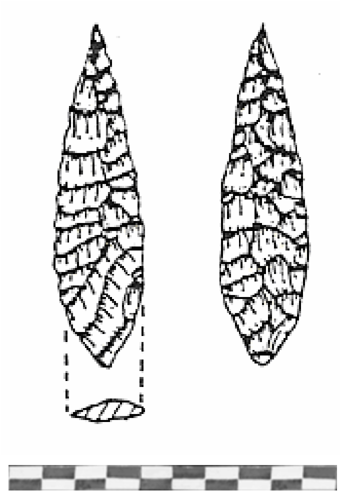


Figure 5.50 Fluted bifacial Arrowhead

Surface Collection, Trench 1 & Trench 2, Al-Majama(site278) Drawn by Ali

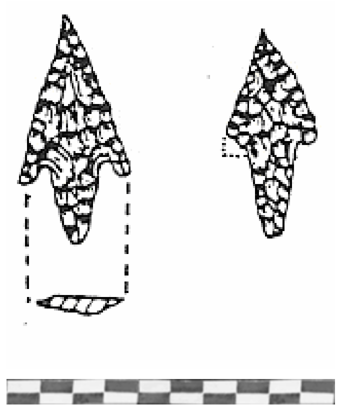


Figure 5.51. Bifacial tanged arrowhead. Surface Collection, Trench 1, Al-Majama(site278) Drawn by Ali

Figure 5.52 Arrowhead fluted from point, Trench 1, Al-Majama(site278) Drawn by Ali

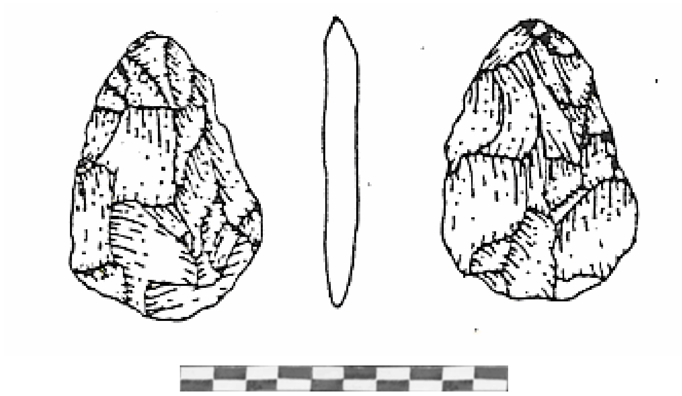


Figure 5.53 Bifacial. Surface Collection, Trench 2, Al-Majama(site278)
Drawn by Ali

Figure 5.54 Bifacial Projectile Point. Surface Collection, Trench 1, Al-Majama (site278)
Drawn by Ali

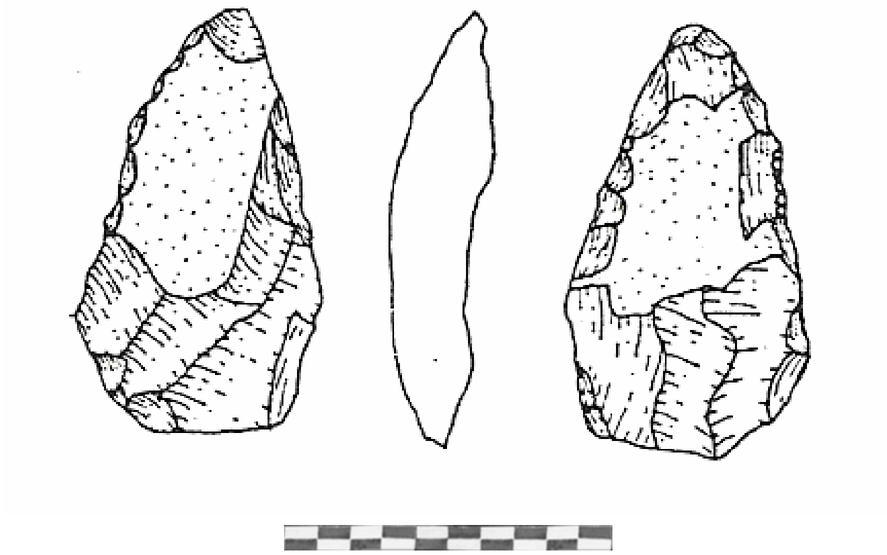


Figure 5.55 Fragment bifacial. Surface Collection, Trench 1 & Trench 2, Al -Majama . (site278) Drawn by Ali

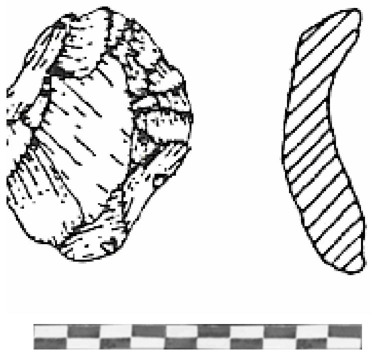


Figure 5.56 Circular Scraper. Surface Collection, Trench 1 & Trench 2, Al-Majama (site278) Drawn by Ali

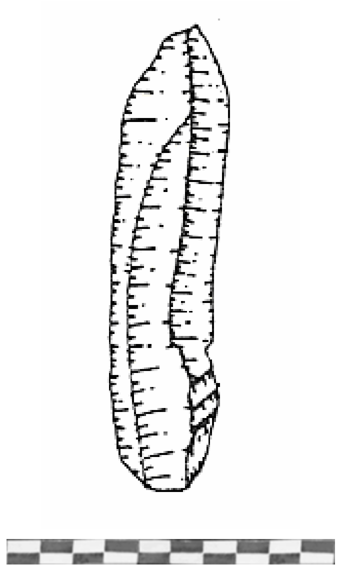


Figure 5.57 Blade. Surface Collection, Trench 1 & 2, Al-Majama(site278)
Drawn by Ali

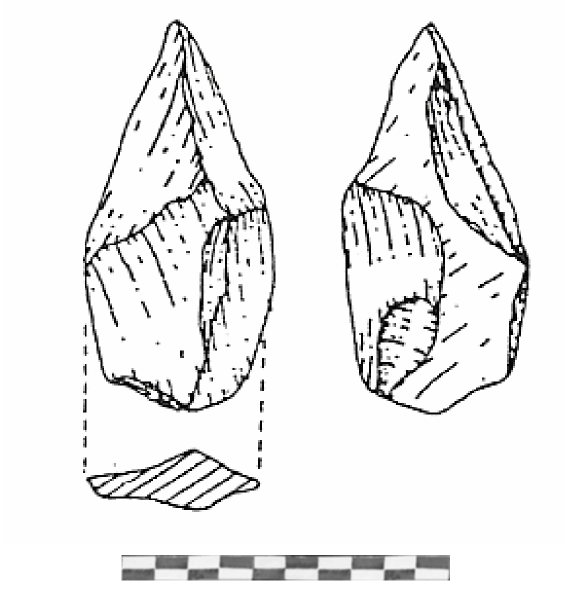


Figure 5.58 Awl. Surface Collection, Trench 1, Al-Majama(site278)
Drawn by Ali

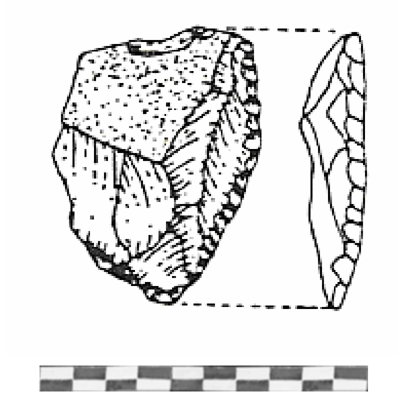


Figure 5.59 Side Scraper. Surface Collection, Trench 1, Al-Majama(site278)
photo by Alghamdi

Figure 5.60 Grinder. Surface Collection, Trench 1 & 2, Al-Majama. (site278)
photo by Alghamdi

