

**IL LOKERIDEDE: A PASTORAL NEOLITHIC MORTUARY
SITE EAST OF LAKE TURKANA, KENYA**

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(B.A.(Hons) 1999, UNIVERSITY OF NAIROBI)

A THESIS

**Submitted in partial fulfillment of the requirements for the award of the
degree of Masters of Arts in Archaeology in the Department of History,
University of Nairobi**

1999

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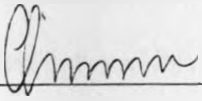
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DECLARATION

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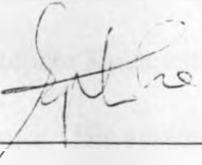


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CHAPTER 1: INTRODUCTION

1.0 Introductory Statement

This work deals with Pastoral Neolithic mortuary practices. At stake is a burial mound site, Il Lokeridede, East Lake Turkana near the Koobi Fora Camp site. The site is a secondary burial mound where human remains were interred after a presumed primary interment, an interlude of limited or a well-defined but elaborate time lapse, exhumation, fragmentation of the remains, combining of the remains, may be a pre-interment ritual and secondary burial. Il Lokeridede was discovered in the summer of 1990 when Dr. Christopher Koch and his student, John Kamau, came across it on an archaeological excursion and excavation at Dongodien. Dr. Koch told me about the site early 1991. The site was by then a mound with eroding potsherds and obsidian flakes scattered all over. Fallen over angular stone slabs lay on top of the mound. Dr. Koch's initial guess was that the site is a secondary burial mound similar to Jarigole near Allia Bay which has been excavated by Koobi Fora field school teams for over one decade.

Dr. Christopher Koch expressed to me the need to do some excavations to establish the function and the site context. Koch and I arranged to grid the site and do test excavations during the summer of the 1991. I decided to work on the site on an M.A. thesis project. When I worked on the site, Dr. Koch was a lecturer with the Koobi Fora Field School. The Field school administration assisted by supplementing the funds donated to Dr. Koch by the Dean's committee, University of Nairobi. The Koobi Fora Field School assisted me with logistic, accommodation, some field gear, and manpower in form of students who were being taught as Dr. Koch was a teaching staff. The distance

between Il Lokeridede (GaJi 23) and Dongodien (GaJi 4) is about 0.5 Km and that (Fig 1.1) between Illeret Stone Bowl (FwJi 5) and Il Lokeridede is about 50 Km.

Excavation of Il Lokeridede recovered both human remains and grave goods. The grave goods especially pottery is reminiscent to that from sites not far from Il Lokeridede (GaJi 23) especially Dongodien (GaJi 4) and Illeret Stone Bowl (FwJi 5) (Both excavated in the 80's). The two sites were excavated by John Barthelme (1981, 1985). The shared affinities are in temper inclusions, colour, decoration motifs and designs, paste texture, burnishing and slipping. The above similarities are used as the basis of testing the relationship between sites Il Lokeridede, Dongodien and Illeret Stone Bowl. The three sites share only pottery as a major part of the excavation recovery. Dongodien and Illeret Stone Bowl are settlement sites as opposed to Il Lokeridede which is a mortuary site. The materials from Il Lokeridede is in the University of Nairobi. The materials are undergoing analysis pending transfer to the National Museums of Kenya. The assemblage comprises of surface and excavated collections. Both surface collection and excavation was done by Dr. Christopher Koch, the author and occasionally, Koobi Fora Field school participants.

1.1 Hypothetical framework and goals

The location of the sites of Il Lokeridede, Dongodien and Illeret Stone Bowl led to an assumption that, though Il Lokeridede is functionally different from the other two, the sites has resulted from geographically confined activities of Neolithic Pastoralists. This function notwithstanding, the sites are the result of a common cultural pool that existed in the area during the whole lifespan of the Neolithic Pastoralism. The temporal-spatial limits of this common culture are not known. The three sites, though functionally different,

represent people who shared a common cultural pool. This common cultural pool shared by the inhabitants of the area is reflected in similarities of the artifacts recovered in the three sites. Since the three sites share common pottery characteristics, the attributes on potsherds are used to test the presence of a common cultural interface. Whatever is reflected in each of the three sites was incorporated in this study for the purpose of determining the similarities. It is obvious that pottery had a common function in the Pastoral Neolithic(PN)culture as it is found in both settlements (Dongodien and Illeret Stone Bowl)and mortuary site (Il Lokeridede). Hence pottery attributes are used in this work to test the presence or absence of such a common cultural pool. This has been done to realise the following goals:-

- (1) Finding out whether pottery Wares from the three sites are similar.
- (2) Putting the research site of Il Lokeridede in its archaeological and chronological perspective in the research area (East Turkana) during the Pastoral Neolithic time span.
- (3) To confirm the function of Il Lokeridede through its artifactual and geographical context.

1.2 Methodology and Project Limitations

The work started by laying of the grid references on the mound and its immediate environ. The grid was set at 0⁰ line. The surface matrix of the mound was sub-divided into one meter squares. For the purpose of establishing the cultural extent of the mound from the top, a pit on the immediate crest of the mound was sampled for excavation (pit 121/112

Fig 1.2). Here random sampling was used. As the cultural layer continued extending to the immediate mound base, the adjacent square, pit 121/111 was opened hoping to reach the edge of the cultural layer. The terminal edge was not found as the cultural layer spilled into the next outer pit, 121/110. Due to limited time and resources, priority was shifted towards reaching the bottom of the cultural layer. Material concentration became nucleated bottomwise. Lake sand beach was found and hoping that the mound bottom was near and soon, two adjacent pits 121/113 and 121/114 on the mound peak were opened. Artifacts were recovered in the lake beach sand meaning it was a part of the cultural layer. Being partially sponsored by the Koobi Field School, I had to go by their schedule and that means by the end of the Field School Session I had to call off the research.

By the time the excavation was called off, the vertical and horizontal extent of the mound had not been reached. The concentration of artifacts was becoming high as the excavation proceeded. Over two thousand artifacts were recovered including potsherds, stone tools, flakes, human and fish bone remains, beads, grinding stones and a fragment of a Stone Bowl. Pottery comprises eighty percent of the total assemblage. The artifacts were brought to the University of Nairobi for cataloguing, cleaning and analysis. During the excavation and cataloguing it was becoming obvious that pottery was the only material that could form a firm basis of realising the major goals of the research. This was because of its high representation as compared to other artifact types and close similarities with other dated pottery wares from the neighbouring sites to Il Lokeridede, Dongodien, Illeret

Stone Bowl and Jarigole. Work at Jarigole is still going on and no holistic analysis of the materials from the site is done hence its exclusion from this research.

1.3 Data Sampling

The assemblage from the three sites (GaJi 23, GaJi 4 and FwJi 5) is overwhelmingly enormous. Majority of the sherds have not been used in the comparative analysis from the three sites. Conditions such as excessive weathering stage, fragmentation, lack of provenance and texture, lack of decorations, partial decorations and preservation conditions were used as elimination criterions.

1.4 The Study Area

The area studied is to the East of Lake Turkana. The area lies in Sibiloi National Park (Fig. 1.1). Illokeridede (GaJi 23) is about 11Km from Koobi Fora Camp. Dongodien (GaJi 4) is about 10Km and to the South of Il Lokeridede. Illeret Stone Bowl (FwJi 5) is about 50Km to the North of GaJi 4 and GaJi 23. FwJi 5 is near Illeret next to Kenya - Ethiopia border. Dongodien and Illeret stone Bowl were excavated by John Barthelme (1985) in the early 80s. John Kamau did work at Dongodien in the summer of 1991 with Dr. Christopher Koch. The materials that have been used in this work from Dongodien and Illeret Stone Bowl sites are at the National Museums of Kenya. No new research was done by the author at the two sites for this work.

1.5 Analysis and Comparison

The pottery artifacts recovered were fragmentary. No complete pots were recovered and due to fragmentary nature of the sherds, no conjoining was done. The pottery have been treated as sherds as against whole pots in this work. Attributes have been used as the criteria of analysis and comparison and most of the terms used have been defined in the Glossary (pp. 140) at the end of this Thesis. The Illeret Stone Bowl and Dongodien data have been solicited afresh by the author. Same attributes as those studied on Il Lokeridede materials have been studied on the pottery assemblages from the two sites. For Illeret Stone Bowl and Dongodien, the excavator (Barthelme, 1985) studied the pottery assemblages but the results of the study are not available to me.

For Il Lokeridede (GaJi 23) attributes that have been considered are sherd position, where the respective sherd came from, paste texture, rim decorations, sherd outer surface posture, grooves, ripple marks, stylus impressions, evulsed stylus, decoration design, decoration design elements and colour. The same attributes have been analysed by the author at Dongodien (GaJi 4) and Illeret Stone Bowl (FwJi 5) assemblages to establish their universal similarities and differences. The assemblages used from Dongodien (GaJi 4) and Illeret Stone Bowl site (FWJi 5) are currently stored at the National Museums of Kenya. Undecorated and surface collection body sherds have not been used in this work. Basically, sizeable undecorated rimsherds from the three sites have been used in this analysis.

1.6 Conclusion

This work is meant to find out whether there are differences and similarities that can be drawn between sites Il Lokeridede, Dongodien and Illeret Stone Bowl. In order to realise the goal, attributes of the materials from the three sites are compared. Though similarities between the three sites are predominant, this work is using analytical and comparative methods to prove it. To do that, attributes from the three sites have been collected and compared in excel computer programme. The results are presented in this work, explained, and a conclusion drawn.

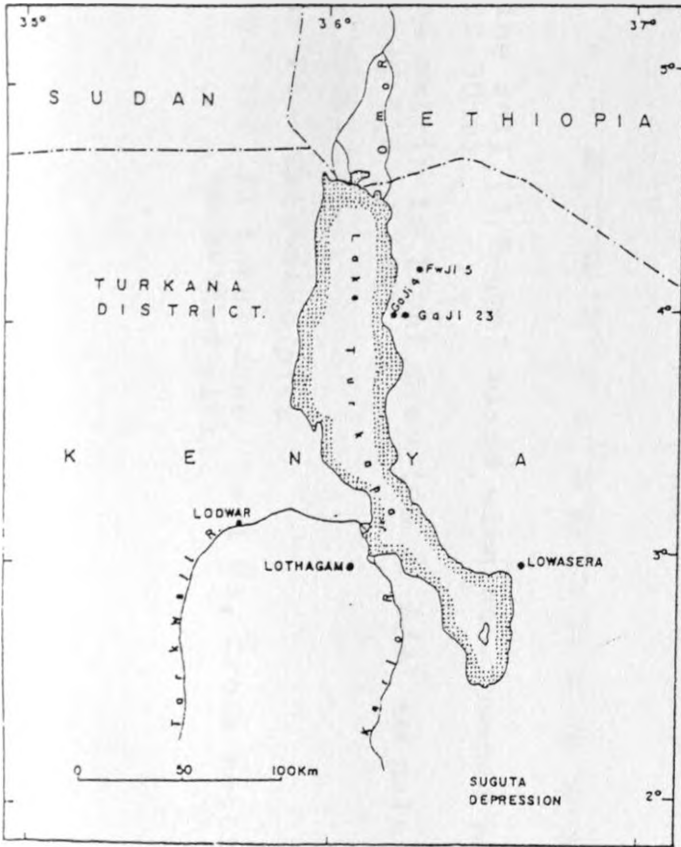
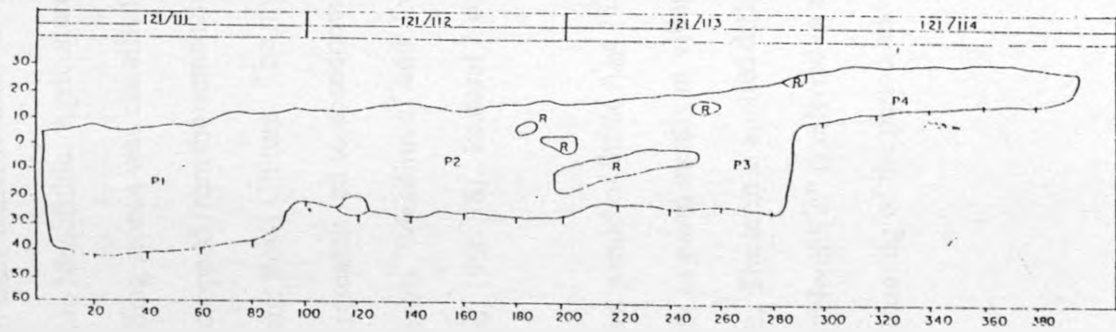


Fig. 1.1 Location of Il Lokeridede (GaJi 23), Dongodien (GaJi 4) and Illeret Stone Bowl FwJi 5) Sites.



Fine soil (1/8-1/4mm) mixed with sub-rounded pebbles (30-50mm).

The matrix is light grey (10 yr 6/2) to pale brown (10 yr 6/3)

R- rocks

P1- P4 - Excavated pits

Fig. 1.2 I1 Lokeridede, GaJi 23, Cross section of excavated pits.

CHAPTER 2: RELATED WORKS

2.0 INTRODUCTION

The Later Stone Age of East Africa has undergone changes since 1930s to reach its currently widely accepted definition of Pastoral Neolithic. Several Archaeological cultures are known since Leakeys' (1931) work. In the 1930s', cultures were defined in a tripartite scheme either in terms of lithics, ceramics or mortuary practices. A division into "Mesolithic" or "Neolithic" period was used in their classification. In terms of lithics, "Elmentaitan" and "Wilton" were categorized into Mesolithic. Agriculture as depicted by the presence of stone bowls, mortars and grinding stones was classified as "Neolithic" (Robertshaw, 1990). Later some cultures were dropped from the nomenclature and others broken down. Neolithic was replaced by AStone Bowl Culture. The invention of radio carbon dating methods in the 1950s and new research led to abandonment of Leakey's classification scheme. This resulted in the terms "Mesolithic" and "Neolithic" being replaced with "Late Stone Age" (LSA) (Sutton, 1966:38). Pastoral Neolithic (PN) was added to LSA in the 1970s.

The term "Neolithic" is attributed to last period of Stone Age. This is the period when people began to settle semi-permanently or permanently in villages, grew crops, kept animals and used polished stones for tools. The term is applied differently by different people and in different areas. Sometimes "Neolithic" is referred to as a 'revolution.'" (Childe, 1936: 1942: 1958) showing that the coming of the period and its development was deemed rapid.

East African “Neolithic” is defined in terms of animal husbandry. This has been prompted by the fact that there is no evidence of plant husbandry whereas there is archaeological evidence on cattle domestication. Hence the East African “Neolithic” is referred to as Pastoral Neolithic (PN) which has been defined as either:

----- “cultures of Eastern Africa which (1) relied substantially on domesticated stock for their livelihood, (2) used pottery, and, (3) employed typical later Stone Age technologies for the manufacture of edged tools” (Bower and Nelson, 1978: 562).

or

----- “to refer to societies with an LSA technology and a pastoral economic base relying heavily on domestic cattle or Ovicaprids” (Robertshaw, 1990:4).

2.1 EAST AFRICA AND LAKE TURKANA BASIN

Earlier Later Stone Age (LSA) assemblage dates are known from Lukenya Hill (Gramly, 1976, Miller, 1979). In the Central Rift Valley, Later Stone Age (LSA) was originally known as Kenya “Aurignacian”, then Kenya “Capsian” and now a local name “Ebburan”. The industry is remarkable as it is associated with the first appearance of pottery dated 4500 B.P at Enkapure Ya Muto on Mau escarpment (Ambrose 1984). Where we have a date of phase existed after the introduction of domestic animals in the Central Rift evidenced by Lukenya, 3300 B.P. at site GvJm 3, known as Ol - pul. Neolithic sites in the

Central Rift are dated at between 3,000 to 1,500 B.P. Most of the Elmentaitan sites in the Central Rift date between 2,500 and 1,500 B.P. Earlier dates of 3,000 B.P have been obtained from Njoro River Cave where cremated burials were associated with Elmentaitan artifacts (Leakey and Leakey, 1950; Merrick and Monagham 1984).

A later Elmentaitan date at Deloraine is 1100 B.P (Ambrose, 1984) while, at Sirikwa holes it dates between 1300 - 1800 AD based on pottery motifs. Unreliable date of between 8000 - 4000 B.P. on radio carbon from shell and bone apatite are known from eastern shores of L.Victoria. Elmentaitan settlements found at Gogo Falls are dated by Radiocarbon between 2,000 and 1,7000 B.P. Cattle, sheep and goat remains co-occur with wild ungulate species at Gogo Falls. Neolithic settlement sites in Serengeti National Park are likely to fall between 3,000 and 1,500 (Robertshaw, 1990). Neolithic tradition at Narosura is dated to about 2,600 B.P. It comprises pottery, domestic cattle, caprines and donkey bones.

Pastoral Neolithic related work in East Africa was pioneered by the Leakeys. This was in the 1930's at Hyrax Hill and Njoro River Cave both in the Central Rift Valley of Kenya. Stone bowls and pottery types termed Gumban "A" and "B" were recovered at Hyrax Hill. The name Gumban was first used by Leakey to describe pottery from Makalia burial site (1931). The Gumban "A" pottery was later referred to as Nderit ware (Wandibba, 1977). The name Nderit is derived from a site called stable's Drift on the Enderit River where pottery with decorations on the surface and internal scorings was recovered. The name "Gumban" was taken from the legendary inhabitants of the area.