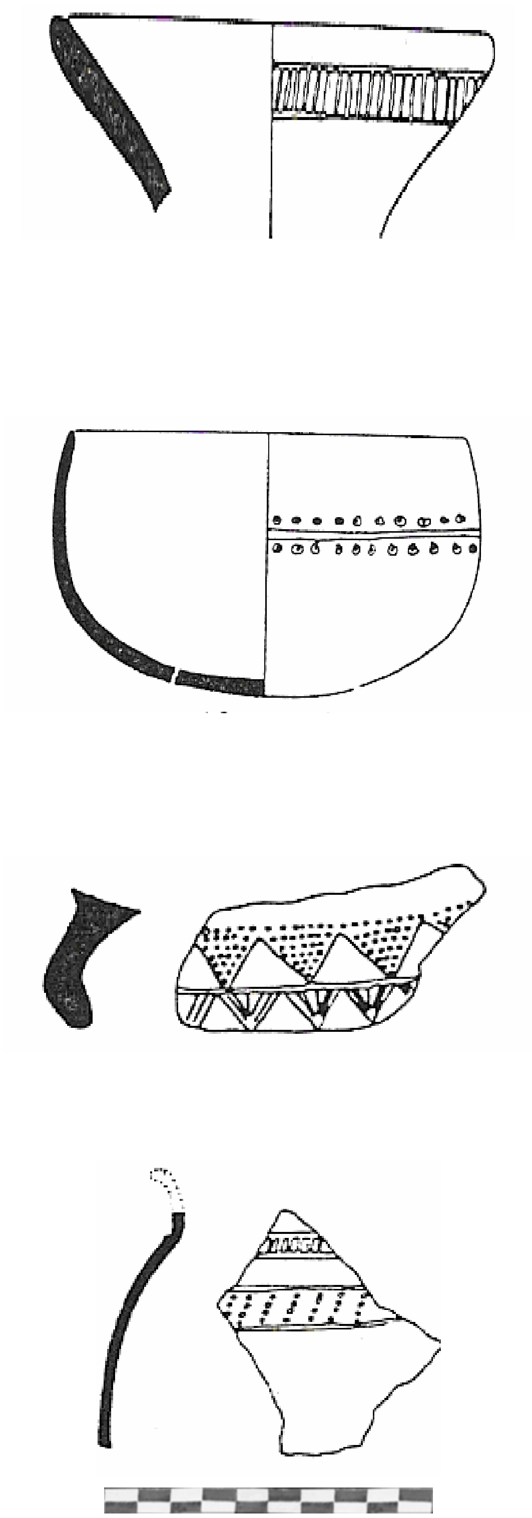


Figure 5.61 Decorated Sherds. Surface Collection, Trench 1 & 2, Al-Majama (site278)
Drawn by Ali

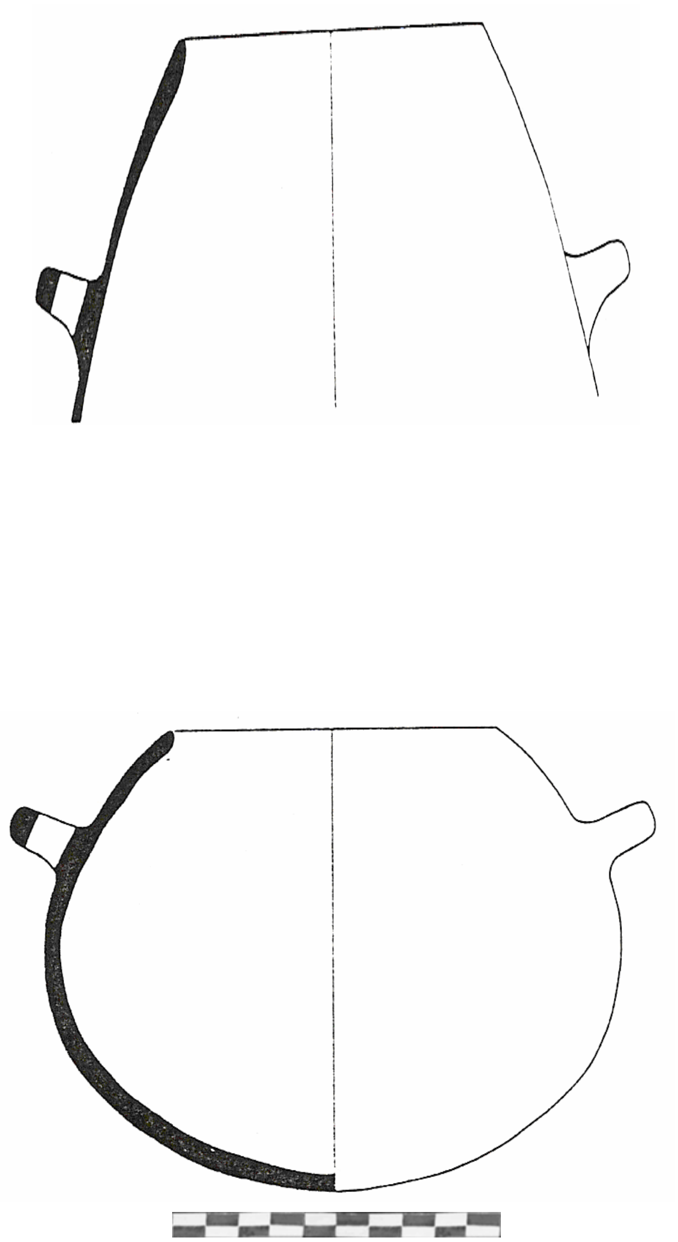


Figure 5.62 Bowl type1. Surface Collection, Trench 1 & 2, Al-Majama. (site278)
Drawn by Ali

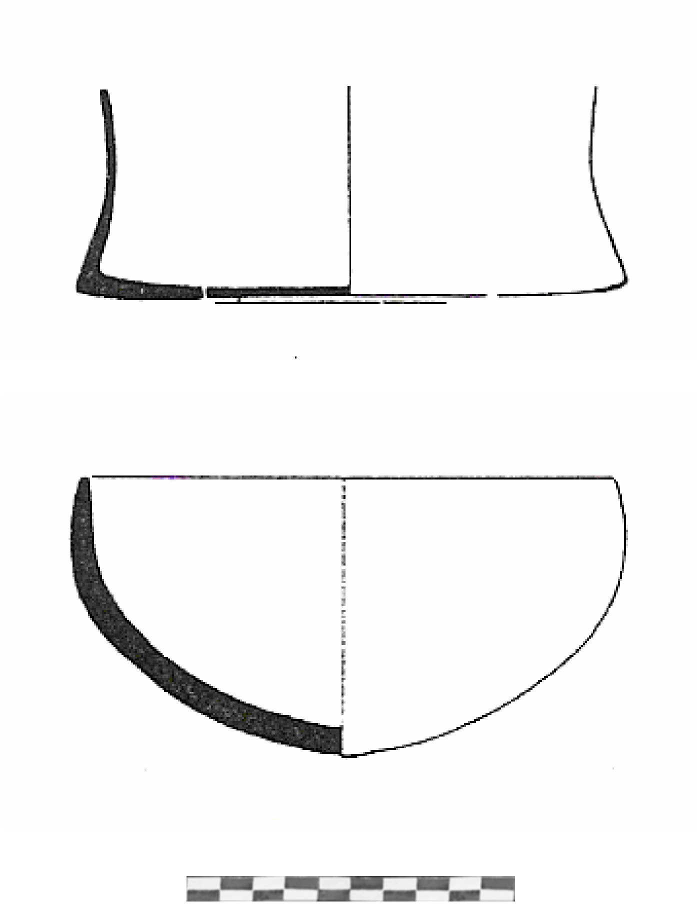


Figure 5.63 Bowl type 2. Surface Collection, Trench 1 & 2 and Squares 3 & 4, Al-Majama(site278) Drawn by Ali

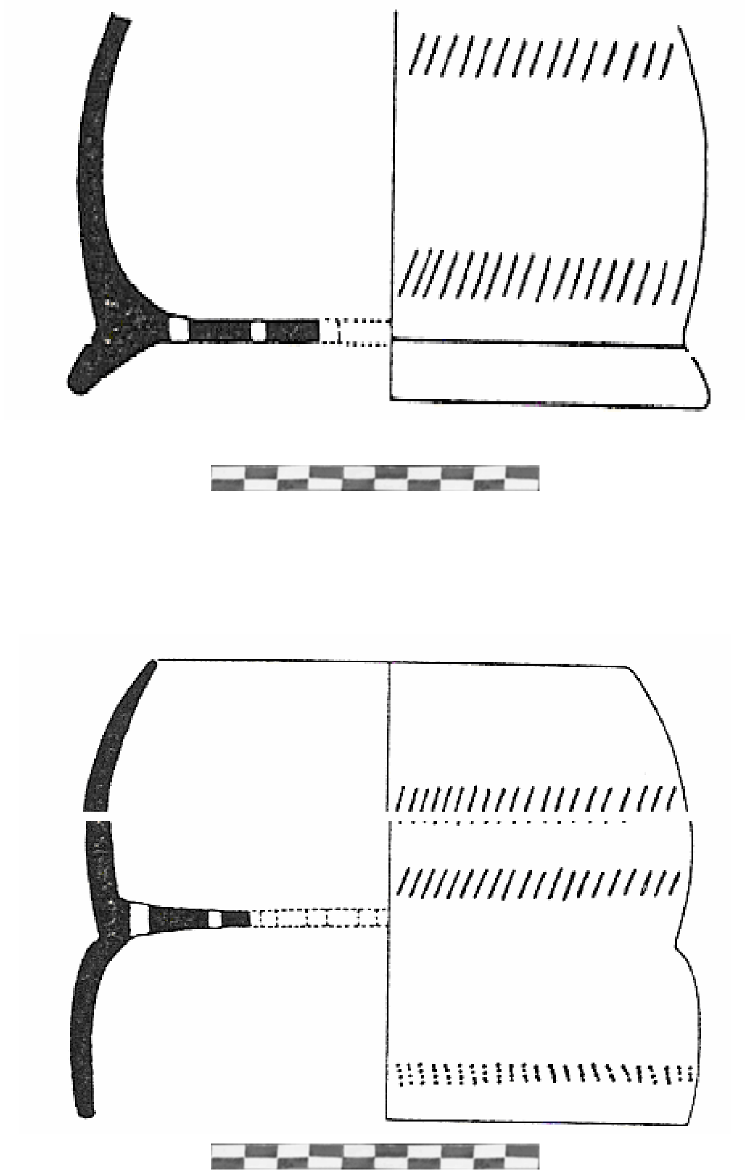


Figure 5.64 Bowl type 3. Surface Collection, Trench 1 & Trench 2, Al-Majama. (site278) Drawn by Ali

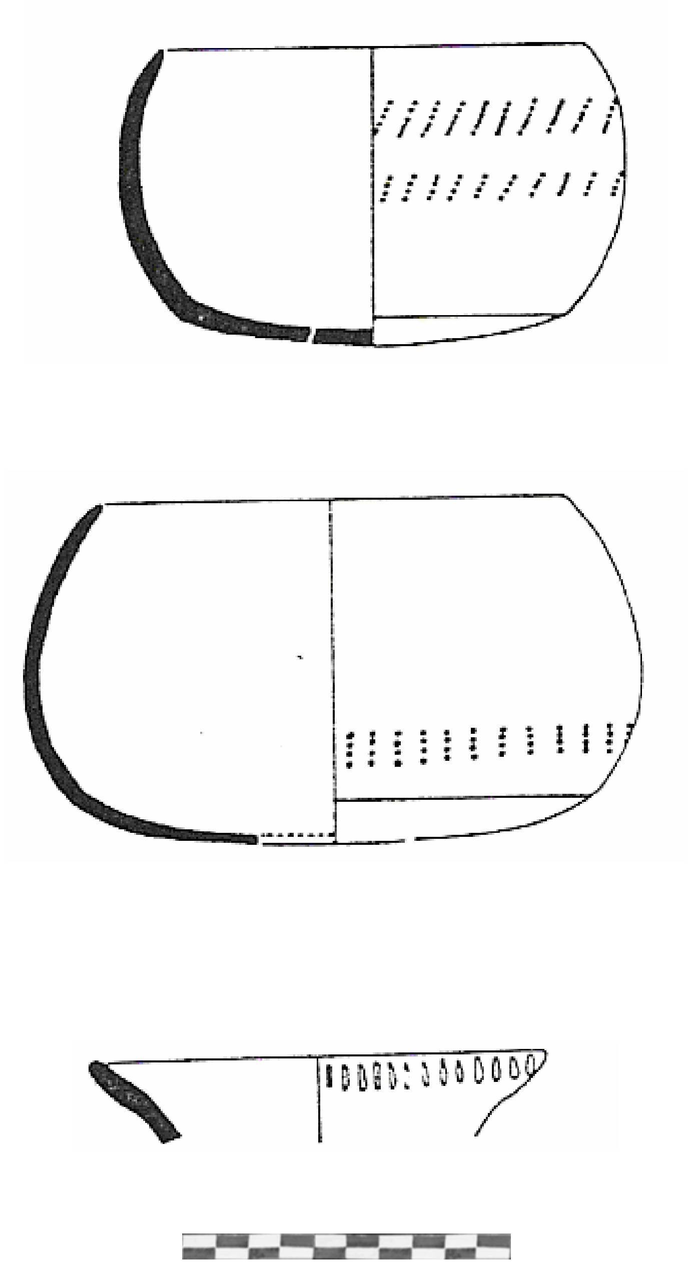


Figure 5.65 Jars and Bowls. Surface Collection, Trench 1 & 2, Al-Majama. (site278)
Drawn by Ali

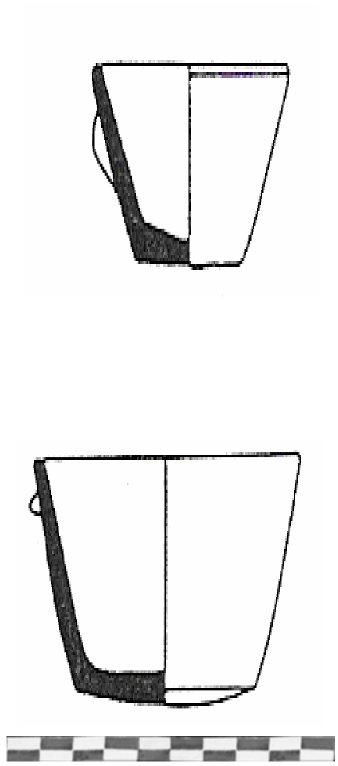


Figure 5.66 Cups. Surface Collection, Trench 1, Al-Majama. (site278) Drawn by Ali

Appendix:5 Artifacts from Farsan island (Zone 1) All the data from Saudi British team (Director Bailey)

Appendix 5.Table 5.1 Islamic pottery from surface collection (gms) Farsan island

Rims	
Number	Weight
1	37
2	76
3	81
4	84
5	45
6	36
7	43
8	187
Total	589
Base	
Number	Weight
1	56
2	77
3	87
4	65
5	87
6	56
7	94
8	66
9	24
10	124
11	45
12	231
13	183
14	87
15	66
Total	1348

Appendix 5. Table 5.2 Islamic pottery from surface collection (gms) Farsan island

Body sherds	
Number	Weight
1	2
2	2
3	2
4	1
5	1
6	1
7	1
8	1
9	4
10	1
11	16
12	13
13	10
14	9
15	9
16	3
17	3
18	3
19	1
20	1
21	2
22	2
23	1
24	1
25	1
26	1
27	1
28	2
29	8
30	4
31	9
32	6
33	6
34	3
35	5
36	5
Total	143

Appendix 5. Table 5.3 Pre Islamic pottery from surface collection (gms) Farsan island

Body sherds	
Number	Weight
1	45
2	47
3	52
4	5
5	5
6	2
7	2
8	2
9	2
10	6
11	1
12	2
13	2
14	3
15	4
16	3
17	7
18	1
19	3
20	4
21	3
22	3
23	2
24	3
25	6
26	5
27	41
28	23
29	27
30	33
31	11
32	27
33	33
34	46
35	78
36	34
Total	500

Appendix 5. Table 5.4 Later Neolithic pottery from surface collection (gms) Farsan island

Rim	
Number	Weight
1	35
2	31
3	14
4	16
5	23
6	48
7	33
8	13
9	46
10	57
11	51
12	32
13	64
14	34
15	13
16	11
17	5
Total	526
Body sherds	
Number	Weight
1	65
2	6
3	4
4	8
5	13
6	44
7	64
8	24
9	39
10	31
11	40
12	12
13	10
14	5
15	14
16	17
17	34
18	27
19	1
20	2
21	2
22	33
23	29
24	21
25	20
26	41
27	11
28	87
29	13
30	20
31	6
32	5
33	5
34	12
35	23
36	11
37	18
38	9
39	5
40	18
41	3
42	16
43	4
44	5
45	2
46	2
47	1
48	6
49	7
50	6
51	8
52	9
53	23
Total	941