They were later proved not to be the original inhabitants of the Rift Valley as they were geographically restricted to Central Kenya (Muriuki, 1974)

In the 1937/38 period, three prehistoric occupations were discovered at Hyrax Hill. The occupations are; (1) Neolithic occupation and a cemetery together with the stone-walled enclosures, lying at the foot of the hill on the South East, (2) the village of pit dwellings at the North-east extremity of the hill assumed to belong to a phase of the Gumban "B" variant of the stone Bowl Culture, (3) Pit dwellings located to the South-west of the hill (Leakey, 1945). Decorated bowls from Hyrax Hill, which are ovoid beakers and wide-mouthed bowls similar to those of Gumban "A" though the internally scored bowls are lacking at Hyrax Hill. Low, stone-covered burial mounds with central graves are characteristics of the Gumban "A" (Leakey, 1945).

The lithic industry was described as microlithic capsian which predominantly comprised crescents, "bevelled edge" burins, microburin scrapers, *lames e'ccaille's* and capsian fabricators. This implies that the site was of a Late Stone Age industry and therefore the term Neolithic is appropriate for it. Coil technique was applied in pottery manufacture. Rim profiles were either straight or slightly curved with a few sherds portraying beveling. Bases were occasionally flat or "knobbed" with blunt conical bases dominant. Hyrax Hill was initially dated by Makalian Lake Beach levels at 325ft (100m). The date for the Neolithic occupation and cemetery at Hyrax Hill are uncertain. The raised Makalia Beach levels (375 ft) are said to be subseqented by the occupation (M.D. Leakey, 1945). The wet phase of the Makalia was around 6000 BC - 8000 B.P. Since those beach sands

are found in Hyrax it is estimated that the site was occupied after that. Mary Leakey suggested a date between 5,500 and 2,500 B.P. (Leakey 1945).

Njoro river Cave was excavated by Louis and Mary Leakey in 1950. The site is mainly a low cave extending parallel to the Njoro River. It is famous for the recovery of cremated human remains. About 80 individuals were found. The presence of almost corresponding number of bowls (N=78), pestles (N=78) and lower grindstones (N=77) to the number of adult individuals led to a suggestion that a ritual was conducted at the site.

Radio carbon dates from Njoro River cave are 2,920 \pm 80, 2900 \pm 3090 \pm 65,3165 \pm 100 (Ambrose, 1982). The date of 3,000 B.P is confirmed by Merick and Monaghan (1984). A date between 2,920 B.P and 960 B.P was suggested for the Crematorium. Pottery from Njoro River cave includes globular pots with pointed bases and shallow flat-bottomed bowls. Pottery is highly burnished and resemble Elmentaitan ceramics. Burnishing of Njoro River Cave pottery compares to that of Wilton "B" Rock Shelter at Lukenya (Leakey, 1950).

Since the 1970's, the East African Neolithic has undergone revision. Several occurrences have been found to post-date 3,000 B.P fitting in the original criteria of the PN. Apart from the Leakeys, other researchers (Odner, 1972; Gramly, 1975; Bower, et.al; 1977, 1978; Robbins 1972; Wandibba, 1977) have defined PN ceramic wares. Most of the work was done between 1975 and 1980. Others (Collett and Robertshaw, 1983; Ambrose 1982, 1984) grouped PN wares. At that time Central Rift Valley received the

greatest focus although Northern Kenya received greater interest (Robbins, 1980; Barthelme, 1981, 1985; Philipson, 1977; Stiles 1982).

A team from the University of Massachusetts at Boston (UMB) defined most of the PN wares (Bower *et al*; 1977). Between 1975/76 the expedition worked intensively in the Central Rift Valley. They covered an area running from Southern end of Lake Bogoria Southward to Mt. Suswa, and from the crest of the Nyandarua Range Westward to the Western side of the Mau Escarpment. The major goals of this expedition were: (1) dating and documenting the LSA/PN transition in Central Kenya, (2) assessing cultural diversity within the PN, (3) assessing the relative importance of the hunter/gatherer, pastoral and agricultural adaptations in the ecologically diverse environments afforded by Central Kenya, (4) Investigating the integration of lithic technologies in LSA and PN economic adaptations, (5) identifying activity areas in complex LSA and PN occurrences and assessing their relevance in identifying lithic assemblages (6) investigating trade in raw materials such as obsidian and determining the extent to which lithic and ceramic technologies were geographically integrated in order to compare group size and interaction in LSA and PN communities; and (7) dating and documenting the PN/Pastoral Iron Age (PIA) transition in central Kenya.

The sites involved in this massive work are Nderit Drift, Maasai Gorge Rock Shelter, Salasun, Akira, Ndabibi, Maringishu, Remnant, Gilgil, Crescent Island and Lion Hill Cave. Ceramic wares of the PN period from Central Kenya were analysed (Most of the analysis involved formerly excavated materials lying at the Museum, Nairobi with special emphasis on temporal-spatial distribution. Six ware types were recognized on the

basis of decoration. In some cases vessel shapes, temper and paste were used as part of the definitions. The pottery wares defined were called Nderit (Formerly Gumban "A") Narosura, Akira, Maringishu, Remnant and Kansyore. Nderit ware has decorations consisting of closely set cuneiform impressions in most cases covering the whole surface with haphazardly executed grooves or incised lines jabbing without any other decorations. Some of the sherds have internal scorings. The most typical vessel form was the carinated bowl. Similar ceramic styles have been found as far north as Lopoy in the Western Lake Turkana Basin (Robbins, 1972); and Illeret to the east of the lake (Barthelme, 1977), Eliye Springs to the Southwest of the Lake (Soper and Jacobs, 1972), North Horr (Phillipson, 1977) probably Khartoum according to Arkell's description (1949), Lukenya Hill to the South, Seronera in Serengeti National park where Bower (1973) describes pottery identical to (Leakey's 1931) description and Narosura stone Bowl Site in the Southern Kenya Highlands. (Odner 1972) describes pottery identical to Class AA@ (Gumban "A") in terms of shape, colour, manufacture technique, rims, bases and decoration.

From the radio carbon estimation, Nderit ware proved to be the oldest of the six wares dating 3290 B.P (Gramly, 1975) and as early as 7,200 B.P in the Central Rify Valley region of Kenya. (Bower 1991) associates Nderit ware with an early phase of the PN. He suggests that Nderit ware is indigenous to East Africa as it lacks affinities from outside (but see Arkell, 1949). The Burnished pottery referred to at Khartoum site is reminiscent to Nderit ware or its variant.

In the Lake Turkana Basin research has taken a slightly different dimension. There has been more emphasis on interaction between the environment and archaeology. PN sites are studied in relation to their surroundings (Ambrose 1980).

Prior to PN is a Later Stone Age phase when people were primarily fisher/hunters. It has been shown that PN existed with fishing culture and the latter disappeared around 1,000 BP at Lopoy (Robbins, 1980). Late Stone Age fishing sites are characterized by bone harpoons (Kimaru, 1991), fish remains (Stewart, 1989) and stone industry (Robbins, 1972, 1974).

Lowasera is a bone harpoon site southwest of North Horr and southeast of Lake Turkana. The site was excavated by Phillipson between 1974 and 1975. Late Stone Age tools, bone harpoons, pottery and human remains were recovered. The pottery from the site is associated with bone harpoons but their contemporaneity is questionable. This is because the pottery sites date later than bone harpoon sites. Sites dating more than 8,000 BP and with harpoons do not have ceramics (Barthelme, 1985). Bone harpoon sites to the south of the talked about geographical distribution area of Sahelian-Saharan zone date earlier than ceramic sites (Arkell, 1949; Mohammed Ali, 1987). The oldest date of ceramic ware, that of Nderit, to the south of the region is from Dongodien (GaJi 4) dating to 4,000 BP (Barthelme, 1985; Collett and Robertshaw, 1983). But bone harpoon sites such as Ishango in Zaire date to the Late Pleistocene (See Stewart, 1989).

It is suggested that ceramics and harpoon cultures came from the north and south respectively around the East African water mass (Sutton, 1974, 1977; Kimaru

1991). The association of the two at the same sites are seen as two different lines of occupation by two different groups of people. The pottery at Lowasera is described as gritty, poorly fired and extremely friable (Phillipson, 1977). The rim sherds are thin and some have lips while others are highly eroded to reflect this attribute. Shallow bowls were identified after reconstruction. Use of the coil technique of manufacture is attested by several specimens. Vessel walls are generally vertical at the rim. Lips where preserved were rounded. Some sherds had wavy-line decoration. Lowasera is dated to between 9420 ± 200 and 2520 ± 150 BP (Phillipson, 1977) (Fig. 2.1).

Robbins (1974) pioneered Holocene work to the west of Lake Turkana. His first work was at the site of Lothagam. The research recovered stone tools, bone harpoons, fish and animal bones as well as decorated and undecorated pottery (Robbins, 1980). Nderit Ware with various decoration expressions, beads and bangles made of ostrich eggshell were also recovered. Earliest Nderit material from the west of the lake is at Aipa which is tentatively dated between 5,000-6,000 years ago (Robbins, 1980). It is suggested that there is a relationship between Nderit and Turkwell cultural traditions. Work at Lopoy also recovered human remains which were analyzed by Robbins (1980).

At Namoratunga II Kalikol to the west of the lake, basalt pillars originally thought to be of astronomical significance were attributed to the megalithic people (Soper, 1982; Stiles, 1982). The burial practices resemble those of the Konso of Ethiopia, a Cushitic-speaking group. The conclusion drawn from the determination of pillar alignment was that Namoratunga stone pillars had astronomical significance

presumably used by the Cushitic speakers about 2,300 BP. Later Soper (1982) negates that the pillars had an astronomical significance. The idea of Cushitic intrusion in the Lake Turkana Basin has been advanced by many different people (e.g., Ehret, 1971; 1974 Soper, 1982; Stiles, 1982; Phillipson, 1977). This is given credence by a recent report that Khartoum may harbour the earliest evidence of pottery-making by a probable non-agricultural society dated to 5,500 BP (Shinnie, 1990:224).

If this is true it means that the basin inhabitants have been in contact with people from the north of it (Barthelme, 1985; Kimaru, 1991; Phillipson, 1977), at least during the early Holocene. At the site of Namoratunga II Kalikol, Nderit and Turkwell Wares are recognized. Nderit pottery occurs on both sides of the lake and as far south as Northern Tanzania and is associated with the PN. It is attributed to Southern Cushites on grounds of distribution (Soper, 1982; Bower, 1973). Bower (1973) reports a stratigraphical overlap of Nderit and Akira Wares. At Laikipia Highlands the surface occurrences of Nderit pottery cannot be dated. Nderit was associated with Akira pottery at open sites (Palagalagi and Sukuta Farm) and one rock shelter, (KFR-A7) (Siiriani, 1984).

Nderit pottery has been reported at Aipa (Robbins, 1972, 1980), Nderit Drift (Bower, 1973, 1977), Lukenya Hill (Gramly, 1976) and near Rumuruti (Siiriani, 1977). Isolated cases of small excavated sherds have been identified (Robbins, 1972; Bower, 1973, 1977). Typical Nderit Ware pottery has been reported in Central Kenya with an unanticipated early radiocarbon date on bone apatite of 7,255±225 BP at the site of Salasun Rock Shelter (Bower, *et al.*, 1977; Bower and Nelson, 1978). New

finds of Nderit pottery to the west of Lake Turkana at Lothagam have also been reported (Koch, pers. comm.).

Between 1975 and 1980 John Barthelme did intensive work to the east of Lake Turkana. His work established a cultural succession of hunter-gatherers, fishers, Neolithic pastoralists and sub-recent to recent occupations. Three principal phases of transgression-regression of Lake Turkana were established from the Galana Boi beds. These showed that at 9,500 BP, Lake Turkana reached a maximum transgressive height of 75-80m above 1975 lake levels. The lake remained high though fluctuating occasionally until a *hiatus* was reached between 7,500-7,000 BP. Palynology showed the presence of montane forest and thicket taxa which do not occur presently in the area.

Regional geomorphologic and micro-stratigraphic studies on the 'Kibish Lake Plain' (Butzer, et. al. 1969) suggested that the Lake Turkana level fell to modern levels during the mid-Holocene, 6,600±150 BP. The second transgressive-regressive phase is stratigraphically and sedimentologically identified during middle Holocene in Area 102. Shell dates from Areas 102 and 103 are 5,060±245 and 4,540±230 BP respectively. To the southwest of Area 102 an earlier date of 6,500-6,200 BP is found.

The third phase of transgressive-regressive is detected during the late Holocene around 3,500-3,250 BP. Since 2,500 years ago, the lake fluctuated around the modern lake level and it has become highly alkaline. This evidence is also supported by the environmental studies conducted by Hamilton (1982).

Barthelme (1985) discovered 30 sites and 74 localities to the northeast of Lake Turkana of which fourteen were either sampled or excavated. He located a group of open air later Stone Age sites. The sites lacked pottery and contained a distinctive lithic industry of primarily chert microliths and microblades. The occupations were set on high ground overlying permanent freshwater sources. No faunal remains recovered were associated with lithic industry or pottery. Barthelme (1985) suggests that the lack of faunal remains and pottery in these sites indicate that they are Late Pleistocene to early Holocene hunting and gathering traditions that either preceded or co-existed with the lacustrine-based early Holocene fishing adaptations (Stewart, 1989; Sutton, 1974).

The most numerous archaeological sites at East Turkana are early to middle Holocene fishing settlements. Seven sites were discovered along the 75-80m shoreline of L. Turkana. At least two of these are said to be associated with the first high lake transgression and the rest either with phase 1 or 2. A single site was associated with the second major Holocene regression. Fishing sites exhibited broadly similar technological and economic patterns. Lithic industries are composed of microlithic scrapers which are unstandardized, *ouils écaillés* and core tools. Crescents and curved backed blades dominated the microlith types. Scrapers and burins were few (Barthelme, 1985). *Outils écaillés* and core choppers were well-represented at all fishing settlements. Cores were represented by bipolars. Micro-crystalline silicas provided raw materials for microliths, *ouils écaillés* and scrapers. Quartz was selectively used to make *ouils écaillés* and hammerstones. Lava was used in the manufacture of scrapers and heavy duty tools.

Obsidian was scarce. No microliths were made from either lava or obsidian. Grindstones and fire cracked rocks were features of the occupation areas.

Barbed bone harpoons, uniserial, biserial, triserial and barbless were either sampled or excavated from all fishing settlements. Notched and circular grooves were identified from the harpoon collection.

Both decorated and undecorated pottery was found in all but two sites, FxJi 12 and FxJi 12 North. The latter contained pottery with an affinity to Wavy-Line of the Sudan-Sahel (Arkell, 1949). Ostrich eggshell and stone beads were collected from most sites.

Nderit pottery was recovered at two major sites, Dongodien (GaJi 4) and Illeret Stone Bowl Site (FwJi 5). The dates for GaJi 4 are 3,945 and 3,960 B.P. from charcoal calibration. The dates for FwJi 5 is 4,000 B.P. calibrated from bone apatite (Barthelme 1985). Pottery recovered at Dongodien has external surfaces fully covered with rows of closely spaced cuneiform impressions. Internal surfaces were either decorated or scored with incised or deeply grooved lines. External and internal surfaces portrayed other features including circular and wavy impressions. Rimsherds showed tapered or flattened lips usually with milling and cross-hatchings. Some externally decorated sherds with cuneiform impressions that lacked internal decoration were also recovered (Barthelme, 1985).

Nderit Ware sherds were usually dark brown to dark grey in colour and were tempered with angular fragments of quartz. From rim profiles, it was suggested that vessels were open-mouthed and globular in shape.

The work at Dongodien established a direct association of Nderit Ware pottery with domestic animals dating to 4,000 BP. This date, with that of Gaji 2, represents one of the earliest excavated occurrences with evidence of domestic animals in East Africa. The dates for GaJi 2 are 3,970 B.P and 4,160 B.P, calibrated from charcoal samples and 8,915 B.P calibrated from shell sample. The inhabitants of Dongodien continued to harvest the plentiful fish resources of the lake but use of barbed bone harpoons had disappeared. Hunting of wild animals had declined tremendously. Site subsistence activities can be summarized in two ways.

1. Due to the recovery of domestic animals, fish refuse and small bovids, the site may have been used as a home base for stock-herding peoples who practised a diversified subsistence economy.

2. The site may have been occupied by cattle herding groups of hunter-gatherers who may have procured and butchered domestic animals (Barthelme, 1985).

Nile perch and several species of catfish were recovered from the Eastern side of the lake (Stewart, 1989). No absolute date has been established for GaJi 12. It was a Holocene fishing site. A relative date of between 8,000 and 9,000 B.P is suggested for this site due to similarities observed on bone harpoons in an earlier research (Barthelme, 1985; Kimaru 1991). The dates for GaJi 11 are 8,520 B.P and 8,710 B.P.

calibrated from shell and *Etheria* shell respectively (Table 1 and 2). Hippopotamus, crocodile and terrestrial mammal remains were recovered.

Human remains from Galana Boi sediments associated with the early to middle Holocene beach deposits showed that the individuals were robustly built and portrayed a degree of teeth wear (Mbua, 1984).

Early evidence of barbed bone harpoons in Africa comes from the Lower Omo Basin at Harpoon Hill dated by radiocarbon to at least 9,100 BP (Phillipson, 1977). At Lothagam, barbed harpoons were associated with beach deposits dated to 7,100 BP (Robbins, 1974; but see Stewart's footnote, 1989:248). The majority of Saharan fishing sites with bone harpoons according to Sutton (1977) date between 8,000-6,000 BP.

At East Lake Turkana sites GaJi 11 and FxJi 12 are associated with barbed bone harpoons and have radiocarbon dates of between 8110 \pm 130 BP and 8394 \pm 270 BP. Barthelme (1985) expressed a suggestion alongside others (de Henzelin, 1962; Robbins, 1974; Sutton, 1974; 1977), that harpoon culture originated in the East African water masses and gradually diffused and spread to the north and possibly east of this region.