Appendix 6: Artefacts from Coastal plain (Zone 2) All the data from Alghamdi work 2007

Appendix 6.Table 6.1 Litics tools weight trench1 Al-Majama (site 278)

Number	Type	Length cm	Width cm	Raw material	Weight(gm)
1	Axe	9.5	5	Flint	91
2	Axe	3.5	2	Flint	14
3	Axe	3.5	3	Flint	5
4	Axe	4	2	Flint	7
5	Axe	3.5	1	Flint	3
6	Obsidian flake	3	2.2	Obsidian	2
7	Obsidian retouched flake	3.2	2.4	Obsidian	6
8	Obsidian retouched flake	3.9	9	Obsidian	5
9	Obsidian retouched flake	2.5	3.4	Obsidian	3
10	Obsidian retouched flake	1.9	2.4	Obsidian	6
11	Obsidian retouched flake	1	2.2	Obsidian	6
12	Obsidian retouched flake	2.7	1	Obsidian	10
13	Obsidian retouched flake	2.5	2.5	Obsidian	8
14	Obsidian retouched flake	2.2	2.8	Obsidian	4
15	Obsidian retouched flake	2	1.8	Obsidian	3
16	Obsidian retouched flake	2.5	0.5	Obsidian	2
17	Obsidian retouched flake	3	4	Obsidian	7

18	Obsidian retouched flake	2.5	0.5	Obsidian	3
19	Obsidian retouched flake	2	1.9	Obsidian	4
20	Obsidian retouched flake	2	1.6	Obsidian	2
21	Blade projectile point	2.5	1	Flint	4
22	Blade projectile point	2.4	1.9	Flint	1
23	Blade projectile point	2.2	1.8	Flint	3
24	Blade projectile point	2.3	2.8	Flint	4
25	Blade projectile point	2	1	Flint	1
26	Blade projectile point	2	0.5	Flint	2
27	Blade projectile point	3.4	2.5	Flint	4
28	Blade projectile point	3.5	2.5	Flint	6
29	Blade projectile point	2.3	2	Flint	3
30	Blade projectile point	2.4	1.8	Flint	2
31	Blade projectile point	3.2	2.5	Flint	3
32	Projectile point	1.5	1.6	Flint	11
33	Projectile point	1	8	Flint	1

34	Arrowhead	2.8	2.5	Flint	2
35	Arrowhead	3	2.1	Flint	3
36	Arrowhead	2	1.8	Flint	2
37	Arrowhead	1.8	1	Flint	3
38	Arrowhead	1.6	3	Flint	2
39	Arrowhead	3	3	Flint	12
40	Arrowhead	8	6	Flint	3
41	Arrowhead	5.5	8.9	Flint	65
42	Arrowhead	2.4	2.3	Flint	2
43	Arrowhead	3.4	2	Flint	6
44	Arrowhead	3	1	Flint	8
45	Arrowhead	3.6	2.1	Flint	11
46	Arrowhead	4.9	2	Flint	20
47	Arrowhead	4.9	2.3	Flint	16
48	Arrowhead	4.6	2.3	Flint	13
49	Arrowhead	3.4	2.6	Flint	18
50	Arrowhead	5	2.6	Flint	10
51	Arrowhead	2.8	1.6	Flint	6
52	Arrowhead	3.9	1.9	Flint	9
53	Arrowhead	2.7	2.9	Flint	16
54	Arrowhead	3.8	2.4	Flint	5
55	Arrowhead	3	1.1	Flint	8
56	Bifacial Fragment	2.3	1.1	Flint	28
57	Bifacial Fragment	3	2.4	Flint	29
58	Bifacial Fragment	2.8	1.8	Flint	30
59	Bifacial Fragment	3.3	1	Flint	10
60	Bifacial Fragment	2.3	1.3	Flint	3
61	Bifacial Fragment	2.6	2.6	Flint	4
62	Bifacial Fragment	2.8	1.5	Flint	2
63	Fragment	3.8	2.3	Flint	6
64	Fragment	4	2	Flint	15
65	Fragment	2.6	2.4	Flint	10
66	Fragment	3.2	2	Flint	6
67	Fragment	2.1	2.9	Flint	11

68	Bifacial Projectile point	4.8	2.8	Flint	16
69	Bifacial Projectile point	4.5	2.6	Flint	2
70	Bifacial Projectile point	2.9	1.9	Flint	6
71	Bifacial Projectile point	3.9	1	Flint	8
72	Bifacial Projectile point	3.3	2	Flint	15
73	Bifacial Projectile point	3	2	Flint	11
74	Bifacial Projectile point	2.9	2	Flint	8
75	Bifacial Projectile point	2.5	2	Flint	3
76	Bifacial Projectile point	4	1	Flint	11
77	Bifacial Projectile point	1.2	3	Flint	16
78	Bifacial Projectile point	2	1.5	Flint	15
79	Bifacial Projectile point	4	1	Flint	21
80	Bifacial Projectile point	3.5	1	Flint	14
81	Bifacial Projectile point	2.3	1	Flint	16
82	Bifacial Projectile point	1.3	1	Flint	12

83	Bifacial Fragment	1	1	Flint	6
84	Bifacial Fragment	2.5	1.2	Flint	22
85	Bifacial Fragment	1.3	1	Flint	11
86	Bifacial Fragment	3.2	1.8	Flint	8
87	Bifacial Fragment	4.1	2.4	Flint	16
88	Bifacial Fragment	3.4	1.6	Flint	12
89	Fragment	5	2.8	Flint	14
90	Fragment	3.4	3.1	Flint	7
91	Fragment	2.1	1.1	Flint	8
92	Fragment	3	4	Flint	12
93	Fragment	2.6	1.3	Flint	10
94	Fragment	3	1.1	Flint	6
95	Fragment	2	2	Flint	6
96	Circular scraper	5	1.4	Flint	7
97	Circular scraper	2	1.3	Flint	11
98	Blade	2	2	Flint	10
99	Blade	2	2	Flint	4
100	Blade	3	4	Flint	5
101	Blade	3		Flint	6
102	Blade	4	4		7
103	Awl	1	4	Flint	3
104	Awl	1.5	3	Flint	8
105	Awl	3	2	Flint	4
106		2	8	Flint	5
107	Side scraper	3	2	Flint	4
108 Spit 3	Side scraper	3	1	Flint	2
Total					1019

Appendix 6.Table 6.2 Litics tools weight trench 2 Al-Majama (site 278)

Number	Type	Length	Width	Raw material	Weight(gm)
1	Grinder	9.5	7.5	Flint	323
2	Grinder	10	9	Flint	598
3	Grinder	9	6.5	Flint	456
4	Grinder	8	5	Flint	675
5	Grinder	6.5	8	Flint	499
6	Grinder	5	5	Flint	456
7	Grinder	7	4	Flint	226
8	Grinder	9	6.5	Flint	459
9	Grinder	4	5	Flint	323
10	Grinder	4	4	Flint	543
11	Grinder	9	9	Flint	349
12	Grinder	11	5	Flint	298
13	Grinder	5	6	Flint	565
14	Grinder	4	8	Flint	465
15	Grinder	6	5	Flint	395
16	Grinder	6	7	Flint	656
17	Grinder	3	9	Flint	765
18	Grinder	8	4	Flint	349
19	Grinder	7	4	Flint	876
20	Grinder	7	9	Flint	564
21	Grinder	8	11	Flint	654
22	Grinder	11	5	Flint	387
23	Grinder	3	4	Flint	670
24	Grinder	8	6	Flint	545
25	Grinder	10.7	6	Flint	890
26	Grinder	12	7	Flint	765
27	Grinder	4	5	Flint	654
28	Fragment	6	3	Flint	23
29	Fragment	6	3	Obsidian	221
30	Fragment	6	3	Obsidian	276
31	Fragment	5	2	Obsidian	324
32	Fragment	5	4	Obsidian	165
33	Fragment	4	4	Obsidian	187
34	Fragment	4	3	Obsidian	166
35	Fragment	4	4	Obsidian	98
36	Fragment	4	2	Obsidian	210

37	Flake	4	4	Obsidian	126
38	Flake	4	4	Obsidian	176
39	Flake	4	3	Obsidian	130
40	Flake	4	3	Obsidian	98
41	Flake	3	3	Obsidian	65
42	Flake	3	3	Obsidian	186
43	Flake	3	3	Obsidian	265
44	Flake	3	2	Obsidian	274
45	Flake	2	3	Obsidian	211
46	Flake	2	3	Obsidian	287
47	Flake	2	2	Obsidian	126
48	Flake	2	1	Obsidian	176
49	Flake	2	2	Obsidian	96
50	Flake	2	1	Obsidian	46
51	Flake	2	1	Obsidian	56
52	Flake	2	1	Obsidian	85
53	Flake	2	1	Obsidian	59
54	Flake	2	1	Obsidian	30
55	Flake	2	1	Obsidian	43
56	Flake	3	2	Flint	32
57	Flake	3	2	Flint	32
58	Flake	3	2	Flint	20
59	Flake	2	2	Flint	14
60	Flake	2	4	Flint	23
61	Flake	2	2	Flint	43
62	Flake	4	3	Flint	24
63	Flake	4	2	Flint	35
64	Flake	3	2	Flint	12
65	Flake	2	2	Flint	32
66	Flake	3	2	Flint	43
67	Flake	1	4	Flint	23
68	Flake	2	4	Flint	22
69	Flake	4	4	Flint	13
70	Flake	3	3	Flint	44
71	Flake	2	3	Flint	11
72	Flake	4	3	Flint	7

73	Flake	4	3	Flint	23
74	Flake	3	3	Flint	22
75	Flake	2	3	Flint	11
76	Flake	2	3	Flint	23
77	Flake	3	2	Flint	1
78	Flake	4	3	Flint	4
79	Flake	4	4	Flint	6
80	Flake	4	3	Flint	8
81	Flake	4	3	Flint	23
82	Flake	2	3	Flint	23
83	Fragment	2	3	Flint	7
84	Fragment	2	3	Flint	4
85	Fragment	2	3	Flint	11
86	Fragment	2	3	Flint	10
87	Fragment	2	3	Flint	2
88	Fragment	3	2	Flint	7
89	Fragment	2	2	Flint	9
90	Fragment	3	2	Flint	8
91	Fragment	4	2	Flint	8
92	Fragment	3	2	Flint	8
93	Fragment	3	2	Flint	5
94	Fragment	3	4	Flint	15
95	Fragment	3	3	Flint	15
96	Fragment	2	1	Flint	11
97	Fragment	2	1	Flint	23
98	Fragment	4	1	Flint	34
99	Fragment	3	1	Flint	16
100	Fragment	3	1	Flint	23
101	Fragment	3	1	Flint	154
102	Fragment	1	1	Flint	23
103	Fragment	1	1	Flint	43
104	Fragment	1	1	Flint	54
105	Fragment	3	2	Flint	23
106	Fragment	1	1	Flint	23
107	Fragment	4	1	Flint	22
108	Fragment	3	2	Flint	43

.

109	Fragment	2	4	Obsidian	23
110	Fragment	2	4	Obsidian	23
111	Fragment	2	4	Obsidian	7
112	Fragment	2	4	Obsidian	4
113	Fragment	2	4	Obsidian	11
114	Fragment	2	3	Obsidian	10
115	Fragment	2	3	Obsidian	2
116	Fragment	2	3	Obsidian	7
117	Fragment	3	3	Obsidian	9
118	Fragment	3	3	Obsidian	8
119	Fragment	3	3	Obsidian	8
120	Fragment	2	3	Obsidian	8
121	Fragment	2	5	Obsidian	5
122	Fragment	2	5	Obsidian	15
Total					20675

Appendix 6.Table 6.3 Grinder ,Chipped ,Fragments, Obsidian Trench 2 Al-Majama (site 278)

Number	Type	Length	Width	Raw material	Weight(gm)
1	Grinder	13	13	Flint	1599
2	Grinder	17	12.5	Flint	1343
3	Grinder	15	11.5	Flint	1657
4	Grinder	13	12	Flint	1232
5	Grinder	11	7	Flint	991
6	Grinder	8	8	Flint	876
7	Grinder	8	8	Flint	715
8	Grinder	8	8	Flint	565
9	Grinder	7	7.5	Flint	365
10	Grinder	8	6	Flint	376
11	Grinder	12	6	Flint	232
12	Grinder	9	4	Flint	342
13	Grinder	6	8	Flint	281
14	Grinder	5	7	Flint	234
15	Grinder	5	7	Flint	190
16	Grinder	5	3	Flint	165
17	Grinder	5	4	Flint	90
18	Grinder	4	4	Flint	93
19	Grinder	3	4	Flint	95
20	Grinder	3	4	Flint	80
21	Flake	4	2	Obsidian	20
22	Flake	3	3	Obsidian	23
23	Flake	3	3	Obsidian	22
24	Flake	3	3	Obsidian	16
25	Flake	3	2	Obsidian	13
26	Flake	3	2	Obsidian	19
27	Flake	3	2	Obsidian	17
28	Flake	3	2	Obsidian	9
29	Flake	2	1	Obsidian	17
30	Flake	2	1	Obsidian	12
31	Fragment	2	1	Obsidian	17
32	Fragment	2	3	Obsidian	12
33	Fragment	2	3	Obsidian	9
34	Fragment	2	3	Obsidian	15
35	Fragment	2	2	Obsidian	22
36	Fragment	2	2	Obsidian	12
37	Fragment	2	2	Obsidian	15
38	Fragment	1	2	Obsidian	17
39	Fragment	1	2	Obsidian	21

40	Fragment	1	2	Obsidian	7
41	Fragment	1	2	Obsidian	7
42	Fragment	1	2	Obsidian	7
43	Fragment	1	1	Obsidian	5
44	Fragment	1	1	Obsidian	5
45	Fragment	1	1	Obsidian	5
46	Fragment	1	1	Obsidian	5
47	Fragment	2	1	Obsidian	5
48	Fragment	2	1	Obsidian	5
49	Fragment	2	1	Obsidian	5
50	Fragment	1	3	Obsidian	5
51	Fragment	1	1	Obsidian	2
52	Fragment	1	1	Obsidian	3
53	Fragment	1	1	Obsidian	3
53	Fragment	3	1	Obsidian	3
54	Fragment	2	1	Obsidian	3
55	Fragment	3	1	Obsidian	5
56	Fragment	1	2	Obsidian	3
57	Fragment	1	2	Obsidian	3
Total					11903

Appendix 6.Table 6.4 Pottery weight trench 1Rim spit 1 Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	81
2	I	37
3	I	76
4	I	81
5	I	84
6	I	45
7	I	36
8	I	43
9	I	187
10	I	143
11	I	78
12	I	69
13	I	195
14	I	165
15	I	276
16	I	159
17	I	299
18	I	398
19	I	322
20	I	198
21	I	83
22	I	73
23	I	60
24	I	294
25	I	81
26	I	93
27	I	28
28	I	156
29	I	298
30	I	399
31	I	243
32	I	125
33	I	175
34	I	76
35	I	56
36	I	33
37	I	65
38	I	34
39	I	56
40	I	89
41	I	76
42	I	66
43	I	56
44	I	34
45	I	25
46	I	87
47	I	34
48	I	22
49	I	34
50	I	42
51	I	23
52	I	22
53	I	23
54	I	65
55	I	77
56	I	65
57	I	34
58	I	87
59	I	65
60	I	66
61	I	67
62	I	64
63	I	28
64	I	35
65	I	65
66	I	67
67	I	87
Total		7045

Appendix 6.Table 6.5 Pottery weight trench1 Base spit 1 Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	34
2	I	56
3	I	93
4	I	78
5	I	55
6	I	73
7	I	78
8	I	49
9	I	81
10	I	39
11	I	49
12	I	39
13	I	98
14	I	76
15	I	85
16	I	48
17	I	87
18	I	198
19	I	125
20	I	154
21	I	176
22	I	98
23	I	67
24	I	103
25	I	87
26	I	96
27	I	59
28	I	89
29	I	165
30	I	265
31	I	186
32	I	49
33	I	183
34	I	195
Total		3413