Stamped Ware' pottery has been dated at Lothagam to 8,420 BP and a single wavy-line decorated sherd is dated between 7,960 BP and 6,200 BP (Robbins, 1972, 1974). Wavy-Line decorated pottery was collected from two of the large fishing settlements. Sites lacking pottery were dated between 8,700-8,400 BP. East Turkana and related sites to the north of it date prior to 8,000 BP (Barthelme, 1985). Fishing settlements lacked pottery (Barthelme, 1985). Later, decorated pottery including vessels with wavy decorations were manufactured in the region.

The Pastoral Neolithic phase was identified east of Lake Turkana, dating between 4,500-4,000 BP (Barthelme, 1985). This represents the earliest evidence for food production and animal husbandry in East Africa. Domestic animal remains were recovered from three sites, Dongodien (GaJi 4), Illeret Stone Bowl Site (FwJi 5) and (GaJi 2). At Dongodien, Nderit Ware and burnished pottery were recovered in direct association with domestic caprines and cattle. Reliance on obsidian as a raw material and diversion from fishing to pastoralism are also noted.

At Illeret Stone Bowl Site, seven stone bowls were recovered from the surface not in direct association with remains of domestic cattle and caprines. The seven stone bowl fragments were collected on the surface. Due to nearness to the site they are considered to be part of the site contents (Barthelme, 1985). The site contained pottery sherds with numerous execution techniques and decorative motifs including probable antecedents of Narosura Ware (Ambrose, 1984). Illeret Ware, a new pottery ware, was also identified. The site was dated to $4,000 \pm 140$ BP. The date is suspicious because it came from bones and radiocarbon dates are unstable unless redone getting the same dates several times (Collett and Robertshaw, 1983). The occupation is conservatively given a date of 3,000-4,000 BP. Illeret Ware appears to be concentrated primarily in northwestern Kenya near the Lake Turkana Basin. Other sherds have been collected at Eliye Springs to the southwest of the lake (Soper and Jacobs, 1972; Barthelme, 1985:180). Phillipson (1977b) reported a similar design from North Horr, Nyero and Magosi Rock Shelter, Karamoja Uganda and South Western Ethiopia (Barthelme, 1985).

Barthelme (1985) and Phillipson (1977) note that evidence of pastoralism at East Turkana links the early food producing traditions in the Sudan and the later pastoralist settlements in the Central Rift Valley of Kenya (Bower and Nelson, 1978; Ambrose, 1984; Bower *et al.*, 1977). The introduction of Neolithic pastoralism in the Lake Turkana Basin may have resulted from small scale human migrations sparked off by middle Holocene climatic deterioration in the Sahel-Sahara zones. The same view is expressed by Rightmire (1975) and Barthelme (1985).

Barthelme (1985) reconstructed land use patterns in the Lake Turkana Basin from roughly 10,000 years ago. He noted that by 9,100 years ago or earlier, humans had settled along the shorelines of Lake Turkana. Fishing was the primary activity. Pottery appeared at least 7,000 years ago. Settlement took place at this time close to the lake shoreline. No evidence of upstream settlement from the shoreline was found.

A second shift in land use took place between 4,500-4,000 BP and is evidenced by the advent of Neolithic pastoralism. Settlement patterns changed accordingly. The settlements were then around beach shorelines, river drainages and possibly on the crests of inland escarpments. Fishing continued but gradually disappeared with its replacement by domestication. Low density scatters of pastoralist artifacts suggest increased mobility (Barthelme, 1985).

It is clear that most of the past work incorporating the Holocene Period has focused on economic adaptations. The prehistory of the Holocene Period has proved to be complex in East Africa. In the Lake Turkana Basin, very little is known about the

way of life of the Galana Boi people. Only a sketch such as that of Barthelme is available.

The primary and most visible change was in food procurement and preparation strategies (Stewart, 1989). At this time of change, a parallel change was effected on all the inter-related items of culture. Such items are settlement patterns, innovation, mobility, group work, interaction within the community, religion etc. This is today clarified by the unfolding facts of such sites as Jarigole, Dongodien and Il Lokeridede. At these sites groups of people within a limited geographical area established a central site where they buried their dead possibly after primary burial and subsequent exhumation. This suggests evolving traditions and beliefs. The dead were probably seen as a part of the extant community living within the periphery of the sites. This most possibly resulted in rituals performed occasionally at the sites as a show of continued co-existence between the living and the departed. This area of social life has not been considered in detail in the past work. The first possible reason is lack of physical evidence to base the interpretation on and secondly, too much emphasis on economic factors such as PN adaptations and the relationships between them and the environment (e.g., Stewart, 1989).

The building of monuments to bury the dead, grave goods and sometimes implanting angular stone slabs on the horizon on top, is an exhibition of respite accorded the dead. The construction of a monument possibly is a way of accommodating the dead in the home which is analogous to the home of the living. The

site monument could have been the meeting place for the living dead which bound them together.

The study of Holocene human remains has received considerable attention (e.g., Barthelme, 1985; Robbins, 1980). Mbua (1984) studied remains of 51 individuals attributed to *Homo sapiens* recovered from Holocene Galana Boi Beds between 1968 and 1981. Several bones were determined to be pathological. Unusual muscle attachment, a development of abnormalities and deformations document the lifestyles of Galana Boi people (Mbua, 1984).

Stewart (1989) analyzed fish remains from sites worked by former researchers and concluded that people responded to a change in the environment during the Holocene. This is based on the analysis of fish bones which showed that people shifted from exploitation of land animals to dependence on aquatic resources as climatic amelioration resulted in an increased fish supply in the lake. The increased rainfall resulted in new fish species such as Nile perch and high reproduction of fish due to favourable conditions created by change in lake biochemistry, i.e., freshening of the lake waters (Stewart, 1989).

Ostrich eggshell beads from Jarigole were studied by (Mumanyi 1988). Six types of beads were recognised namely: barrel, spheroid, flattened, straight sided disc, disc and flat disc (Mumanyi, 1988). The site contains early PN pottery and Nderit Ware. The pottery is decorated sometimes including inside. The decoration is referred to as the triangular motif by Wandibba (1977).

Holocene funerary practices of Kenya were studied by Kyule (1989). Both primary and secondary burial practices were identified in the form of burial cairns and mounds respectively. Three main forms of disposal of the dead were recognised namely: discartion, cremation and inhumation. Human remains recovered from sampled and excavated burial cairns in the East Turkana region around Koobi Fora are being studied by Koch (pers. comm.).

The author, Kimaru, (1991) analyzed bone harpoons from four fishing settlements sites which are: Lothagam, Lowasera, GaJi 11 and GaJi 12. The research resulted in the examination of morphological variations of harpoons found from fishing settlement sites. The harpoons were found to be similar. The conclusion reached was that the fishing culture was practised by people who were migratory and in close contact. The harpoon culture is suggested to be an intrusion from outside the basin, especially from the north and west of it.

In 1991, Kamau and Koch conducted new excavations at the site of Dongodien. The aim of the research was to enhance the understanding of cultural-economic patterns of the earliest pastoralists in the Lake Turkana Basin. Cattle, goat/sheep and fish remains were recovered (Kamau, pers. comm.).

2.2 CONCLUSION

From the review of the past works presented above, it is clear that the work related to human life ways in the mid-to-late Holocene which is mainly on Neolithic

pastoralism is at its infancy. This work is aimed at producing insight into the understanding of the late prehistory of the basin.

This research is aimed at proving the existence of an integrated cultural pool within the L. Turkana basin during the height of Neolithic Pastoralism. The cultural pool was a medium between which different cultural items were projected. The role played by that cultural pool as a medium of exchange, invention and innovation is depicted by similarities observed on artifacts found from three sites which are being compared in this work. The sites are IL Lokeridede (Gaji 23), Dongodien (Gaji 4) and Illeret Stone Bowl (FwJi 5).

Generalised similarities are observed on artifacts from the three sites. The similarities observed on artifacts are a clear indication that though the three sites were the venue and vestiges of different functions, same people or people sharing same cultures performed their activities there. IL Lokeridede site is a secondary mortuary site as opposed to Dongodien and Illeret Stone Bowl sites which were habitation sites. Similar artifacts reflect the close relationship between the activities, mortuary and settlement because they are both offshoots of the common cultural pool.

Secondary interment and settlement are a reflection of unfolding lifestyles during the Neolithic Pastoralism. Secondary interment could only have been performed by people who were either semi or permanently settled. The taming and eventual keeping of animals domestically could have led to reduced human movements and the need to have permanent institutions such as secondary burials.

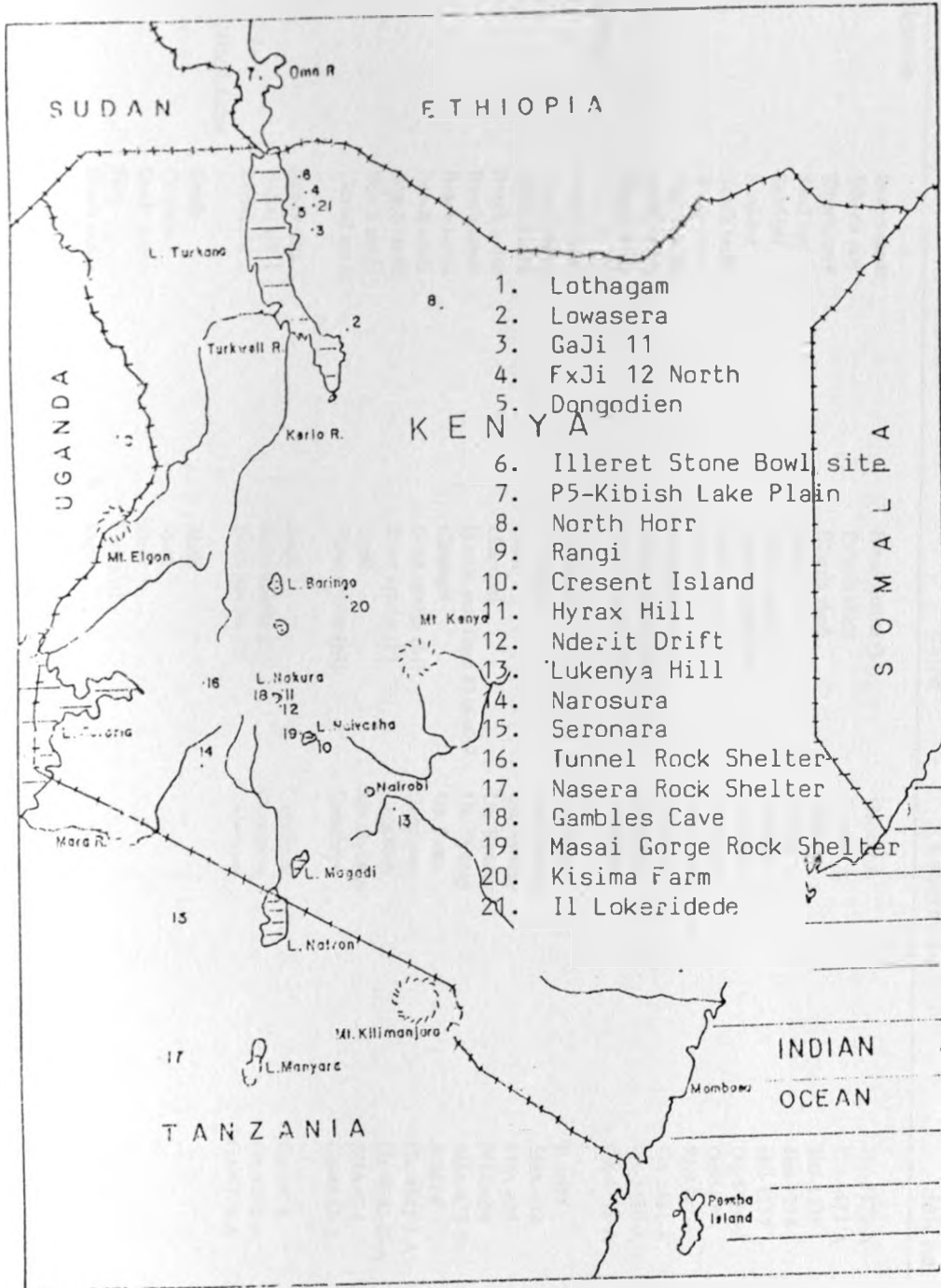


Fig. 2.1 Selected Plio-pleistocene to Holocene sites(modified from Barthelme, 1985).

TABLE 2.1
RADIOCARBON DATES *

| SITE | Lithology/enviroment of dated unit | Material dated | Laboratory |
|---|---------------------------------------|-------------------------|------------------|
| <u>Fishing settlements</u> | | | |
| GaJi 3 | Beach sands | Bone apatite (M) | Geochron |
| GaJi 11 | Etheria reef | Etheria shell | Geochron |
| GaJi 11 | Etheria reef | Etheria shell | Helsinki |
| GaJi 11 | Sand bar | Shell | Helsinki |
| GaJi 11 | Sand bar | Etheria shell | Helsinki |
| GaJi 11 | Sand bar | Bone apatite (F) | Geochron |
| FxJj 12 | Beach sands | Shell | Geochron |
| FxJi 12 | Beach sands | Shell | Radiocarbon Ltd. |
| FxJi 12 | Beach sands | Bone apatite (M) | Geochron |
| FxJi 12 | Beach sands | Bone apatite (M&F) | Geochron |
| FxJi 12-N | Beach sands | Bone apatite (H) | Geochron |
| <u>Pastoral Neolithic</u> | | | |
| GaJi 2 | Beach sands | Charcoal | Un. Penn |
| GaJi 2 | Beach sands | Charcoal | Un. Sydney |
| GaJi 2 | Beach sands | Shell | Un. Sydney |
| GaJi 4 | Beach sands | Charcoal | Un. Sydney |
| GaJi 4 | Beach sands | Humic acid from SUA-637 | Un. Sydney |
| GaJi 4 | Beach sands | Charcoal | Un. Penn |
| GaJi 4 | Beach sands | Bone apatite (M) | Geochron |
| GaJi 4 | Beach sands | Bone apatite (F) | Geochron |
| GaJi 4 | Beach sands | Shell | Un. Sydney |
| FwJj 5 | Fluvial sands | Bone apatite (M) | Geochron |
| <u>Other sites</u> | | | |
| Nderati | Sandy silts | Shell | Geochron |
| GaJj 9 | Burial site 1 | Bone apatite (H) | Geochron |
| GaJj 9 | Burial site 2 | Bone apatite (H) | Geochron |
| <u>Previously obtained dates</u> | | | |
| Ileret 1 | Sands | Shell | --- |
| Area 103 ² | Coquina | Shell | --- |
| Area 103 ² | Sandy silts | Shell | --- |
| Area 103 ² | Silts | Charcoal | --- |
| Area 102 ³ | Beach sands | Shell | Un. Birm |

* (Barthelme, 1985)

| Laboratory date no. | Date (yr BP) |
|------------------------|-----------------|
| Gx-5475-A | 4,560±185 |
| Gx-5477-A | Modern |
| Hel-1275 | Modern |
| Hel-1276 | 8,520±130 |
| Hel-1277 | 8,710±130 |
| Gx-5476-A | 7,855±160 |
| Gx-5479 | 9,260±235 |
| RI-954 | |
| Gx-5481-A | 8,395±270 |
| Gx-5480-A | 8,355±235 |
| Gx-4733-A | 3,215±155 |
| P-2609 | 3,970±60 |
| SUA-634 | 4,160±110 |
| SUA-635 | 8,915±140 |
| SUA-637 | 3,945±135 |
| SUA-637-B | 4,100±125 |
| P-2610 | 3,960±60 |
| Gx-4642-I-A | 3,405±130 |
| Gx-4642-II-A | 4,580±170 |
| SUA-638 | 10,320±150 |
| Gx-4643-A | 4,000±140 |
| Gx-5478 | 13,440±640 |
| Gx-4641-A | Modern |
| Gx-6400-A | 3,125±210 |
| --- | 9,360±135 |
| --- | 9,880±670 |
| --- | 5,060±245 |
| --- | 4,390±235 |
| Birm-540 | 4,540±230 |

Schmitt

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TABLE 2.2
RADIOCARBON DATES: CORRECTED AND UNCORRECTED AGES *

| SITE | Material dated | Date (yr BP) | Uncorrected Date (yr BP) | C ¹³ Value |
|-----------------------------------|--------------------|-----------------|-----------------------------|-----------------------|
| <u>Fishing Settlements</u> | | | | |
| GaJi 3 | Bone apatite | 4,560±185 | 4,160±185 | +0.5 |
| GaJj 11 | Etheria shell | modern | | -0.1 |
| GaJj 11 | Bone apatite | 7,855±160 | 7,460 ± 160 | +0.3 |
| FxJj 12 | Shell | 9,540±260 | 9,140 ± 260 | -0.1 |
| FxJj 12 | Shell | 9,260±235 | 8,950 ± 235 | -5.0 |
| FxJj 12 | Bone apatite (M) | 8,395±270 | 8,030 ± 270 | -1.9 |
| FxJj 12 | Bone apatite (M&F) | 8,355±235 | 8,000 ± 235 | -2.4 |
| FxJj 12-N | Bone apatite (H) | 3,245±155 | 2,945 ± 155 | -6.0 |
| <u>Pastoral Neolithic</u> | | | | |
| GaJi 4 | Bone apatite (M) | 3,405±130 | 3,075±130 | -3.8 |
| GaJi 4 | Bone apatite (F) | 4,580±170 | 4,230±170 | -2.6 |
| FwJj 5 | Bone apatite (M) | 4,000±170 | 3,660±170 | -3.5 |
| <u>Other Sites</u> | | | | |
| Nderati | Shell | 13,440±640 | 13,100±640 | -3.1 |
| GaJj 9 | Bone apatite | Modern | | -1.3 |
| GaJj 9 | Bone apatite | 3,125±210 | 2,880±210 | -9.3 |

* From Barthelme (1985)

CHAPTER 3: SITE STRUCTURE

3.0 INTRODUCTION

Site Il Lokeridede (GaJi 23) is a secondary burial mound. The site content force a designation of secondary funerary practice after a primary body disposal and subsequent exhumation. It is evident that a transition of the body from primary to secondary burial, intentional or unintentional smashing of the remains and probably grave goods took place. This is based on the extreme fragmentary nature of the materials. It is also very likely that during this transitional stage, grave goods were incorporated. This chapter presents the physical on-ground structure of site Il Lokeridede, Dongodien and Illeret stone Bowl sites. It includes site location, geological history of the sites and their environs, physical features and stratigraphy.