Appendix 6.Table 6.6 Pottery weight trench 1 Body sherds Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	4
2	I	7
3	I	5
4	I	5
5	I	8
6	I	32
7	I	13
8	I	11
9	I	23
10	I	6
11	I	9
12	I	32
13	I	22
14	I	7
15	I	66
16	I	56
17	I	44
18	I	31
19	I	35
20	I	34
21	I	8
22	I	8
23	I	8
24	I	2
25	I	22
26	I	2
27	I	2
28	I	29
29	I	18
30	I	15
31	I	15
32	I	13
33	I	34
34	I	33
35	I	34
36	I	65
37	I	12
38	I	87
39	I	12
40	I	14
41	I	22
42	I	3
43	I	43
44	I	22
45	I	15
46	I	12
47	I	19
48	I	16
49	I	8
50	I	8
51	I	14
52	I	16
53	I	14
54	I	22
55	I	37
56	I	34
57	I	65
58	I	55
59	I	54
60	I	57
61	I	45
62	I	34
63	I	55
64	I	17
65	I	8
Total		1593

Appendix 6.Table 6.7 Pottery weight trench 1 Body sherds spit 2 Al-Majama (site 278)

Number	Layer I Spit 2	weight
1	I	3
2	I	3
3	I	3
4	I	1
5	I	24
6	I	26
7	I	23
8	I	24
9	I	25
10	I	22
11	I	22
12	I	11
13	I	19
14	I	12
15	I	8
16	I	8
17	I	8
18	I	8
19	I	3
20	I	3
21	I	3
22	I	22
23	I	2
24	I	2
25	I	2
26	I	2
27	I	14
28	I	2
29	I	2
30	I	2
31	I	26
32	I	6
33	I	6
34	I	2
35	I	26
36	I	43
37	I	2
38	I	2
39	I	2
40	I	7
41	I	7
42	I	17
43	I	1
44	I	1
45	I	1
46	I	1
47	I	36
48	I	3
49	I	12
50	I	16
51	I	8
52	I	8
53	I	8
54	I	8
55	I	9
56	I	9
57	I	12
58	I	1
59	I	18
60	I	12
61	I	12
62	I	16
63	I	6
64	I	6
65	I	1
66	I	23
Total		713

Appendix 6. Table 6.8 Pottery weight Body sherds Spit 4 Al-Majama (site 278)

Number	**Layer I Spit 3**	**weight**
1	I	7
2	I	7
3	I	23
4	I	12
5	I	14
6	I	11
7	I	10
8	I	6
9	I	8
10	I	8
11	I	8
12	I	8
13	I	23
14	I	12
15	I	15
16	I	17
17	I	15
18	I	11
19	I	6
20	I	6
21	I	5
22	I	6
23	I	32
24	I	21
25	I	2
26	I	9
27	I	9
28	I	11
29	I	22
30	I	12
31	I	34
32	I	22
33	I	2
Total		414

Appendix 6. Table 6.9 Pottery weight Trench 2 Base

Number	Layer I Spit 1	weight
1	I	87
2	I	120
3	I	98
4	I	76
5	I	45
6	I	232
7	I	187
8	I	123
9	I	87
10	I	87
11	I	59
12	I	57
13	I	120
14	I	76
15	I	86
16	I	54
17	I	98
18	I	73
19	I	39
20	I	55
21	I	232
22	I	185
23	I	166
24	I	56
25	I	87
26	I	54
27	I	39
28	I	33
29	I	76
30	I	23
31	I	18
32	I	46
33	I	88
34	I	33
35	I	43
36	I	12
37	I	34
38	I	55
39	I	23
40	I	33
41	I	65
42	I	12
43	I	34
44	I	212
45	I	26
46	I	34
47	I	65
48	I	76
49	I	23
50	I	21
51	I	22
52	I	33
53	I	11
54	I	10
55	I	34
56	I	54
57	I	33
58	I	24
59	I	36
60	I	54
61	I	65
62	I	34
63	I	27
64	I	34
65	I	23
66	I	33
67	I	56
68	I	10
Total		13097

Appendix 6.Table 6.10 Pottery weight Trench 2 Base Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	98
2	I	123
3	I	88
4	I	56
5	I	87
6	I	44
7	I	121
8	I	68
9	I	98
10	I	94
11	I	76
12	I	80
13	I	39
14	I	84
15	I	65
16	I	56
17	I	77
Total		1354

Appendix 6. Table 6.11 Pottery weight Trench 2 surface collection Body sherds Al-Majama (site 278)

Number	Layer I	weight
1	I	21
2	I	12
3	I	15
4	I	11
5	I	23
6	I	8
7	I	8
8	I	8
9	I	12
10	I	3
11	I	5
12	I	5
13	I	6
14	I	1
15	I	1
16	I	1
17	I	3
18	I	6
19	I	6
20	I	6
21	I	6
22	I	6
23	I	17
24	I	22
25	I	18
26	I	8
27	I	8
28	I	12
29	I	3
30	I	4
31	I	4
32	I	4
33	I	7
34	I	1
35	I	1
36	I	1
37	I	23
38	I	13
39	I	12
40	I	16
41	I	5
42	I	5
43	I	5
44	I	5
45	I	5
46	I	5
47	I	3
48	I	5
49	I	17
50	I	16
51	I	12
52	I	16
53	I	22
54	I	25
55	I	25
56	I	27
57	I	2
58	I	2
59	I	2
60	I	2
61	I	8
62	I	8
63	I	6
64	I	7
65	I	6
Total		600

Appendix 6. Table 6.12 Pottery weight Trench 2 Spit 1 Body sherds Al-Majama (site 278)

Number	Layer I Spit 1	weight
234	I	5
235	I	5
236	I	5
237	I	5
238	I	5
239	I	5
240	I	5
241	I	5
242	I	5
243	I	5
244	I	5
245	I	5
246	I	5
247	I	5
248	I	5
249	I	5
250	I	3
251	I	3
252	I	3
253	I	3
254	I	12
255	I	16
256	I	5
257	I	5
258	I	3
259	I	3
260	I	3
261	I	3
262	I	3
263	I	3
264	I	3
265	I	3
266	I	1
267	I	23
268	I	11
269	I	24
270	I	23
271	I	21
272	I	20
273	I	1
274	I	9
275	I	5
276	I	9
277	I	9
278	I	2
279	I	2
280	I	2
281	I	2
282	I	2
283	I	22
284	I	12
285	I	14
286	I	14
287	I	16
288	I	7
289	I	7
290	I	7
291	I	7
292	I	4
293	I	4
294	I	4
295	I	4
296	I	4
297	I	4
298	I	4
299	I	4
Total		446

Appendix 6.Table 6.13 Pottery weight Body sherds Trench 2 Spit3 Al-Majama (site 278)

Number	Layer I Spit 3	weight
1	I	5
2	I	8
3	I	6
4	I	3
5	I	3
6	I	3
7	I	3
8	I	3
9	I	3
10	I	3
11	I	1
12	I	3
13	I	4
14	I	6
15	I	2
16	I	2
17	I	2
18	I	2
19	I	2
20	I	2
21	I	1
22	I	1
23	I	1
24	I	1
25	I	2
26	I	3
27	I	2
28	I	2
29	I	3
30	I	1
31	I	2
32	I	1
Total		86

Appendix 6. Table 6.14 Grinder tools Square 3 and 4 Al-Majama (site 278)

Nnmber	Type	Length	Width	Raw material	Weight(gm)
1	Grinder	11	9.5	Filnt	545
2	Grinder	12	9	Flint	540
3	Grinder	17.5	5	Flint	456
4	Grinder	14	7	Flint	444
5	Grinder	16	8.5	Flint	343
6	Grinder	15.5	10.5	Flint	568
7	Grinder	11	9.5	Flint	567
8	Grinder	13	8	Flint	654
9	Grinder	15	8	Flint	590
10	Grinder	12	7	Flint	654
11	Grinder	6	6	Flint	432
12	Grinder	9	9	Flint	437
13	Grinder	8	9	Flint	448
14	Grinder	8	9	Flint	547
15	Grinder	8	9	Flint	545
16	Grinder	12	8	Flint	345
17	Grinder	14	8	Flint	675
18	Grinder	11.7	7	Flint	342
19	Grinder	8	7	Flint	277
20	Grinder	5	7	Igneous	347
21	Grinder	8	8	Igneous	341
22	Grinder	6	6	Igneous	323
23	Grinder	6	9	Igneous	543
24	Grinder	6	9	Igneous	239
25	Grinder	7	9	Igneous	342
26	Grinder	5	7	Igneous	432
27	Grinder	5	6	Igneous	398
28	Grinder	9	6	Igneous	352
29	Grinder	11	6	Igneous	564
30	Grinder	13	8	Igneous	234
31	Grinder	15	6	Igneous	654
32	Grinder	11	6	Igneous	340
33	Grinder	13	9	Igneous	453
34	Grinder	16	6	Igneous	265
35	Grinder	13	5	Igneous	376
36	Grinder	8	5	Igneous	234
Total					15365

Appendix 6.Table 6.15 Fragments weight Square 3 Al-Majama (site 278)

Number	Type	Length	Width	Raw material	Weight(gm)
1	Flake	3	4	Igneous	34
2	Flake	2	3	Granet	12
3	Flake	3	4	Granet	23
4	Fragment	2	4	Granet	23
5	Fragment	2	3	Granet	34
6	Fragment	2	3	Granet	12
7	Fragment	3	3	Granet	15
8	Fragment	2	2	Igneous	11
9	Fragment	3	2	Igneous	8
10	Fragment	1	3	Igneous	9
11	Fragment	1	3	Igneous	9
12	Fragment	3	3	Flint	9
13	Fragment	4	2	Flint	10
Total					209

Appendix 6. Table 6.16 Fragments weight square 4 Al-Majama (site 278)

Nnmber	Type	Length	Width	Raw material	Weight(gm)
1	Flake	4	2	Igneous	4
2	Flake	3	3	Igneous	6
3	Flake	4	2	Igneous	5
4	Flake	4	2	Igneous	9
5	Flake	3	2	Igneous	8
6	Flake	3	3	Igneous	9
7	Fragment	3	2	Igneous	9
8	Fragment	2	3	Igneous	9
9	Fragment	2	1	Igneous	5
10	Fragment	3	1	Igneous	9
11	Fragment	2	3	Igneous	5
12	Fragment	3	2	Flint	5
13	Fragment	2	2	Flint	5
14	Fragment	2	2	Flint	5
15	Fragment	2	3	Flint	5
16	Fragment	3	2	Flint	3
17	Fragment	2	3	Flint	3
18	Fragment	3	1	Flint	3
19	Fragment	1	1	Flint	3
20	Fragment	1	3	Flint	2
21	Fragment	3	3	Flint	6
22	Fragment	3	3	Flint	6
23	Fragment	3	3	Flint	6
24	Fragment	3	3	Flint	6
25	Fragment	34	3	Flint	6
26	Fragment	5	2	Flint	6
27	Fragment	2	1	Flint	7
28	Fragment	2	1	Flint	8
Total					168

Appendix 6. Table 6.17
Pottery weight Square 3 Base
Al-Majama (site 278)

Number	Layer I Spit 1	Weight
1	I	43
2	I	54
3	I	65
4	I	76
5	I	55
6	I	23
7	I	65
8	I	48
9	I	65
10	I	67
11	I	35
12	I	77
13	I	58
14	I	145
15	I	67
16	I	88
17	I	45
18	I	65
19	I	125
20	I	176
21	I	264
22	I	98
23	I	65
24	I	176
25	I	165
26	I	76
27	I	323
28	I	243
29	I	165
30	I	22
31	I	87
32	I	54
33	I	98
Total		2710

Appendix 6. Table 6.18
Pottery weight Square 3 Rims
Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	54
2	I	33
3	I	47
4	I	28
5	I	55
6	I	25
7	I	65
8	I	77
9	I	14
10	I	35
11	I	43
12	I	66
13	I	34
14	I	35
15	I	33
16	I	27
17	I	37
18	I	45
19	I	65
20	I	25
21	I	42
22	I	22
23	I	32
24	I	25
25	I	45
26	I	13
27	I	12
28	I	24
29	I	33
30	I	23
31	I	7
32	I	99
33	I	34
34	I	20
Total		1274

Appendix 6.Table 6.19
Pottery weight Square 3 Rims
Al-Majama (site 2784)

Number	Layer I Spit 1	weight
1	I	34
2	I	45
3	I	44
4	I	56
5	I	27
6	I	87
7	I	76
8	I	345
9	I	77
10	I	34
11	I	76
12	I	45
13	I	11
14	I	23
15	I	25
16	I	33
17	I	21
Total		958

Appendix 6. Table 6.20
Pottery weight body sherds square 3
Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	23
2	I	15
3	I	3
4	I	7
5	I	6
6	I	8
7	I	8
8	I	8
9	I	23
10	I	12
11	I	12
12	I	16
13	I	15
14	I	13
15	I	15
Total		184

Appendix 6. Table 6.21 Pottery weight Square 3 Body sherds Al-Majama (site 278)

Number	Layer I	weight
1	I	23
2	I	3
3	I	33
4	I	3
5	I	12
6	I	16
7	I	14
8	I	15
9	I	2
10	I	2
11	I	6
12	I	13
13	I	14
14	I	12
15	I	11
16	I	10
17	I	5
18	I	5
19	I	5
20	I	7
21	I	7
22	I	7
23	I	7
24	I	6
25	I	7
26	I	12
27	I	21
28	I	23
29	I	2
30	I	2
31	I	2
32	I	2
33	I	2
34	I	2
35	I	13
36	I	14
37	I	16
38	I	12
39	I	2
40	I	2
41	I	2
42	I	2
43	I	2
44	I	2
45	I	2
46	I	22
47	I	21
48	I	23
49	I	8
50	I	9
51	I	8
52	I	8
53	I	17
54	I	13
55	I	15
56	I	17
57	I	12
58	I	3
59	I	5
60	I	5
61	I	5
62	I	5
63	I	5
64	I	5
65	I	5
66	I	5
Total		598

Appendix 6.Table 6.22 Pottery weight Square 4 Body sherds Al-Majama (site 278)

Number	Layer I Spit 2	weight
1	I	11
2	I	16
3	I	17
4	I	14
5	I	7
6	I	7
7	I	7
8	I	157
9	I	16
10	I	12
11	I	12
12	I	12
13	I	32
14	I	33
15	I	17
16	I	8
17	I	8
18	I	8
19	I	8
20	I	8
21	I	16
22	I	14
23	I	3
24	I	5
25	I	7
26	I	5
27	I	21
28	I	8
29	I	8
30	I	12
31	I	12
32	I	12
33	I	14
34	I	9
35	I	9
36	I	5
37	I	5
38	I	5
39	I	21
40	I	12
41	I	16
42	I	14
43	I	16
44	I	23
45	I	6
46	I	6
47	I	9
48	I	6
49	I	6
50	I	6
51	I	6
52	I	22
53	I	21
54	I	17
55	I	8
56	I	8
57	I	8
58	I	8
59	I	8
60	I	16
61	I	14
62	I	3
63	I	8
64	I	14
65	I	32
66	I	55
Total		974

Appendix 6.Table 6.23 Pottery weight Square 4 Base Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	34
2	I	78
3	I	56
4	I	23
5	I	76
6	I	65
7	I	49
8	I	78
9	I	65
10	I	34
11	I	12
12	I	34
13	I	6
14	I	12
15	I	67
16	I	88
17	I	127
18	I	34
19	I	65
20	I	87
21	I	98
22	I	34
Total		1268

Appendix 6.Table 6.24 Pottery weight Square 4 Base Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	87
2	I	80
3	I	45
4	I	127
5	I	212
6	I	156
7	I	48
8	I	248
Total		1003

Appendix 6.Table 6.25 Square 4 Daub clay Al-Majama (site 278)

Number	Layer I Spit 1	weight
1	I	150
2	I	167
3	I	289
4	I	145
5	I	76
6	I	87
7	I	345
8	I	67
9	I	77
10	I	123
11	I	256
12	I	187
13	I	390
14	I	276
15	I	147
16	I	67
17	I	55
18	I	87
19	I	34
20	I	87
21	I	33
22	I	87
Total		3232