3.1 IL LOKERIDEDE: GaJi 23

The site is a burial mound located in Area 102 about 11 km east of Koobi Fora camp. From the site, the Six Miles Airstrip is to the east, Dongodien site (GaJi 4) to the south, Lake Turkana's North island to the west and Lorenyang Hills in between (see Figs. 1.1 & 2.1). From the top of the burial mound, all the above can be seen. Dongodien is about 0.5 km south of Il Lokeridede. The two sites are separated by laga Il Lokeridede which drains toward Lake Turkana. The site is sandwiched by two finger-like dry distributaries of laga Il Lokeridede. The Stone Fort Site (Soper and Jacobs, 1972) are

between laga II Lokeridede and the burial mound. Derati and Shin Hills can be seen on the horizon to the east of site II Lokeridede.

3.1.1 GEOLOGICAL HISTORY

A major work to establish rock sequence of Area 102 was undertaken by Barthelme (1981). A thick succession of Galana Boi sediments is established in the area. The deposits consisted of lacustrine, fluvial-colluvial units exhibiting a complex pattern of lake level fluctuations. Lithological units revealed a sequence of alternating layers of consolidated and unconsolidated diatomaceous silts (Barthelme, 1985) (Fig. 1.2)

Horizontal bands of calcium carbonate with limonite occurred within the unconsolidated silts. A fine layer of horizontally bedded diatomite indicative of episodes of low energy stable lacustrine environments of deposition were present within the silty horizon. The sequence of diatomaceous silts thinned to the east (Barthelme, 1981, 1985) where it mixed with coarse beach sands of the 75-80m lake transgression.

Three layers of coarse gravel, sand and reworked colluvial-fluvial sediments overly the silt units. Holocene deposits in some of Barthelme's trenches showed complex succession of sands which were underlain by Plio-Pleistocene indurated sands.

The subsidence of the lake level left laid down beach sand hanging on top of the hill which holds site II Lokeridede. Outside the area covered by the site, the beach sand is not visible. This is explained by possible fluvial-aeolian erosion since deposition. The beach sand layer resembles the top layers at Dongodien and near Lorenyang Hills which are designated Galana Boi Beds (Barthelme, 1985).

The hill on which the burial mound is built is a relic of several cycles of natural actions. During the early-middle phases of the Holocene Period, the transgressive-regressive cycles of the lake shaped the physiographic features prominent on the expanse shoreline of the Lake Turkana including Area 102. This is in form of erosion or deposition. At the third and final phase of the lake transgressive-regressive erosion seems to have minimised on the hill and the outlying areas. This is proved by pockets of layers of *Melanoidis* shells which were laid down by low energy lake waves. This phase coincides with the advent of Neolithic pastoralism and subsequent settled mode of life as depicted by Dongodien, Lothagam, Il Lokeridede, Illeret Stone Bowl Site and Jarigole.

Since the final drop of the lake level, erosion played a major role in shaping the landscapes further. This was accelerated by persistent dryness, which the region has experienced occasionally. The continued erosion by moving water and wind has deepened the dry channels such as Laga Il Lokeridede and two channels that sandwich the hill on each side and steepened the hill edges. Lack of vegetation and reliable rainfall has accelerated erosion. It is a general suspicion that by the time the mound was constructed, the region was vegetated.

3.1.2 SITE PHYSICAL NATURE

Il Lokeridede is set on a hill. The mound is constructed on a flat surface on the hill. The size of the mound top is about 81 m². But the extent of the cultural layer is not known. Excavation has not established the size of the layer. More excavation in the future is

vital to establish the extent of the cultural layer. The hill on which the mound is set is covered by consolidated cracked mudstone. The mudstone contains engulfed *Melanoidis tuberculata* shells. Fossilized bones of Plio-Pleistocene animals are common where the mudstone has cracks or has undergone erosion. There is no undergrowth vegetation. Few scattered acacia and toothbrush (*Mswaki*) trees are the only vegetation. Animals observed are dik-dik, oryx in the dry valley and striped hyena. On the crest of the hill and steep areas, the Koobi Fora exposures are seen.

Angular “arranged” stone slabs are laid on top of the mound. They may have been upright and fallen over from wind erosion. These stone slabs were possibly aimed at keeping off animals and to protect the mound from natural forces. They may also have had the purpose of enabling easy identification of the mound to the people around the area.

There is a noted stone pavement starting at the mound base to the east of it. The pavement is about 3m wide. It is made of arranged mud-stone slabs. The pavement seems to have been arranged as an approach to the mound. It is distinct as it is confined in terms of width and length. It is not easy to locate site Gaji 23 since the environment around it is changing very fast as a result of general decline in the environment around the Lake Turkana Basin. The high concentration of obsidian flakes and potsherds on the surface are the only indicators of the site presence. This is because the prominent features such as the upright stone slabs have fallen, are cracking and shattering due to exfoliation processes. The constructed pavement is fast being covered by wind blown sands. Most of the rocks which have not been weathered by contrasting temperatures

among the stone slabs are still angular and half buried in the sand. The rocks are double-coloured on buried parts and exposed parts respectively. This is as a result of prolonged exposure to the sun and wind.

There is no stone slab arrangement formula that has so far been recognised. Wind has blown away most of the sand probably wearing away most of the sand on the base of the arranged stones if implanted initially. However, laid stone slabs are the only defenders of the site from the wind.

3.1.3 STRATIGRAPHY

The work that has been done on the site is still very minimal. Due to little time considering work required to prepare the site for excavation, none of the pits excavated reached the mound base. Mapping the site and establishing a datum consumed most of the time. This was done at the expense of excavation. Limited time considering the inaccessibility of the site minimised time for excavation. Initially, the author and the supervisor underestimated the depth of the mound. This led to the opening of more than one pit hoping the bottom would be reached soon. The deepest pit has the depth of half a meter and the bottom is yet to be reached. The high artifact concentration per unit area reduced excavation speed tremendously.

By the same token, the horizontal extent of the mound was not established. One marginal 1 x 1 m square was opened hoping the cultural level ended there. This was not the case and its outer neighbour was opened. Still, the cultural layer edge was not found. There is no evidence of thinning of the cultural layer implying the edge is still

far ahead. More excavation in the future is required to establish the vertical and horizontal ends of the mound. This I suggest should be the next immediate theme of the future work at the site.

The stratigraphy of Il Lokeridede mound is uniform at the top because it was a backfill. It is a mixture of fine soil 1/8 - 1/4mm and subrounded pebbles 30 - 50mm. The lithological matrix is light brownish gray. Normally the soil is mixed with *Melanoides tuberculata* shells. The shells are an indication of sub-mergence during the L. Turkana's transgression-regression period. The shells were left hanging when the Lake shrunk at the end of Holocene pluviality. Other than Il Lokeridede, other sites discussed in this thesis include Dongodien and Illeret Stone Bowl as discussed below.

3.2 DONGODIEN: GaJi 4

The site is located in Area 102 to the North East of Koobi Fora Camp. Dongodien is about 0.5Km South of Il Lokeridede. It is opposite IL Lokeridede across the dry Laga IL Lokeridede. Dongodien was situated on the shoreline when Lake Turkana stood nearly 50m higher than today. The site of Dongodien was excavated by John Barthelme in late 70's. John Kamau did re-excavation with Dr. Christopher Koch as a part of the former's M.A. work (pers. Comm). The author and Dr. Christopher Koch visited the site in the summer of 1992 when doing work at Il Lokeridede site.

3.2.1 STRATIGRAPHY

Altimeter readings show the archaeological horizon lay 44 - 47 meter above June 1976 level of Lake Turkana. Series of Radio -Carbon determinations support the occupation

horizon dates 4,000 B.P. Galana Boi deposits in Area 102 (Raynolds, 1973) have a maximum thickness of 32 - 35m and lay on upper member beds of Koobi Fora formation (Raynolds 1973, Vondra and Bowen, 1978).

Principal archaeological level is lithogologically in three units:-

- i. Light orange clear coarse gravelly sand beds containing whole and broken mollusc shells mainly *Melanoides tuberculata*. Sub-rounded gravels and abundant bone refuse, stone artifacts and faunal remains and a charcoal fragment.
- ii. Light orange clear, medium coarse sand, small gravels, mollusc shells, artifacts, bone refuse and charcoal fragments.
- iii. Pale to dark gray charcoal stained medium - fine sand, few mollusc shells, concentrations of fish and charcoal, artifacts especially minute obsidian debitage.

Sedimentary succession is exposed as a result of Late subsidence during the Lake Holecene and thereafter. As the Lake subsidence advanced, paleo-lake shoreline was exposed containing microlithic toolkit, Nderit ware pottery and domestic animal remains.

3.2.2 DATING

Six Carbon - 14 dates were made from Dongodien. Four different materials were used in dating which are: mollusc shell, fish and mammal bones, and charcoal. The dates according to Bartheleme (1985) are:-

| <u>Date</u> | <u>Material</u> | <u>Laboratory</u> |
|----------------|--|----------------------------|
| 10,320+150 B.P | Shell | University of Sydney |
| 4580+170 B.P | Fish | Geochron Labs |
| 3405+130 B.P | Mammal | Geochron Labs |
| 3945+135 B.P | Charcoal | University of Sydney |
| 4100+125 B.P | Humic acid residue from charcoal sample | University of Sydney |
| 3890+60 B.P | Charcoal | University of Pennsylvania |

Table 3.1 Dongodien : GaJi 4 dating

3.2.3 INTERPRETATION

The date from shell is thought to reflect shell date but not occupation horizon (Barthelme, 1985:177). The shell may have intruded into the occupation level from another older level. This explains the big disparity between shell dates and others from other materials.

The disparity between fish and animal bone dates suggests that fish bone may have been a reworked material from an earlier Holocene levels. Another explanation could be that the mammal bone sample have been subjected to geochemical processes of alteration (Robertshaw and Collett, 1983). Barthelme (1985) cautions against endorsement of a single bone apatite date determination from Lake Turkana Holocene deposits.

The age of the occupation level is interpreted as between 3,900 - 4,100 B.P from charcoal samples as their standard deviation overlap (Barthelme, 1985).

3.3 ILLERET STONE BOWL: FwJi 5

The site is situated in Area 10 approximately 1/2Km from the Il-Erriet river. The site location is on the margins of a major river drainage, probably proto Il-Erriet. Illeret Stone Bowl came into existence during the retreat of the second Holocene Lake transgression (chapter 2 this manuscript Bartheleme, 1985.) The site was excavated by John Bartheleme in the late 1970's.

3.3.1 STRATIGRAPHY

Galana Boi deposits at FwJi5 lay on the upper member of the Koobi Fora formation. The thickness is just over two and a half metres. Lower Holocene levels composed of fine to coarse clear gravely sands. Accumulations of unbroken mollusc shells, chiefly *Melanoides tuberculata*, Cleopatra and fish bones. Isolated Uniserial bone harpoon was collected at the Northern margin outcrop of this level. The harpoon presence indicates that these lower Galana Boi units were former beach sediments associated with high pluiviality and fishing cultures (Kimaru, 1991).

Upper Holocene level composed of coarse dirty sands, broken mollusc shell and large angular rock fragments. Recent erosion has exposed stone artifacts and pottery sherds.

Lithology of the upper Holocene level is:

- i) Light gray to pale orange semi-consolidated medium sand, mollusc shells, angular pebbles, silt particles adhering to sand grains - few artifacts.

- ii) Upper Level: Pale gray, poorly sorted, consolidated coarse sand, angular rock fragments, rounded cobbles and broken mollusc shell - Archaeological horizon.
- iii) Lower Level: Medium to dark gray, poorly sorted, coarse sand, sand coated clay pellets, Calcium Carbonate cement, rock fragments and broken mollusc shell (Melanoides Corbicula), Mutella and Pila ovata, broken pumice pebbles, numerous artifacts - broken and water abraded.
- iv) Light gray consolidated coarse sand, Calcium Carbonate concretions, broken *Pila ovata* shells, fish bones and few water worn artifacts. This represent an early stage of deposition of reworked beach and channel deposits after regression of mid-Holocene Paleolae shoreline.
- v) Lower beds: These consists of Plio-Pleistocene silty clays and sandy (tuffaceous fluvi-lacustrine) silts.

3.3.2 DATING

| <u>Date</u> | <u>material</u> | <u>laboratory</u> |
|---------------|-----------------|-------------------|
| 4,000±140 B.P | mammal bone | Geochron labs |

Table 3.2 Illeret Stone Bowl : FwJi 5 dating (Bartheleme 1985)

This date should be viewed with caution as it is a single bone apatite determination (Robertshaw and Collett, 1983; Bartheleme, 1985:213). The site consists of one or more occupational episodes of unknown duration. A tentative date of between 3,500 - 4,000 B.P is suggested (Bartheleme, 1985).

3.4 CONCLUSION

The structures of sites Il Lokeridede, Dongodien and Illeret Stone Bowl are the relics of past and continuing changes of the physical environment by natural forces. Il Lokeridede shares structurally with its neighbouring sites which is a characteristic of Areas 102 and 10. The work of man has changed the physical arrangement within the area occupied by the sites. This has been done by the placement or replacement of physical features which are either local or foreign. Although Il Lokeridede, Dongodien and Illeret Stone Bowl are far apart, they share in their stratigraphy and lithology.

In the succeeding chapter, I intend to analyse the principle artifacts from the above sites with special emphasis on pottery which is found in all the three sites.

CHAPTER 4: ARTIFACT ANALYSIS

4.0 INTRODUCTION

This chapter presents an analysis of the materials recovered from the study area. The materials include potsherds, formal stone tools, faunal remains and beads which were either excavated or collected from the surface. The analysis was centered on the attributes of the artifacts. The aim of this analysis was to determine the similarities and differences between the three sites that form the core of the study. The sites are Il Lokeridede, Dongodien and Illeret Stone Bowl. In the succeeding section, the sites are discussed starting from Il Lokeridede which was my primary focus.

4.1 IL LOKERIDEDE: GaJi 23

At Il Lokeridede, the role of natural factors in concentrating and breaking up of materials is minimal. The aim of constructing a burial mound is a projection of attitudes towards death the Neolithic Pastoralists of northern Kenya held (Hodder, 1986:128). This makes it imperative that analysis be conducted on the material to understand burial practice at the time (Watson *et al.*, 1971:ix). This is given weight by the fact that grave goods and the graves themselves are seen as good mirrors of pre-historic society (Ake, 1979).

Pottery recovered from the sites is more common than any other material type. Attribute analysis has been done on all the decorated sherds. Very few vessels could be reconstructed due to the fragmentary nature of the potsherds. The decorated sherds have been, for convenience, categorized into Nderit, ripples, and other decorated pottery.

These three major categories are further sub-divided into rim and body sherds, and burnished or unburnished.

The attributes considered regarding rim sherds are; slip colour, interior and exterior, paste texture, temper inclusions, surface treatment, rim profile, lip shape, decorations and rim millings. Attributes looked at regarding body sherds are; sherd type, i.e., part of the body of the vessel the sherd has come from, surface treatment, temper inclusions, paste texture, vessel shape, decoration locations, type and expression of the decorations. In this case, a complete vessel has been divided into rim, neck, handle, shoulder and base (see Fig.4.1). A total of 629 sherds have been analyzed.

| | NO. | % |
|-------------------------|-----|-------|
| Nderit - Rimsherds | 6 | 0.95 |
| - Bodysherds | 20 | 3.18 |
| - Bodysherds (variants) | 31 | 4.93 |
| Other decorated sherds | | |
| Rimsherds | 87 | 13.83 |
| - Bodysherds | 121 | 19.24 |
| Plain - Rimsherds | 4 | 0.64 |
| - Bodysherds | 360 | 57.23 |
| Total | 629 | 100 |

Table 4.1 Number of sherds analysed.

4.1.1 POTTERY: Nderit Ware

Nderit ware is represented by 26 (4.13%) sherds. This ware is the oldest known and properly dated of all the East African PN ceramic wares.

All decorations are usually located on the exterior surface. Decorations usually cover the whole surface. They are expressed in several ways usually as compounds of other elementary decorations which are:

- (1) Vertical grooves broadening basewards narrowing rimwards
- (2) Irregular row(Fig 4.12a). of stylus impressions (Fig 429b).
- (3) Stylus impressions in panels (Fig 4.13b).
- (4) Crescentic marks made by crescent-edged objects in rows or fields (Fig 4.30b).
- (5) Mixed parallel grooves and perpendicular rows of stylus impressions and grooves (Fig 4.13b)

Bulging walls of decoration marks are common especially with internal scoring, showing decorations were made with the clay still wet. All the Nderit sherds are internally scored. Scoring is expressed either as shallow regular grooves, irregular haphazardly deep grooves or broad evulsions.

All sherds are slipped. Slip colours are brown (10YR 4/6) (Takehara,1967) (N=7, 35%), brownish red (10YR 5/4) (N=1, 5%), red (10YR 5/6) (N=11, 55%), and dark brown (7.5 YR 7/6) (N=1, 5%), internally. External colour paints are red (N=16, 80%),(10YR 5/6) brownish red (N=3, 15%) (10YR 5/4), brown (N=3, 5%) (10YR 4/6).

Various mineral elements are used in different quantities. All the sherds have quartz granules in their temper, obsidian chips (N=11, 42%), calcite particles (N=6, 23%), shell (N=1, 5%), and ruby specks (N=6, 23%). Temper inclusions are not used as a criteria to establish the number of specimens as more than one temper(s) are found in a single specimen.

Majority of the sherds have a convex posture (N=14, 67%), and a few concave (N=2, 10%). One vessel rim is carinated. A lid which is the biggest single sherd (see Fig. 4.1) recovered has a convex posture and is perforated in the middle.

This ware is represented by six rims. Internal slip colour is brown (10YR 4/6) on all the rims. Externally there is brown colour (10YR 4/6) (N=4, 67%), and red (N=2, 33%) (10R 5/6). Quartz granules are observed in all the rims. Obsidian chips (N=3, 50%), and calcite particles (N=2, 33%). Only one rim is evidently burnished. Rim profiles are out-turned (N=1, 17%), in-turned (N=4, 67%), and in-turned and bevelled (N=1, 17%). Lip shapes are rounded (N=3, 50%), flattened (N=1, 17%), pointed and carinated (N=1, 17%).

Normally rimsherds have only varnishing decorations basewards. The decorations are mixed grooves and stylus impressions in panels, grooves, herringbone and one rim is plain. Rims are milled with grooves (N=4, 67%), the groove millings are usually slanted, stylus impressions (N=1, 17%), and one rim sherd is un-milled. One rim vessel is internally scored with evulsions and the rest (N=5, 83%), have haphazardly deep grooves.

Ripple marks on sherds are relics of incomplete burnishing. The sherds of this kind exhibit varying degrees of burnishing or lustering (Shephard, 1956) depicted in the prominence of the ripples. When burnishing is extreme, it is not possible to recognise ripples, but when it is low, ripples are prominent. Ripples are left as strains when the burnishing object does not complete one cycle or when it is not smooth. Sometimes burnishing is patchy with some areas left as pockets of unburnished and burnishing intensive lip-wise. This is seen as a strategy to make the rim stronger by increasing the temper cohesiveness thus avoiding breakage. The rim is more prone to breaking and wearing out than other parts of the vessel.

There are 31 sherds represented in this case (10%). Majority of them are from the vessel shoulder (See Fig. 4.1) (N=30, 97%), and the remaining one is a neck part(Fig.4.15b).

Different colour slips are observed on both sides of the sherds which are internal brown (10YR 4/6) (N=12, 38.71%), red (10R 5/6) (N=12, 38.71%), brownish red (10R 5/4) (N=3, 9.68%), and black (7.5YR 1.7/1) slip colour (N=3, 9.68%). One of the sherds is too highly eroded to recognise the slip colour. Externally they are brown (10YR 4/6) (N=14, 45%), and red(10R 5/6) slip colour (N=17, 55%).

Quartz particles are observed universally in all sherds, obsidian chips (N=20, 65%), shell (N=2, 6%), ruby specks (N=7, 23%), volcanic ash and calcite particles (N=4, 13%), are also found. Vessel shapes are convex (N=27, 87%), one of them is carinated and pointed (N=4, 13%). All the sherds do not have any other decorations except ripples. All the ripples are located on the external surface.

Ripples are expressed as :

- (1) Irregular and vertical (N=8) (Fig 4.14a)
- (2) Horizontal parallel ripples (N=2) (Fig 4.11a)
- (3) Regular vertical ripples (N=11) and (Fig 4.14a)
- (4) Overlapping ripple marks portraying extreme burnishing towards
varnishing (N=10) (Fig 4.11a).

4.1.2 POTTERY : Other decorations

These comprise 13.83% (N=87) of the collection. Few rims joined with body sherds implying that many vessels are represented by a single rim sherd. Similarly, few rim are represented by more than one rim sherd even without joining. Most of the rims observed show brown (10YR 4/6) slip colour internally (N=72, 83%), red (10R 5/6) (N=12, 14%), and brownish red (N=3, 3%)(10R 5/4). External slip colour varied from brown(10YR 4/6) (N=59, 68%), red(10R 5/6) (N=19, 22%), brownish red (10R 5/4) (N=8, 9%), to dark brown (7.5YR 3/4) (N=1, 1%). All rimsherds have quartz in their temper, obsidian specks (N=58, 67%), ruby (N=6, 7%), calcite particles (N=19, 22%), volcanic ash (N=5, 6%), and basalt particles are also found.

Over 75% (N=65) of the sherds show evidence of burnishing. Burnishing is only on the external surface. The degree of burnishing varies and is unequal on different rims. Some are highly burnished while others are slightly burnished.

There is no uniformity in rim profile. Different kinds of profiles noted are in-turned (N=58, 67%), out-turned (N=15, 17%), in-turned and carinated (N=10, 11%), in-turned and bevelled (N=3, 3%), out-turned and bevelled (N=1, 1%).

Shapes observed are rounded (N=50, 57%), pointed (N=14, 16%), rounded and thickened (N=13, 15%), thickened and flattened (N=4, 5%), pointed and thickened (N=3, 3%) and flattened (N=3, 3%).

Some rims do not have any decorations (N=18, 21%). In this case, decorations are assumed to be either non-existent or present in the shoulder part of the complete vessel. The decorations observed, like in the body sherds, are either compounds of other elements observed or single. Decorations on the body and rim part of the vessel appeared similar.

The decorations are:

1. Ripple markings (Fig 4.14a)
2. Grooves (Fig 4.27a)
3. Crescentic marks (Fig 4.30b)
4. Mixed grooves and stylus impressions (Fig 4.20a)
5. Mixed stylus impressions and crescentic marks (Fig 4.32b)
6. Pendant triangles made of stylus impressions (Fig 4.6)
7. Stylus impressions (Fig 4.20b)
8. Herringbone impressions.

Occasionally millings are not different from decorations on the vessel surfaces. There are unmilled rim sherds (N=16, 18%), groove millings (N=47, 54%), herringbone millings (N=18, 21%), millings of stylus impressions (N=3, 3%), crescentic markings, (N=1,

1%) mixed grooves and ripple markings, (N=1, 1%), mixed grooves and herringbone impressions (N=1, 1%). The millings are usually displayed internally and externally.

This category make up 19.24% of the assemblage (N=121). These are represented by small and single sherd fragments. None of the sherds from this category refit. The small size of the fragments has frustrated the efforts to reconstruct vessels. A few of them (N=25, 14%), show evidence of burnishing. Burnishing is only applied on the external surface.

Slip colour varies not only between different sherds but also internal and external sides of the same sherd. Internal slip colours observed are brown (10YR 4/6) (N=82, 67.77%), red (10R 5/6) (N=27, 22.31%), black (7.5YR 1.7/1) (N=8, 6.61%), brownish red (10R 5/4) (N=1, 0.83%), and dark brown (7.5YR 3/4) (N=3, 2.48%). External slip colours are red (10R 5/6) (N=76), 62.81%, brown (10YR 4/6) (N=34), 28.11%, brownish red (10R5/4) (N=5), 4.13%, darkbrown (7.5YR 3/4)(N=6, 4.13%) and black (7.5YR 1.7/1) having one case.

Temper inclusions are quartz granules in all specimens including ruby specks (N=14, 8%), volcanic ash (N=9, 5%), shell (N=1, >1%), calcite (N=13, 7%), and obsidian (N=89, 51%).

Majority of the sherds exhibit a generalised convex posture, concave shape in a few, one is carinated and one has a straight shape. Here, shapes are delicately observed because of smallness in specimen size.

Majority of the sherds came from the shoulder (N=109, 90%), from the neck (N=11, 9.1%) and one is a figurine part possibly a tail or neck (see Fig. 4.25b).

Among the highly burnished sherds, varnishing grooves, horizontal or slanting and usually overlapping grooves are evident. Burnished mixed grooves and stylus impressions in panels are observed. Burnished broad grooves made by use of two different sized objects (N=1), branching parallel grooves, burnished grooves made by pressing an object on wet clay are also observed. Usually decorations cover the whole surface area. Decorations are only on the external surface. Other decorative motifs are expressed as:

1. Different sized grooves in panels
2. Mixed parallel and horizontal grooves
3. Vertical parallel grooves
4. Slanting rows of stylus impressions in panels interrupted by interludes of broad grooves.
5. Touching rows of stylus impressions
6. Converging grooves
7. Zigzag grooves with stylus impressions engraved in them
8. Haphazardly expressed grooves.
9. Zigzag grooves and separate rows of stylus impressions in panels
10. Parallel grooves in fields
11. Parallel overlapping grooves
12. Mixed vertical and slanting grooves
13. Fields of stylus impressions mixed with rows of crescentic marks
14. Rows of stylus impressions in fields dissected by fields of parallel grooves

15. Rows of crescentic markings
16. Rows of stylus impressions engraved in grooves

Texture varies from one kind of paste to the other. Generally, the paste texture is mixed. There is a uniform correlation between paste type and the size of the particles. Quartz tends to be the most coarse in all specimens. Obsidian chips portray a general mixture of coarse and small granules. The sources of different pastes are not known. Organic ones could be from the basin such as shell and thatch grass. The same case applies to volcanic ash. It is very likely that quartz and obsidian are from sources outside the basin because they are not found on the surface in the basin.

Pottery from Il Lokeridede is generally well oxidised. This is in contrast to pottery from Dongodien, which is generally reduced. Il Lokeridede pottery differs also with that from Nderit Drift. The specimens from the latter site, show a high degree of reduction. At Il Lokeridede, very few specimens are reduced. The majority of the sherds are internally red coloured showing that they were fired on at high temperatures.

There are four plain rims represented. Interior and exterior slip colour is brown (10YR 4/6). Paste texture is coarse. Temper inclusion in all the rims are quartz granules and obsidian chips. Rim profiles are outturned (N=3) and inturned (N=1). Lip shapes are rounded and thickened (N=3) and rounded only (N=1).

A total of 360 sherds were recovered. The number is slightly and unusually higher than that of the decorated body sherds. The sherds are slipped with brown (10YR 4/6) colour slip. They are well-fired. The number of body sherds is overwhelmingly higher than the rims (N=4). There are no sherds that conjoin. The sherds come from the shoulder part of the vessels.

From the information collected by looking at attributes of sherds from Il Lokeridede, an interesting vessel configuration can be posited. Though few vessels (about two) have been reconstructed to a reliable extent, a few things can be concluded. The out-turned rim profile of the rim sherds indicates the vessels were open bowls. It has been found that a substantial number of vessels were carinated. Towards the base, immediately after carination, the vessels tend to have a convex posture. The open bowls seem to have been short in height.

Small mouthed, gourd-shaped vessels are common in the assemblage. This is explained by the crescent shape of the cross-section of some rims. These were probably used in the storage of liquids or some kind of ritual. There is evidence of the bowls being lidded by a ceramic lid which is perforated at the middle and probably used for passing a stirring implement (Fig. 4.2).

The bases of the majority of the vessels are round. There is a unique base which is disk-shaped (Joukowsky, 1986). The bases are usually undecorated and thickened. A single ceramic sherd has been attributed to a figurine. The figurine piece is thick, reminiscent to either a neck, tail or leg of an animal. It has groove decorations on it. The piece is too small for a final conclusion to be made, but similar sherds are known from Jarigole (see Fig. 4.25b)

4.1.3 STONE ARTIFACTS

Stone artifacts are the second most common class of artifacts recovered from GaJi 23. Obsidian pieces are scattered all over the surface of the mound and its environs. They are all flakes whose functions are not possible to establish. Obsidian accounts for 95% of the raw material (see Tables 4.9 and 4.10). It is either black or greenish colour, semi-translucent usually with a brown outer margin when held against the light. Some pieces are dark green and fully opaque. The same characteristics have been noted at Dongodien (GaJi 4). Analysis of obsidian source areas in northern Kenya has shown that sources within the Lake Turkana Basin account for a large portion of the obsidian materials recovered from sites in the same area (Merrick and Brown, 1984). However, small quantities of obsidian from sources outside the basin is evident (Barthelme, 1985). Microcrystalline silica (MCS) is the second most common stone raw material (4%) followed by quartz (1%).

Lithic materials from GaJi 23 are dominated by flakes (86%) (see Table 4.8). These are 139 recognisable flakes and utilised tools which is 7% of all the plotted materials. Utilised tools found after sorting out debitage and flakes are twenty which is 14% of the stone assemblage. Tools recovered are *outils écaillés* (N=4), flakes with backed edges (N=6), segmented blades (N=4), segmented flakes with edge damage (N=2), a notch (N=1) and a burin (N=1). The maximum length of the flakes is 27mm and the minimum is 6mm.

Obsidian was the most frequently used raw material in the manufacture of lithic tools (80%) followed by microcrystalline silica (16%) and quartz (4%). The initial intention of the makers was to produce flakes. This is based on their frequency, modification and re-use after wearing or breaking. Different use for such re-used tools is possible as shown by the other few tool types (see Table 4.9). The presence of release surfaces and double flaking scars on the majority of the modified tools suggest they were all flakes initially. This anticipated reduction in weight during modification for re-use is well reflected in the averages and standard deviations of different tools and flakes (see Table 4.2-4.8). By the same token, disparity on width/length and thickness/width ratios of flakes and different types of utilised tools is attributed to this (see Table 4.2-4.6).

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|------|-------|
| Length | 119 | 11.62 | 5.29 | 3.69 | 26.75 |
| Width | 119 | 7.28 | 3.11 | 2.08 | 19.65 |
| Thickness | 119 | 1.91 | 1.24 | 0.50 | 6.37 |
| W/L | 119 | 0.63 | 0.59 | 0.56 | 0.73 |
| Th/W | 119 | 0.26 | 0.40 | 0.24 | 0.32 |

Table 4.2 Measurements (mm) Of Flakes From GaJi 23

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|-------|-------|
| Length | 6 | 14.42 | 4.87 | 11.17 | 24.92 |
| Width | 6 | 8.72 | 5.02 | 4.68 | 19.65 |
| Thickness | 6 | 1.72 | 0.64 | 0.73 | 2.52 |
| W/L | 6 | 0.60 | 1.03 | 0.42 | 0.79 |
| Th/W | 6 | 0.20 | 0.13 | 0.16 | 0.13 |

Table 4.3 Measurements (mm) of Flakes with backed edges.

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|------|------|------|-------|
| Length | 4 | 9.96 | 3.40 | 5.94 | 13.46 |
| Width | 4 | 8.69 | 4.40 | 4.12 | 15.34 |
| Thickness | 4 | 2.60 | 1.36 | 1.70 | 3.81 |
| W/L | 4 | 0.87 | 1.29 | 0.69 | 1.14 |
| Th/W | 4 | 0.30 | 0.31 | 0.41 | 0.25 |

Table 4.4 Measurements (mm) of Outil eccaille

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|------|-------|
| Length | 4 | 13.81 | 6.27 | 5.17 | 21.48 |
| Width | 4 | 9.13 | 3.40 | 4.24 | 13.67 |
| Thickness | 4 | 1.54 | 1.95 | 0.69 | 2.06 |
| W/L | 4 | 1.51 | 0.54 | 0.82 | 0.64 |
| Th/W | 4 | 1.48 | 0.57 | 0.16 | 0.15 |

Table 4.5 Measurements (mm) of segmented blades

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|-------|-------|
| Length | 2 | 24.46 | 2.18 | 22.28 | 26.64 |
| Width | 2 | 11.02 | 0.67 | 10.35 | 11.68 |
| Thickness | 2 | 2.63 | 0.26 | 2.36 | 2.89 |
| W/L | 2 | 0.46 | 0.31 | 0.46 | 0.44 |
| Th/W | 2 | 0.46 | 0.39 | 0.23 | 0.25 |

Table 4.6 Measurements (mm) of backed blades

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|-------|-------|
| Length | 2 | 19.80 | 2.95 | 16.84 | 22.74 |
| Width | 2 | 10.30 | 0.29 | 10.05 | 10.63 |
| Thickness | 2 | 1.73 | 0.14 | 1.59 | 1.86 |
| W/L | 2 | 0.52 | 0.02 | 0.60 | 0.47 |
| Th/W | 2 | 0.09 | 0.48 | 0.16 | 0.17 |

Table 4.7 Measurements (mm) of segmented flakes with edge damage

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|-------|-------|
| Length | 3 | 70.95 | 2.24 | 91.92 | 80.99 |
| Width | 3 | 35.00 | 1.92 | 32.31 | 36.67 |
| Thickness | 3 | 22.39 | 5.33 | 17.34 | 29.76 |
| W/L | 3 | 0.49 | 0.09 | 0.35 | 0.45 |
| Th/W | 3 | 0.64 | 2.78 | 0.54 | 0.81 |

Table 4.8 Measurements (mm) of stone rubbers

| RAW MATERIAL | TOOLS | | FLAKES | | TOTAL | |
|-------------------------|-------|-----|--------|-----|-------|------|
| | N | % | N | % | N | % |
| OBSIDIAN | 16 | 80 | 113 | 95 | 129 | 92.8 |
| MICROCRYSTALLINE SILICA | 3 | 15 | 5 | 4 | 8 | 5.7 |
| QUARTZ | 1 | 5 | 1 | 1 | 2 | 1.4 |
| TOTAL | 20 | 100 | 119 | 100 | 139 | 100 |

Table 4.9 Tools raw materials inventory

| | NOTCH | BURIN |
|-----------|-------|-------|
| Length | 15.37 | 16.66 |
| Width | 10.63 | 11.31 |
| Thickness | 4.95 | 5.33 |
| W/L | 0.69 | 0.68 |
| Th/W | 0.47 | 0.32 |

Table 4.10 Measurements (mm) of a notch and burin

| | No. | Mean | S.D. | Min. | Max. |
|-----------|-----|-------|------|------|-------|
| Length | 20 | 15.10 | 5.96 | 5.94 | 26.64 |
| Width | 20 | 9.41 | 3.82 | 4.12 | 19.65 |
| Thickness | 20 | 2.29 | 1.20 | 0.69 | 5.33 |
| W/L | 20 | 0.62 | 0.64 | 0.69 | 0.74 |
| Th/W | 20 | 0.24 | 0.31 | 0.17 | 0.27 |

Table 4.11 Measurements (mm) of stone tools from Gaji 23

Grinding stone rubbers are common artifacts in the Pastoral Neolithic sites. The association of these tools with archaeological materials is a universal indication of a pastoral society but this work has shown that they could have been used in other ways such as grinding red ocher.