Appendix:7 Artefact from Interior area (Zone 4) All the data from Alghamdi work 2007

Appendix 7.Table 7.1 Trench 1 lithic tools Hima (site 419)

Number	Type	Length cm	Width cm	Raw material	Wight(gm)
1	Circular scraper	5	2	Flint	13
2	Circular scraper	4	3	Flint	8
3	Circular scraper	6	2	Flint	12
4	Circular scraper	3	3	Flint	14
5	Circular scraper	4	3	Flint	11
6	retouched flake	4	3	Obsidian	13
7	retouched flake	4	2	Obsidian	13
8	retouched flake	4	1	Obsidian	15
9	retouched flake	7	2	Obsidian	23
10	retouched flake	5	1	Obsidian	18
11	retouched flake	6	3	Obsidian	14
12	retouched flake	7	3	Obsidian	16
13	retouched flake	3	3	Obsidian	8
14	retouched flake	3	2	Obsidian	12
15	retouched flake	5	2	Obsidian	8
16	retouched flake	5	2	Obsidian	6
17	retouched flake	5	2	Flint	11
18	Bifacial	5	3	Flint	14
19	Bifacial	4	3	Flint	12

20	Bifacial	4	2	Flint	8
21	Bifacial	4	2	Flint	8
22	Bifacial	6	3	Flint	11
23	Scraper	4	1	Flint	10
24	Scraper	6	2	Flint	9
25	Scraper	6	2	Flint	11
26	Scraper	6	2	Flint	14
27	Scraper	4	1	Flint	9
28	Scraper	3	1	Flint	9
29	Scraper	5	1	Flint	9
30	Chip	5	1	Flint	13
31	Chip	7	1	Flint	14
32	Chip	5	3	Flint	11
33	Chip	3	7	Flint	10
34	Chip	3	5	Flint	9
35	Chip	3	6	Flint	11
36	Bifacial ovate	2	7	Flint	14
37	Bifacial ovate	2	3	Flint	7
38	Bifacial ovate	2	3	Flint	4
39	Bifacial ovate	2	5	Flint	8
40	Bifacial ovate	3	5	Flint	16
41	Bifacial ovate	3	5	Flint	13
42	Bifacial ovate	5	3	Flint	12
43	Bifacial ovate	5	4	Flint	15
44	Bifacial ovate	7	5	Flint	8
45	Bifacial ovate	5	6	Flint	12
46	Blade projectile point	3	5	Flint	13
47	Blade projectile point	3	5	Flint	15

48	Blade projectile point	4	7	Flint	21
49	Blade projectile point	5	5	Flint	16
52	Projectile point	3	5	Flint	22
Total					603

Appendix 7 Table 7.2 Trench 2 lithic tools Hima (site 419)

Number	Type	Length cm	Width cm	Raw material	Wight(gm)
1	Circular scraper	5	4	Flint	13
2	Circular scraper	5	4	Flint	14
3	Scraper	7	3	Flint	11
4	Scraper	5	7	Flint	10
5	Scraper	3	6	Flint	9
6	retouched flake	3	5	Obsidian	11
7	retouched flake	3	3	Obsidian	14
8	retouched flake	2	5	Obsidian	7
9	retouched flake	2	5	Obsidian	16
10	retouched flake	2	7	Obsidian	13
11	retouched flake	2	5	Obsidian	12
12	retouched flake	3	3	Obsidian	15
13	retouched flake	3	3	Obsidian	8
17	retouched flake	5	3	Obsidian	12
17	Bifacial	5	2	Obsidian	13
18	Bifacial	5	2	Obsidian	15
19	Bifacial	5	2	Obsidian	21
20	Scraper	7	2	Flint	16
21	Scraper	5	3	Flint	18
22	Scraper	3	3	Flint	12
23	Scraper	3	5	Flint	13
24	Scraper	3	5	Flint	14
25	Chip	2	3	Flint	15
26	Chip	2	4	Flint	16
27	Chip	2	4	Flint	10
28	Bifacial ovate	2	3	Flint	11

29	Blade projectile point	3	5	Flint	13
30	Blade projectile point	3	5	Flint	15
31	Fragment	5	5	Flint	21
32	Fragment	5	7	Flint	16
33	Fragment	5	5	Flint	22
34	Fragment	5	3	Flint	24
35	Fragment	7	3	Flint	22
36	Fragment	5	3	Flint	32
37	Fragment	3	2	Flint	23
38	Fragment	3	2	Flint	12
39	Fragment	3	2	Flint	24
40	Fragment	2	2	Flint	22
41	Fragment	2	3	Flint	23
42	Fragment	2	3	Flint	34
43	Fragment	2	5	Flint	22
44	Fragment	3	5	Flint	17
45	Fragment	3	4	Flint	9
46	Fragment	5	4	Flint	12
47	Fragment	5	3	Flint	14
48	Fragment	4	6	Flint	23
Total					739

Appendix 7. Table 7.3 Square 3 lithic tools Hima (site 419)

Number	Type	Length cm	Width cm	Raw material	Wight(gm)
1	Circular scraper	3	3	Flint	23
2	Circular scraper	5	5	Flint	34
3	Circular scraper	5	5	Flint	32
4	Circular scraper	5	5	Flint	34
5	Circular scraper	5	5	Flint	36
6	retouched flake	7	7	Obsidian	27
7	retouched flake	5	5	Obsidian	30
8	retouched flake	3	3	Obsidian	34
9	retouched flake	3	3	Obsidian	13
10	retouched flake	3	3	Obsidian	15
11	retouched flake	2	5	Obsidian	21
12	retouched flake	2	5	Obsidian	16
13	retouched flake	4	5	Obsidian	23
14	retouched flake	3	5	Obsidian	25
15	retouched flake	3	7	Obsidian	32
16	retouched flake	4	5	Obsidian	13
17	Retouched flake	2	3	Flint	15
18	Bifacial	5	3	Flint	21
19	Scraper	4	2	Flint	16
20	Scraper	4	2	Flint	23
21	Scraper	3	3	Flint	14
Total					497

Appendix 7.Table 7.4 Square 4 lithic tools Hima (site 419)

Number	Type	Length cm	Width cm	Raw material	Wight(gm)
1	Circular scraper	6		Flint	45
2	Circular scraper	7	6	Flint	36
3	Circular scraper	3	6	Flint	13
4	Circular scraper	5	4	Flint	15
5	Circular scraper	6	3	Flint	21
6	retouched flake	6	5	Obsidian	16
7	retouched flake	4	5	Obsidian	23
8	retouched flake	3	7	Obsidian	25
9	retouched flake	5	5	Obsidian	23
10	retouched flake	5	3	Obsidian	34
11	retouched flake	7	3	Obsidian	33
12	retouched flake	5	3	Obsidian	24
13	Retouched flake	3	2	Obsidian	28
14	Retouched flake	3	2	Obsidian	29
15	Retouched flake	3	2	Obsidian	32
16	Bifacial	2	2	Obsidian	36
17	Bifacial	2	3	Flint	24
18	Bifacial	2	3	Flint	22
19	Scraper	2	3	Flint	19
20	Scraper	3	2	Flint	24
Total					570

Appendix 7. Table 7.5 Square 5 lithic tools Hima (site 419)

Number	Type	Length cm	Width cm	Raw material	Wight(gm)
1	Circular scraper	6	3	Flint	25
2	Circular scraper	6	4	Flint	23
3	Circular scraper	4	2	Flint	34
4	Circular scraper	3	3	Flint	33
5	Circular scraper	5	4	Flint	24
6	retouched flake	5	2	Obsidian	28
7	retouched flake	7	3	Obsidian	29
8	retouched flake	5	2	Obsidian	32
9	retouched flake	3	2	Obsidian	36
10	retouched flake	3	2	Obsidian	34
11	retouched flake	3	3	Obsidian	22
12	retouched flake	2	4	Obsidian	34
13	retouched flake	2	2	Obsidian	23
14	retouched flake	2	2	Obsidian	22
15	Bifacial	2	1	Flint	17
16	Scraper	3	3	Flint	19
17	Scraper	3	2	Flint	23
18	Scraper	3	2	Flint	15
Total					473