Three stone rubbers were recovered at site GaJi 23. One has retouch on both distal and proximal edges. This may be as a result of use as a hammerstone. Two have scratch marks on the body which may have been incurred by use as hammer stones on small sharp objects. The largest rubber has linear parallel marks made of red ocher which suggest use in grinding red ocher.

Red ocher is known to have been widely used by many former and contemporary communities for decoration of their bodies or objects. This is associated with certain community rites such as initiation. The smallest is a disc-like oval in shape. It has been reduced by intensive use. It is smooth allover and has no marks on it to suggest use. In terms of weight from the largest to the smallest, they weigh 128.25gm, 82.35gm and 30.65gm respectively (see Table 4.12).

| | N | Mean | S.D. | Min. | Max. |
|-----------------------------------|-----|-------|-------|-------|--------|
| Backed Blades | 2 | 0.93 | 0.04 | 0.89 | 0.97 |
| Segmented Flakes w/Edge Damage | 2 | 0.18 | 0.13 | 0.05 | 0.31 |
| Segmented Blades | 4 | 0.26 | 0.14 | 0.02 | 0.39 |
| Outils eccailles | 4 | 0.29 | 0.35 | 0.05 | 0.89 |
| Flakes with Backed Edges | 6 | 0.27 | 0.15 | 0.04 | 0.53 |
| Flakes | 119 | 1.60 | 2.36 | 0.1 | 10.6 |
| Stone Rubber | 3 | 80.42 | 36.17 | 30.65 | 128.25 |
| All tools | 20 | 0.40 | 0.34 | 0.02 | 1.00 |
| Notch and Burin | 2 | 1 | 0.34 | 1.00 | 1.00 |

Table 4.12 Weight (gm) summary table of stone tools and flakes

A fragment of a stone bowl was recovered by excavation. This is the only stone bowl recovered in the excavation in direct association with archaeological artifacts. The association of stone bowls with PN materials is controversial (Cohen, 1970).

Stone bowls that have been found near PN sites are not in direct association with ceramics or remains of domesticates in the Lake Turkana Basin. However there is no doubt that stone bowls are as old as the PN in East Africa or earlier. Stone bowls are mostly found in sites related to burials such as burial cairns (Brown, 1966), or crematoriums (L.S.B. Leakey, 1931). The place of stone bowls in East African PN prehistory is only lightly known and tentative (Cohen, 1970).

The bowl is shallow and rounded with a rounded rim. At the vicinity of GaJi 23, stone bowls have been collected at the Illeret Stone Bowl Site (Barthelme, 1985). The vessels were not in direct association with pottery and domestic animal remains. The seven stone bowls were collected on the surface at the site. None was recovered by excavation.

4.1.4 BEADS

A total of twelve beads were recovered at Il Lokeridede which is about 0.6% of the whole assemblage. Two types of beads were recovered depending on the raw materials. Nine of them are made of ostrich eggshell. They are of significance as they are at different stages of manufacturing. All the ostrich shell ones are perforated. Some perforations are bigger than others indicating some have been used for a long time as the size of the perforation is increased by wearing due to use. The beads are purposely for decorations. They are socio-technic materials (Binford, 1971). Generally, the beads portray rounded shape.

Majority of them are polished (N=8) to achieve smooth surface. They may have been polished by use of a rough stone. A single bead is unfinished and unpolished. It is likely that the bead was discarded before it was finished. Its edges are still sharp. The edges are rough indicating that it was discarded immediately after it was carved from the raw material. The perforation is rough showing it was not used. This bead gives a clue that beads are made by pressure methods to carve it from its fragile raw material.

Three (N=3) beads are made of green rocks. The green rock is Pre-Cambrian in age and is beryl. The rock is found either in South Horr or Ethiopia which are within the reach of Lake Turkana Neolithic inhabitants (Merrick, pers. comm.).

One of the green beads is perforated on the wall. Its semi-circular curvature indicates it was re-perforated after breaking. The latter perforation is smaller than the former. All the three beads are well polished on the walls and one is ovoid in shape (See Table 4.13).

| | | N | Mean | S.D. | Min. | Max |
|---------------------|-----------|---|------|------|------|-------|
| OSTRICH EGGSHELL | DIAMETER | 9 | 4.87 | 0.95 | 3.86 | 7.03 |
| | THICKNESS | 9 | 1.55 | 0.33 | 0.95 | 5.95 |
| GREEN BERYL | DIAMETER | 3 | 9.71 | 3.39 | 6.31 | 13.10 |
| | THICKNESS | 3 | 4.64 | 0.97 | 3.64 | 5.95 |

Table 4.13 GaJi 23: Measurements Of Beads (mm)

4.1.5 FAUNAL REMAINS

All the human remains recovered are very small in size. Only one hind phalange and a lower molar are complete. Human remains were smashed either intentionally or otherwise in the course of transition from a primary to a secondary final resting place. There is no evidence of bodies having been initially laid in anatomical articulation. The dumping of the body as a whole is doubted by the fact that some of the marginal distal parts, e.g., phalanges are found not associated with the proximal parts such as the humeral parts or radius or ulna. Though no bone scatter analysis has been implemented, it is apparent that the human remains were not buried as discrete burials (Table 4.14). Twenty pieces of ivory were recovered from Il Lokeridede. The reason for putting elephant ivory in the burial mound is unknown. The pieces are small. It is evident that the ivory was fragmented before it was incorporated into the mound and the breaks are not fresh (Table 4.15).

| Body Part | NISP |
|---------------------------|------|
| Cranial Vault Fragment | 4 |
| Front Phalange | 1 |
| Long Bone Fragment | 1 |
| Lower Bone Fragment | 3 |
| Lower Molar | 1 |
| Metacarpal | 1 |
| Unclear | 1 |
| Rib Fragment | 5 |
| Temporarl (Petrosal Part) | 1 |
| Lunate | 1 |
| Lower Molar Crown | 1 |
| Total | 20 |

Table 4. 14 Inventory of Human Remains

| Body Part | Bovid | Elephant | Non-identifiable Mammal |
|--------------------|---------|----------|-------------------------|
| Long Bone Fragment | | | 9 |
| Sharf Fragment | 1 | | 1 |
| Tooth | 1 | | 1 |
| Worked | | | 1 |
| Cervical | 1 goat? | | |
| Premolar | 1 goat? | | |
| Ivory Fragment | | 20 | |
| Total NISP | 4 | 20 | 12 |

Table 4. 15 Inventory of Mammal Identifiable Body Parts

There are 34 parts attributed to other mammals. These include a complete incisor of a small bovid and an incomplete cervical vertebra of a goat. No other part is attributed to domesticates (Table 4.15).

| | NISP | % |
|-------------------------------|------|-------|
| Human | 20 | 13.1 |
| Fish | 8 | 38.0 |
| Mammal (unidentified species) | 46 | 30.1 |
| Shell | 1 | 0.7 |
| Bird | 1 | 0.7 |
| Bovid | 4 | 2.6 |
| Elephant | 20 | 13.1 |
| Non-identifiable bones | 3 | 1.9 |
| Total | 153 | 100.0 |

Table 4.16 Inventory Of Faunal Remains

4.1.6 FISH BONES

The fish parts consist of catfish spines (N=33) and fish vertebra (N=2). The spines are fossilized indicating they are Plio-Pleistocene in age. Only one spine was surface collected. The rest were recovered by excavation. The frequency of fish spines recovered increased towards the mound bottom. Fish spines in this area are seen cemented in the mudstone overlying the Plio-Pleistocene sediments. The ones recovered in the mound could be as a result of weathering of the mudstone or laid down during the early Holocene lake transgressive-regressive cycles before the mound was constructed.

Surface collection recovered 1,600 artifacts. Pottery is the most common material (N=1,545, 96%), followed by obsidian (N=35, 2%), microcrystalline silica (N=6, 1%), human remains (N=7, 1%), ostrich eggshell (N=3), quartz (N=3) and fish bone (N=1%). The high quantity of pottery on the surface corresponds with the same in the mound. Surface collection was done on all 21, 1x1m squares which cover the top of the mound. Appendix, Table A1, contains the distribution and frequency of different artifacts per quarter square.

4.1.7 DISCUSSION

From the analysis in this chapter, a conclusion can be drawn. The majority of the materials from Il Lokeridede are ceramics. The kind of pottery from the burial mound shows that the site dates to early PN times. Nderit pottery from the site is represented by a few sherds. The presence of this ware shows that the site is as old as Dongodien (GaJi 4) and the Illeret Stone Bowl Site (FwJi 5). At Il Lokeridede, the materials that have been recovered were brought for an intended purpose related to funerary practices. Different slip colours have been observed on the sherds. The slip colours are observed on pottery assemblages earlier recovered from Dongodien and the Illeret Stone Bowl Site. Burnishing is common on pottery from Il Lokeridede. Most of the ceramic vessels are shallow open bowls usually carinated. It has been observed that there is a single ware from Dongodien, Illeret Stone Bowl, Jarigole and Il Lokeridede. Since features of the ware earlier observed at the former two sites are found in the Il Lokeridede mound, it is suggested that there is one ware shared by the three sites. At the same time, Il Lokeridede contains obsidian flakes which are also recovered at Dongodien. Grinding rubbers are not reported in the other two sites. Stone grinding rubbers also place the site in the PN era. Il Lokeridede

contains a stone bowl fragment. Stone bowls were earlier recovered only at the Illeret Stone Bowl Site and not Dongodien.

Il Lokeridede was constructed by people who had a common culture which they shared. Since it is a burial mound used for secondary disposal, it is suggested that the site was constructed purposely to serve people from the two settlement sites, Dongodien and Illeret Stone Bowl sites.

4.2 DONGODIEN: GaJi 4

Over 600 hundred sherds were recovered from Dongodien. The assemblage portrayed diversity in decoration execution techniques and design styles. Nderit ware has internal and external decorations. Other sherds lacking internal decorations were also recovered. Stone artifacts and faunal remains were also recovered.

4.2.1 POTTERY: Nderit Ware

At Dongodien, Nderit ware pottery was directly associated with domestic animals but not with stone bowls. Assemblage of Nderit ware sherds was usually dark brown to dark gray in colour and tempered with small angular fragments of quartz. No vessel reconstruction was done due to fragmentary nature of the sherds. Several rim profiles suggests that some vessels had open mouths, globular in shape probably like those from Stable's drift and Makalia burial site (Barthelme, 1985:168). Other (N-24) decorated sherds had evidence of slip application.

A number of whole and fragmentary sub-circular discs were also recovered. The sherds had been purposely shaped by rubbing their edges on an abrasive surface. Most of the pieces had been burnished and slipped. Their function is unknown. There were 68 undecorated sherds comprising 19% of the entire excavated assemblage. For Dongodien pottery (Barthelme, 1985: pp. 158-162, 170-172).

4.2.2 STONE ARTIFACTS

Microliths are the most common stone artifacts followed by *Outils e'ccaille's* and other scraper forms. Crescents were well represented in the microliths. Obsidian account for over 70% of the raw material. One stone bowl manufactured from green metamorphic schist was also identified. It appeared to have been a shallow bowl with rounded sides. The provenance of the bowl is uncertain (Barthelme, 1985). One dihedral burin was collected on the surface made of obsidian flake fragment (Barthelme, 1985: pp. 157, 165-166).

4.2.3 FAUNAL REMAINS

A small collection of fish and mammal bones including fragmentary bovid horn core and several complete bovid teeth was made. Domestic caprines and domestic cattle were recovered from the excavation. Fiona Marshall (1977, 1985 et.al) and Diane Gifford identified mammal, bird and reptile remains while Kathy Stewart (in Marshal et.al. 1985) identified large collection of fish bones. Approximately 7,000 bone fragments were found.

Fish bones consisted primarily of Nile Perch (*Lates niloticus*), tilapia (*Tilapia nilotica*), several species of catfish including Wahrindi (*Synodontis scale*, sp. and *Bagrus bayad*. Fingerfish (*Hyrocynus sp.*) was also identified (Stewart, 1989).

Bovids were categorised as very small bovids (N=19) such as Dik-Dik (*Madoqua sp.*) followed by small bovids (N=596) including impala (*Aenyceros melampus*) and granti gazelle (*Gazella granti*).

Domestic caprini were identified from a combination of dental and post-cranial remains. Medium bovids (N=37) include cattle (*Bos sp.*) identified on the basis of teeth, phalanges and two astragali. Leporidae include cane hare (*Lepus capensis*) was identified by a single phalanx.

Hyracoidae is represented by a rock hyrax (*Procarria sp.*). A polished and perforated incisor of a male hyrax was recovered. Reptile was represented by a single element of a monitor lizard (*Veranus sp.*) and a turtle (*Cheloniidae*). Bird family was recovered represented by several fragmentary diaphyses and a complete talon of a large raptor, possibly the African Fish Eagle (*Haliaeetus vocifer*). A small wading bird is identified from a broken phalanx.

4.3 ILLERET STONE BOWL: FwJi 5

Nearly 600 sherds were recovered from the surface of Illeret Stone Bowl site, while 1706 were recovered through excavation. Other materials recovered from the site include faunal and human remains. No stone artifacts were found.

4.3.1 POTTERY: Illeret type

Common decorative style consists of overlapping crescentic impressions which often occur in rows attributable to 60% of the decorated sherds. This pottery is referred to as Illeret type (Barthelme, 1985:199).

A total of 1706 sherds were recovered from excavation. Seventy Five percent of the excavated decorated sherds are assigned to a single group - Illeret type. This pottery is not accepted as a ware as it lacks universality as it is only found at Illeret Stone Bowl site. Decoration motif of this type consisted of incised or impressed herring bone patterns. Crescentic or lozenge shape impressions which are closely spaced, often overlapping, in horizontal and vertical rows. Majority of sherds displayed a series of zig-zag incised lines forming a herring bone pattern. The surface finish show no evidence of external or internal burnishing. Temper is coarse sub-angular quartz grit.

Vessel thickness is between 5 -8mm with a mean thickness of 6.2mm. Paste is moderately porous silty clay. Red slipping is lacking in this Illeret type. Vessel form is both in straight sided and slightly concave pots.

Illeret type of pottery or its variant is distributed in Northwestern Kenya within and near the Lake Turkana basin, Eliye springs to the South West of the Lake, North Horr, Nyero and Magusi Rock shelters both in North-Eastern, Uganda, Lesayu, Lower Omo Valley South Western Ethiopia, Karamoja and Narosura in Central Rift Valley of Kenya.

Over 100 vessels burnished and slipped with reddish purple colour were found. Majority of them were tapered and had either stamped or incised cross-hatched designs

resembling specimens from Narosura. A single internally scored sherd was found in the excavation.

In summary, over 2,000 sherds were recovered from surface collection and excavation. Impressions, comb-stamping and incisions are the dominant modes of decoration. Internally scored pottery is lacking in this site (Barthelme, 1985: pp. 205 - 206, 209 -211).

4.3.2 STONE ARTIFACTS

Seven stone bowls were recovered at Illeret Stone Bowl site. They are the only stone bowls associated with domestic animal remains in the region (Barthelme, 1985: pp. 202).

4.3.3 FAUNAL REMAINS

Identification was mainly by dental remains due to excessive fragmentation and poor mineralization. Domestic caprines and cattle were identified. Fish bones comprise 40% of the total assemblage (Barthelme, 1985).

4.3.4 HUMAN REMAINS

Six well preserved cranial fragments were recovered. It is not possible to assign cranial parts to the main occupational level. This is because they lay stratigraphically below the main occupation horizon (Barthelme 1985:212). This indicates that they may belong to an earlier occupation of the site very likely early and middle Holocene period.

4.4 CONCLUSION

Dongodien was a Neolithic pastoralism occupation site. The recovery of domestic animals, fish refuse and small wild bovids suggest the site may have represented a homebase for stock herding people who at the same time practised a diversified subsistence economy. A sudden cultural shift to the North-Eastern sector of Lake Turkana is suggested due to lack of bone harpoons (Barthelme, 1985). Bone harpoons were associated with Early to middle Holocene lacustrine fishing cultures (Kimar, 1991). The culture diminished with the advent of pastoralism though the environment may not have been conducive during the Late Holocene. This is because of reduction in pluviality and subsequent subsidence of the Lake, increased salinity and reduction of water fish resources. The sudden cultural shift and economic base is supported by presence of microlithic toolkit, new styles e.g pottery decorations and introduction of domestic animals.

Illeret Stone Bowl site was occupied by Neolithic Pastoralists. The pastoralists tended domestic cattle and caprines and manufactured stone bowls, microlithic stone tools and various pottery wares.

Il Lokeridede is a mortuary site, Dongodien and Illeret Stone Bowl are home and economic bases in terms functions. The latter two were occupied by Neolithic Pastoralists who tended domestic cattle and caprines. They manufactured stone bowls, microlithic stone tools and various pottery wares. The three sites are vestiges of a cultural revolution around the end of the Holocene. New economic activities came into existence. The economic revolution sparked spiral revolutions in the lifestyles of the Neolithic Pastoralists.

Such changes are reflected in Secondary Mortuary practices, settlement patterns and other economic activities such as domestication and pottery manufacture.

CHAPTER 5: COMPARATIVE ANALYSIS : POTTERY

5.0 INTRODUCTION

The aim of this work is to find the relationship between Il Lokeridede and its neighbouring sites. The realisation of that aim gives way to putting Il Lokeridede in its archaeological perspective. This chapter presents the attribute comparison between Il Lokeridede (GaJi 23) Dongodien (GaJi 4) and Illeret stone Bowl (FwJi 5). Pottery attributes have been selected as the criteria of comparison because of their high frequencies in all three sites. The attributes that have been compared using a computer programme are surface treatments (burnishing, slipping and pigmentation), decorations (comb-stamping, grooves, stylus impression and ripple marks), sherd outer posture (convexity, concavity and carination), rim sizes (designs separate or touching), decorative designs (uniformity, panels in band and fields in band) and colour of the sherds (red or brown).

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5.1 SURFACE TREATMENT

In this cartegory, I intend to investigate the relationship between sites on the basis of their surface treatments. Three ways of surface treatment are observed which are burnishing, slipping and pigmentation. Burnishing is similar in Dongodien and Illeret Stone Bowl Sites. The result indicate that 70% of the sherds are highly burnished. In Il Lokeridede between 55% and 60% are highly burnished. This shows that burnishing was common among the Neolithic potters to the East Lake Turkana during the Neolithic Pastoralism time. Analysis has shown that burnishing was high towards the rim and breaking point such as the neck and carinations.

Burnishing is done on the surface. There are two major reasons why burnishing was applied. Firstly, is to increase temper cohesiveness thus making the pot strong. Secondly, is to beautify the pot by making its surface smooth. It has been observed in the analysis that burnishing could be applied before or after decorating of the pot (Fig 5.1).

Self slipping is infrequent in all the three sites (Dongodien 40%, Illeret Stone Bowl 10 -20% and Il Lokeridede less than 5%). This shows that most of the pots were slipped intentionally by the potters using a particular slip. Pigmentation is frequent in all three sites. (Dongodien 90%, Illeret Stone Bowl 80% and Il Lokeridede 60 - 70%). It is observed that most of the pigmentation slipping took place after firing as no reduction is observed on the surface of most of the sherds. It is very likely that pigmentation slipping took place after firing as no reduction is observed on the surface of most of the sherds. It is very likely that if pigmentation slipping took place before firing the slip could be destroyed by fire through reduction process. Slipping could be applied on the surface of the pot in two major ways:

- (i) Emersion or
- (ii) Painting

In the case of emersion, pigmented slip is stirred with water and the whole pot is then emersed in the viscous liquid. After emersion the pot is allowed to dry to a limited extent and then burnished. Emersion seems to be the method frequently used by PN potters around the Lake Turkana. Painting involves the use of hands or another implement to paint the surface of the pot with the viscous pigmentation slip (slip mixed with water.)

This criteria is not the best and has not been observed. Painting has its drawbacks one of them being time consumption. Painting would take more time than emersion and would eskew reducing time for burnishing before total dryness takes place. This blunder may destroy the pot, reduce smoothness and lead to crackings on the surface leaving the pot's surface rough. The other drawback is increasing the volume of work in burnishing. Painting would mean uniform application of the slip on the surface of the pot. To make the pot slip uniform would require more burnishing work.

5.2 SURFACE COLOUR

There are inherent difficulties in determining the original colours of most of the sherds. Such forces as erosion, carbonation, abrasion, corrossion and chemical action due to exposure has resulted in most colours being ambiguous. However, the colour of most of the sherds from the three sites revolves between pure brown and pure red. The determination of the colour of sherds has been sub-divided into either red or brown. This is done depending on whether the sherd is more brownish red or reddish brown. The former is summarily categorised as brown and the latter red (Fig 5.2). The following table illustrates the sherd colours (%) by site:-

| SITE NAME | BROWN | RED |
|--------------------|--------------|---------------|
| IL Lokeridede | 38% (N = 89) | 62% (N = 144) |
| Illeret Stone Bowl | 27% (N = 28) | 73% (N =77) |
| Dongodien | 24% (N = 22) | 76% (N = 68) |

Table 5.1 Sherd external colours.

5.3 SHERD OUTER POSTURE

Sherd outer posture is the alignment of the pot when positioned upright. Analysis of the posture has shown that convexity is the common posture in Il Lokeridede (80 - 90%) and Illeret Stone Bowl (70 -80%) sites and Dongodien with between 10% and 20% has the lowest incidence of convex posture. Concave posture is not common in all three sites. Dongodien leads with between 10 and 20% followed by Illeret Stone Bowl between 10 and 15% and Il Lokeridede with less than 10%. Concave posture is not common in the three sites as sherds with such posture are less than 20%. Carination is poorly represented in the three sites. Dongodien has the highest with this posture accounting for 10 - 20% of the sherds. Carination in both IL Lokeridede and Illeret Stone Bowl sites account for less than 10% (Fig 5.3).

5.4 RIM MEASUREMENTS (MM)

Rim measurements are subdivided into four major categories. The categories comprise sherds that are less than 7mm, between 7-10mm, between 10-13mm and above 13mm. The measurements were taken on the lip and below the lip. Analysis has shown that the three sites compare measurably well between categories less than 7mm and between 10-13mm. Above 13mm the sites reflect some major differences. In case of less than 7mm Il Lokeridede has between 60% and 70% of the sherds. Dongodien and Illeret Stone Bowl sherds are between 10% and 20% (Fig 5.4) respectively. In the other categories, the three sites compare well as they interchange positions.

5.5 DECORATIVE TECHNIQUES

Major decorations recorded from the three sites are grooves expressed either in small incised lines, object dragged grooves or broad parallel ones, ripple marks in form of parallel top-bottomwise, long parallel ripples or short branching haphazard ripple marks, stylus impressions expressed in form of triangular marks, crescents, linear impressions, rectangular or narrow marks: comb stamping and evulsed stylus. The above decorative attributes are represented in the three sites. Grooves are well represented in Il Lokeridede and Dongodien as the major decoration type. Ripple marks are only common in Il Lokeridede. Stylus impressions dominate in Illeret Stone Bowl while comb - stamping and evulsed stylus are remarkably under-represented in all the three sites (Fig. 5.5).

5.5.1 DECORATIVE DESIGNS

Decorative design describes how decorations are arranged on the surface of the pots. This study has found that decorations in Il Lokeridede cover the whole surface of the pot uniformly in between 70 and 80% of the sherds, between 40 - 50% sherds in Illeret Stone Bowl and 20% of the sherds in Dongodien. Panelling in bands is common in Dongodien (80%) followed by Illeret Stone Bowl (40 - 50%) and Il Lokeridede (20 - 30%). Fielding in bands decorative design is absent in Dongodien but lowly represented in Illeret Stone Bowl (10 - 20%) and Il Lokiredede (20 - 30%). Fielding in bands decorative design is absent in Dongodien but poorly represented in Illeret Stone Bowl (10 - 20 %) and Il Lokeridede (less than 10%).

It has been observed that the most common decorative designs in the three PN sites are uniform and panels in a band. The two exchange alternatively in the three sites (Fig. 5.5.1).

5.5.2 DECORATIVE DESIGN ELEMENTS

Decoration design elements represent the matrix patterning of the decorative designs. This is meant to explain the closeness or furtherness of the elements. The initial aim of the element study is to find out whether there is a generalised patterning of the decorative elements. The patterning is categorised into two:

(i) Separate

(ii) Touching

Separate describes elements which are distant from each other. Touching is where such distancing is not present. Among the three sites Dongodien, Il Lokeridede and Illeret Stone Bowl, separation of elements is the common mode of arrangement (Fig 5.5.2).

Il Lokeridede sherds rate between 90% and 95% in elementary separation followed by Illeret Stone Bowl, between 70% and 80% and lastly, Dongodien with 70% separation. Touching in the three sites is observed in less than 50%. There is evident tendency towards design element separation in all the three sites.

5.6 CONCLUSION

Attribute analysis is the method that has been applied to find out the relationship between sites IL Lokeridede, Dongodien and Illeret Stone Bowl. The three sites are geographically located in the same area, East of Lake Turkana. The material contents has revealed a generalised similarity. The three sites are different functionally but more similarities than differences exist. This can be attributed to different site function but same users. The most likely people who used the sites and subsequent construction of the mound are Neolithic Pastoralists. The similarities are an indication of common culture and common people. The differences can be attributed to different functions that the sites were made for.

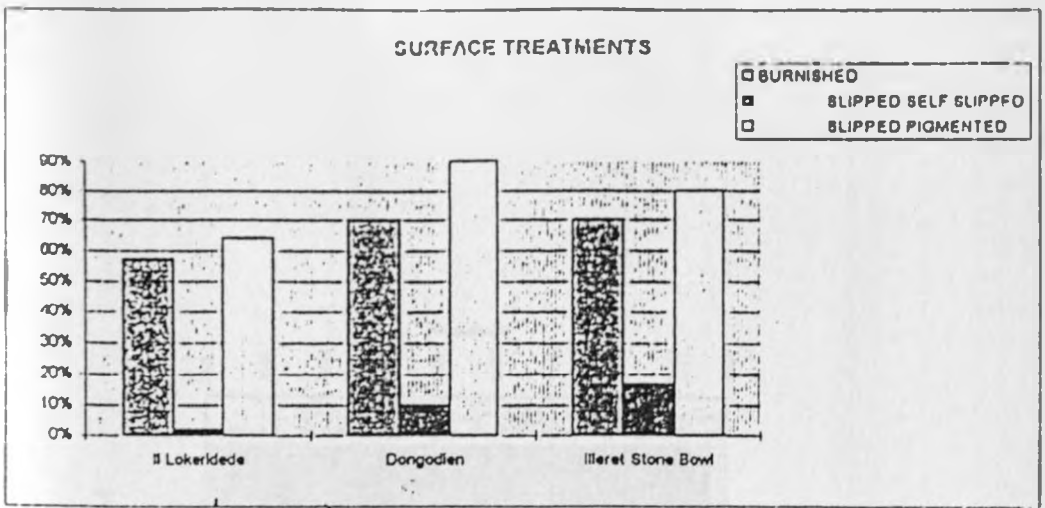


FIG. 5.1 Surface treatments.

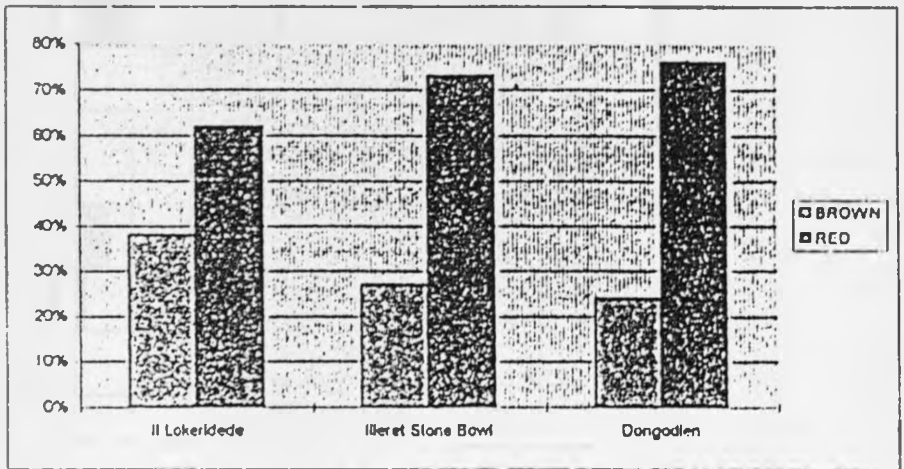


FIG. 5.2 Surface colour.

Sherd Outer Posture

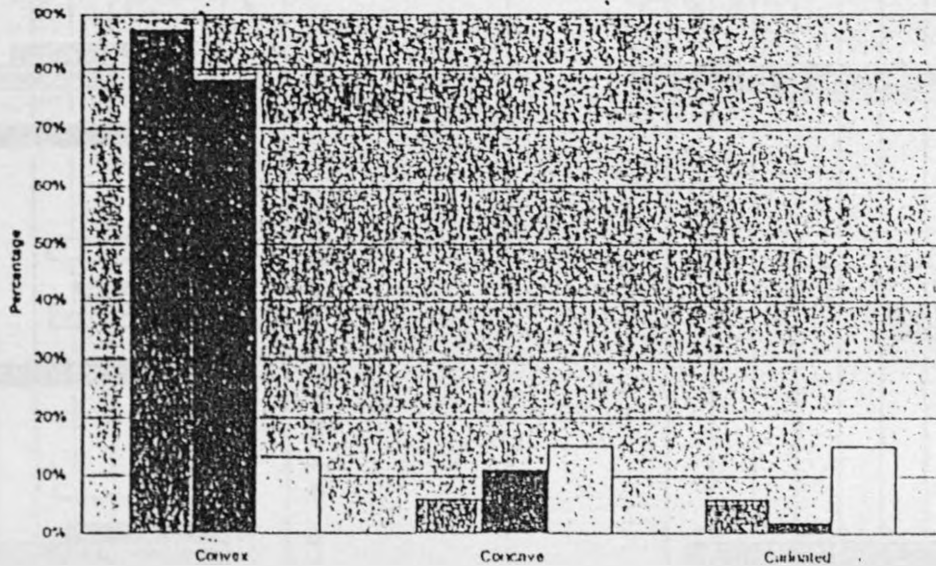


Fig. 5.3 sherd outer posture.

□ I Lokelidede
■ II Level Stone Kwad
○ Oangoden

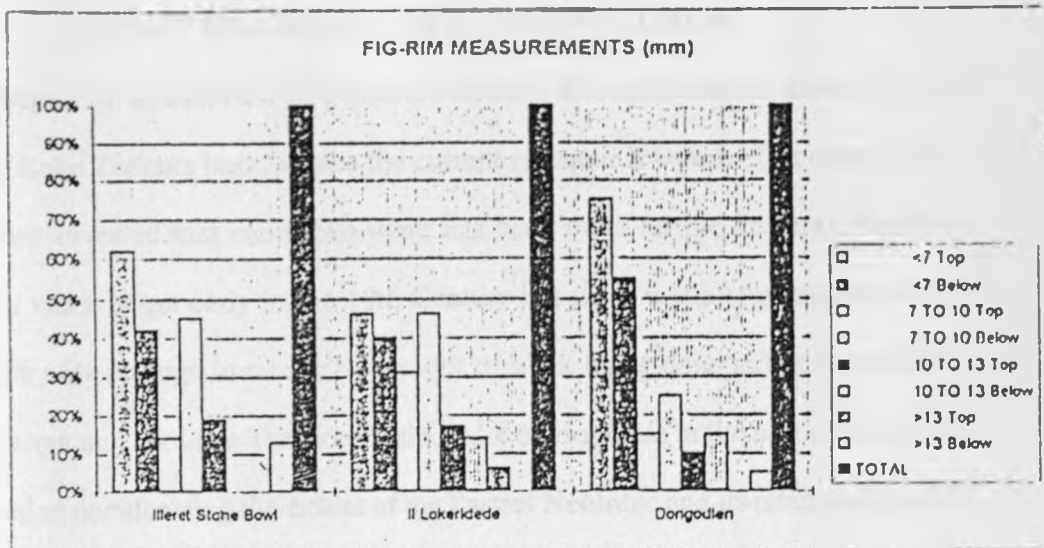


FIG. 5.4 d Rim measurements.

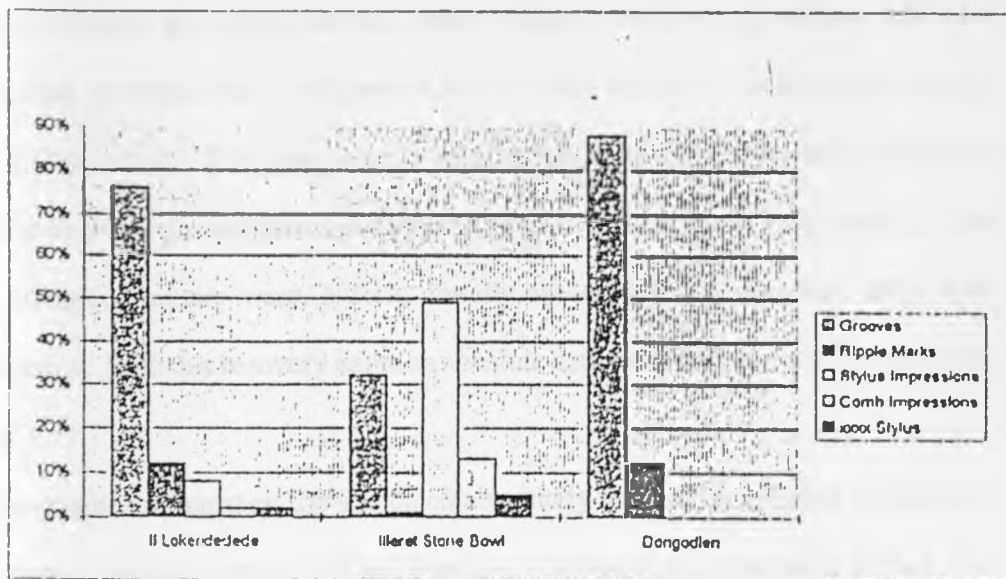


FIG. 5.5 Decorative techniques.

CHAPTER 6: SUMMARY AND CONCLUSION

This work began by an overview of Pastoral Neolithic Research done in East Africa in general and Lake Turkana basin where the current research is based. The overview of past work has revealed that enormous work has been done for the Pastoral Neolithic period. The work began early in the 19th Century but there was a rejuvenation in the 1970's. This new upsurge in research saw a lot of work being done in the Central Rift Valley of Kenya and the Lake Turkana Basin. A lot of emphasis in the past research has been directed at documenting the extent of the Pastoral Neolithic and its relationship with the Later Stone Age industries, defining the pottery wares from Pastoral Neolithic sites and dating pastoral Neolithic sites.

As a result of the intensified research in the 1970's several Pastoral Neolithic sites were identified, excavated, several pottery wares identified and defined and site dates procured. A remarkable development in the 1970's research was defining Pastoral Neolithic Culture itself. This gave way to substantiating its uniqueness and difference from other cultures of the terminal Later Stone Age. The Research was invigorated by the recovery of unique pottery ware, Nderit, directly associated with domestic cattle and caprine remains. With this recovery came an absolute date from the same site, Dongodien of 4,000 B.P.

Dongodien still remains the site dated absolutely and having a direct association of Nderit pottery with domestic cattle and caprines. The same era of research in the Lake Turkana Basin witnessed the research extending to the North of Dongodien and excavation

of Illeret Stone Bowl site which closely resemble Dongodien. Both are habitation sites occupied by Pastoral Neolithic people. Illeret Stone Bowl is also unique in its own way. New pottery ware was found called Illeret ware and red slipped which seem to be derivatives or variants of the famous Pastoral Neolithic Nderit Ware. Of more importance was the recovery of stone bowls associated with domestic cattle and caprines and pottery reminiscent to Nderit at Illeret Stone Bowl. The two sites are similar in material combination and are overwhelmingly thought to have been occupied by people who were sharing a common culture. Illeret Stone Bowl has been tentatively dated to around 4,000 B.P. The two sites seem to have been the venue for an almost proved cultural shift that took place to the North around Lake Turkana basin in the second half of the Holocene. The advent of Neolithic Pastoralism which subsequently led to introduction of domestic cattle in the basin was preceded by still a unique aquatic resource harvesting peoples. What is not clear is how the two cultures, fisher/hunter and pastoralists were related. Material remains depict the differences of the two cultures especially pottery. Holocene fisher/hunter groups used wavy-line pottery not yet documented in the Neolithic Pastoral sites.

No research has shown what could have happened to the Holocene fish harvesting groups around the shoreline of Lake Turkana as pastoralists came in. They could either have been the same people who changed to new life discarding everything else, assimilated or moved away to give way to the advancing pastoralists. The goals to be realised in this research were:-

- (1) Finding out whether pottery Wares from the three sites are similar.

- (2) Putting the research site of Il Lokeridede in its archaeological and chronological perspective in the research area (East Turkana) during the Pastoral Neolithic time span.
- (3) To confirm the function of Il Lokeridede through its artifactual and geographical context.

The focus of this research is on site Il Lokeridede. The site is a burial mound. The location of the site is not far from Dongodien and Illeret Stone Bowl. The excavation of the site has recovered Nderit pottery, stone tools and flakes, fragment of a stone bowl, grinding rubberstones, human remains, elephant ivory chips and ostrich eggshell and stone beads. The material recovery assign the site to Neolithic Pastoralism. The three sites, Il Lokeridede, Dongodien and Illeret Stone Bowl have shown clear material similarities despite having been designed for different functions. Il Lokeridede is a mortuary site while Dongodien and Illeret Stone Bowl are Pastoral Neolithic habitation/home base sites.

The close material similarity, close geographical location, almost similar stratigraphical and lithological combination has led to an assumption that the sites were used by people who were sharing a common culture. Among the attributes compared from pottery from the three sites, a general similarity has been found with minor differences. The differences observed are attributed to such technicalities as sampling difference and diversion caused by functional differences. Pottery wares from the three sites has been compared in terms of their attributes: surface treatments, rim measurements, decorative design elements, sherd outer posture, decorative designs, sherd colours and decorative types.

Dongodien and Il Lokeridede have Nderit ware pottery which is similar in all major attributes. Illeret Stone Bowl lacks what is defined as Nderit ware but has a variant of Nderit and is very likely a derivative of it. Non-Nderit pottery ware from the three sites show a similarity especially in decoration motifs. Although outright similarity has not been found, that was expected due to sampling difference. The number of analysed sherds from those sites not equal and the fact that research is still at the beginning in all the three sites.

The function of Il Lokeridede has been confirmed by this research to be mortuary. The site was used by Neolithic pastoralists as secondary burial venue. It is very likely that the site was occasionally opened to put more remains after a lapse of a given time. The human remains interred at the site were from primary graves, exhumed, maybe fragmented intentionally, grave goods incorporated, a ritual performed and finally buried. If there was no fragmentation then the small size of the recovery of both human and grave goods could be explained by unintentional break up during the exhumation and transfer of the remains. It is noted that the mound was very likely constructed and used by people who practised pastoralism, used Nderit and non- Nderit pottery wares and used microlithic toolkit. The raw material for the tool kit was pre-dominantly obsidian.

Re-use of obsidian tools after condemnation and discard was present. This explains the scarcity of obsidian in the area or the exorbitant cost of procurement. There was high use of flakes as compared to other tools. The people who used the mound came from the outlying areas to the mound such as Dongodien and Illeret Stone Bowl habitation sites. This explains the similarities of the artifacts recovered from the three sites. The users of Il Lokeridede and occupiers of Dongodien and Illeret Stone Bowl may be different and of different migratory waves in the Lake Turkana basin but they shared a common cultural

pool. For example, they were bound together by economic activities such as rearing of domestic cattle and caprines used similar or variant of the same pottery ware and utilised a common obsidian flake microliths toolkit. There could have been a flourishing exchange of technology or ready made goods in the basin thus explaining the similarities and the possible existence of cordial relations among the Pastoral Neolithic people of the study area.

Il Lokeridede has features in itself that show people constructed it as a permanent monument. The structure and the size attest to this. Though it cannot be proved, it is very likely the mound was used seasonally after a lapse of a given time. By the same token, it took a long time between primary burial and secondary burial thus portraying a picture of a people who were moving away and coming back to the same place. If it were not for this reason it would have been plausible to undertake only primary burial considering time, energy and resources invested in constructing and reconstructing a burial mound.

Il Lokeridede archaeologically is a reflection of how people constructed one of the most fascinating monuments with the intention to keep with them the memory of their deceased kin. The monument could have been constructed for a single use but a possibility of re-opening the pit and adding more human remains and grave goods exists. Rituals and ceremonies during burial cannot be ruled out. The mound was made to be a mirror of the living society by which the future members of that society could reflect and get convinced that death has not deprived them their kin. Such an action was of people who had a conviction that such tragedies as death do not terminate human life. Despite the physical absence of the dead ones they still exist but in a different form that they acquire in the transformation from life to death.

The two categories of grave goods reflect on continuing life after death. While pottery and stone tools are utilities reflecting economic well-being, beads and elephant tusk chips portray luxury which are two fundamental features of life. It may be possible that people who were accorded secondary burial were held at higher positions in society. But the purpose is the same since the underlying reason is to bury them with whatever they owned or used when they were alive.

Secondary burial was a way of life that people found themselves in whether naturally or by their own making during the PN period of Il Lokeridede. During the preceding PN period, people were primarily concerned with the procurement of basic needs such as food without engaging in such elaborate activities as secondary burial. The introduction of animals from which people could control their by-products such as meat and milk meant reduced movement and settled life became a possibility. It is well clear that nomadic life is caused by harsh environment such as protracted droughts and seasonal unpredictable rains. When pastoralists tamed and reared animals, they ensured that food procurement was continuous and easy to control as opposed to hunting and gathering.

The self-sustaining life opened avenues for society organisation, stable settlements and communal activities. Such activities include mound building and collecting of primarily buried bodies, after a given time period, and burying them together in a common grave. Therefore, Il Lokeridede is an effect of established human institutions. Therefore, funerary practises are one of those institutions affected by the “Neolithic Revolution.”

The artifactual context of Il Lokeridede is known by analysis of the recovered assemblage. The sites relationship with Dongodien and Illeret Stone Bowl is explained by similarities and differences found in the analysis. What is not known is the date of Il Lokeridede. The similarities of artifacts recovered from Il Lokeridede and those from Dongodien and Illeret Stone Bowl relatively place the site to within the Pastoral Neolithic timespan. Since Dongodien is absolutely dated to 4,000 B.P, Illeret Stone Bowl tentatively to around that date pending confirmation, Il Lokeridede can be relatively placed around the same period of 4,000 B.P. This is solely based on artifactual similarities but can be misleading.

Although the three sites shared similar artifacts, their contemporaneity in terms of age is questionable because the lifespan of PN is not yet known. Some of the important considerations are: the time over which the ware was made and used and how proper Nderit Ware came to be associated with similar/dissimilar types of pottery, i.e, internally scored/unscored respectively. It may be possible that the ware was in use for several millenniums undergoing minimal modifications at different sites. Unless such issues are properly addressed, then it is wrong to use Nderit Ware pottery as a measure of site contemporaneity in terms of age. Nderit Ware is found in many sites associated with the PN in East Africa. While 4,000 B.P is the date of pottery associated directly with the PN there is another ware, Wavy-Line, reported in the Lake Turkana Basin and Khartoum in the Sudan which is absolutely older than Nderit as it is attributed to aquatic resource harvesting culture. Any of the three sites, Il Lokeridede, Dongodien and Illeret Stone Bowl could be older or younger than others respectively. Il Lokeridede could have been constructed when Neolithic Pastoralism had existed for several millenniums. The basis of putting Il Lokeridede into its archaeological and chronological position is the dated sites in the Lake Turkana basin especially Dongodien.

The most common artifact among the three sites compared in this work is pottery. Unfortunately, pottery has not been used in dating Dongodien and Illeret Stone Bowl Sites. Instead organic artifacts found in association with Nderit Ware such as shell, fish bone, mammal remains and charcoal were used as dating samples.

While Nderit Ware is the only kind of pottery in Pastoral Neolithic sites in the Lake Turkana basin, a chronologically older ceramic type known as wavy line pottery has been documented in association with earlier aquatic resource harvesting Holocene cultures. Wavy line pottery is dated in the same region to as old as 7,000 B.P which is not surprising considering it has been found in bone harpoon sites. There is no relation known between wavy line and Nderit pottery wares despite the fact that both are associated with cultures that succeeded each other, fisher/hunter and Neolithic Pastoralism. In between the two cultures there is a vacuum of at least 3,000 years. This is a long period for a culture to appear, develop and die.

There are several possibilities that may account for that gap:

- (a) The existence of Nderit Ware pottery and, in general, the Neolithic Pastoralism at least three Millenniums before 4,000 B.P.
- (b) The two cultures fisher/hunter and Neolithic Pastoralism co-existed alongside each other for at least three millenniums at yet to be located sites.
- (c) Neolithic Pastoralism evolved directly from Holocene fishing cultures.

In summary Il Lokeridede is a Pastoral Neolithic mortuary site constructed and used by the people who manufactured and used Nderit Pottery Ware, and used a unique microliths toolkit. The people who constructed and used Il Lokeridede as a mortuary site were technologically in touch with the occupants of Dongodien and Illeret Stone Bowl sites. They all shared a common cultural pool. Procurement from the pool of cultural items as needs of the time dictated was prevalent. This explains the different site functions but similar artifacts.

The work at Il Lokeridede (GaJi 23) is still at its early stage. No absolute date is known for the site. This is because no material recovered from the site is absolutely dated. More work at the site is recommended. Future research at the site may provide implicit and precise answer to the date issue which could not have been fully addressed in this work due to inadequate resources and time.

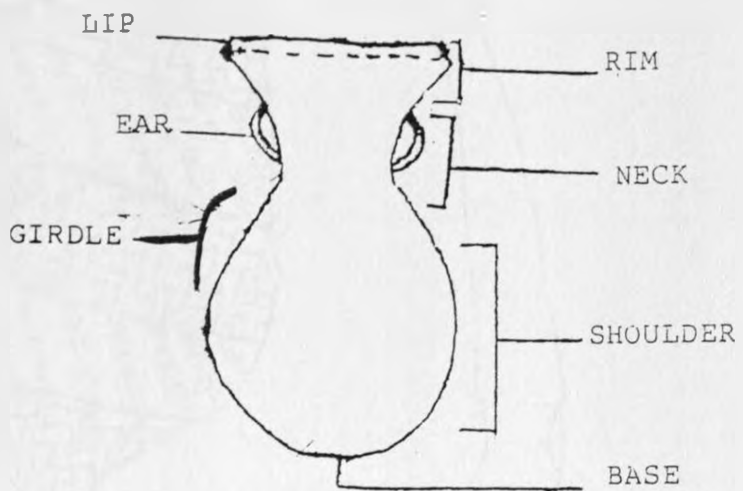


Fig.4.1 Parts of a pot.

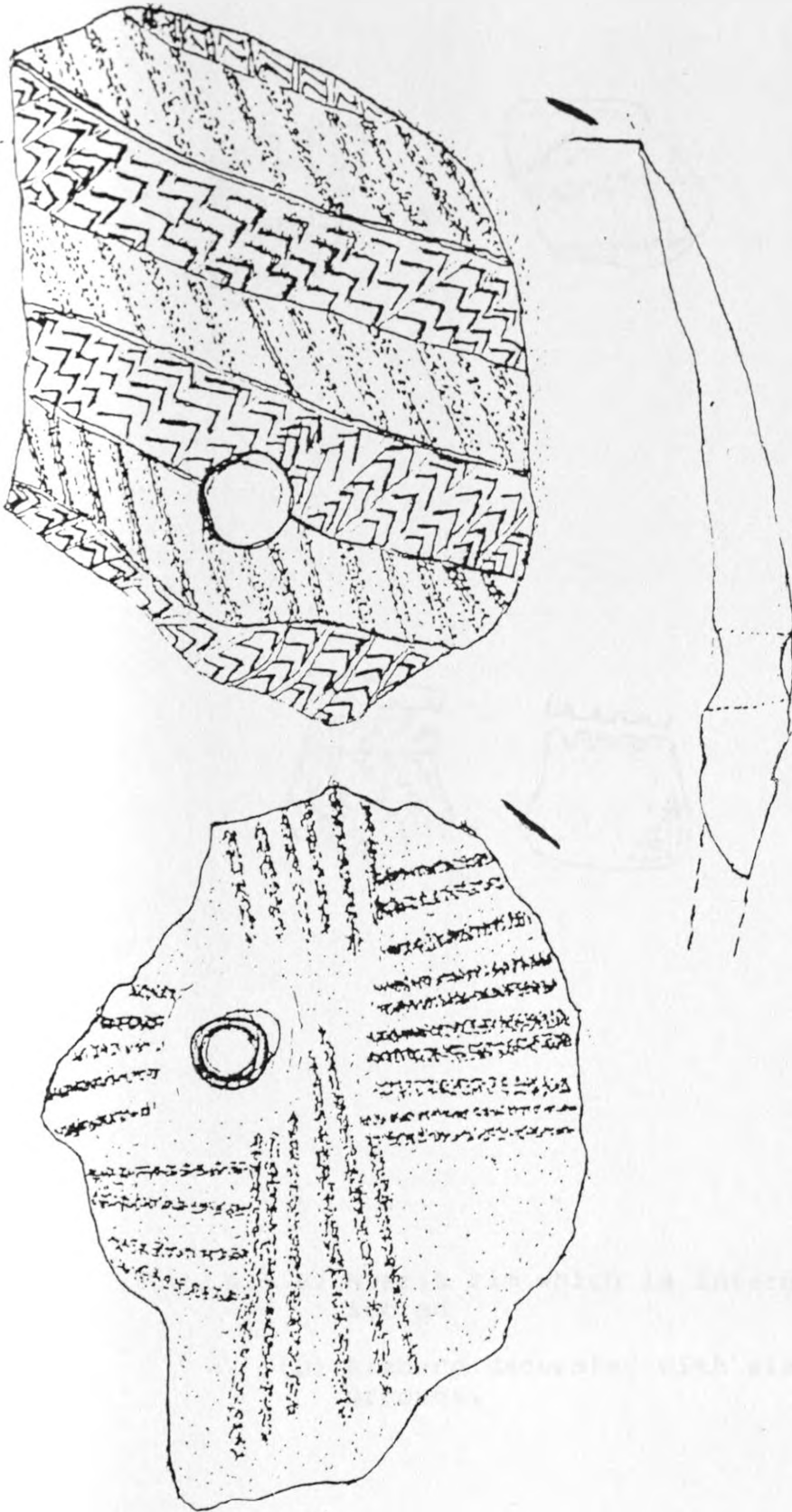


Fig.4.2 Nderit lid which is perforated in the center.

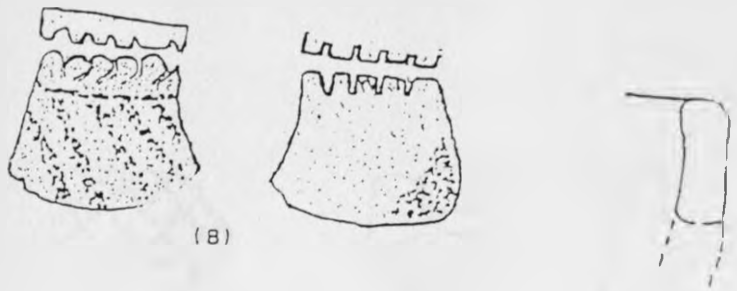


Fig. 4.3(a) Nderit rim which is internally scored

(b) Rimherd decorated with slanting grooves.

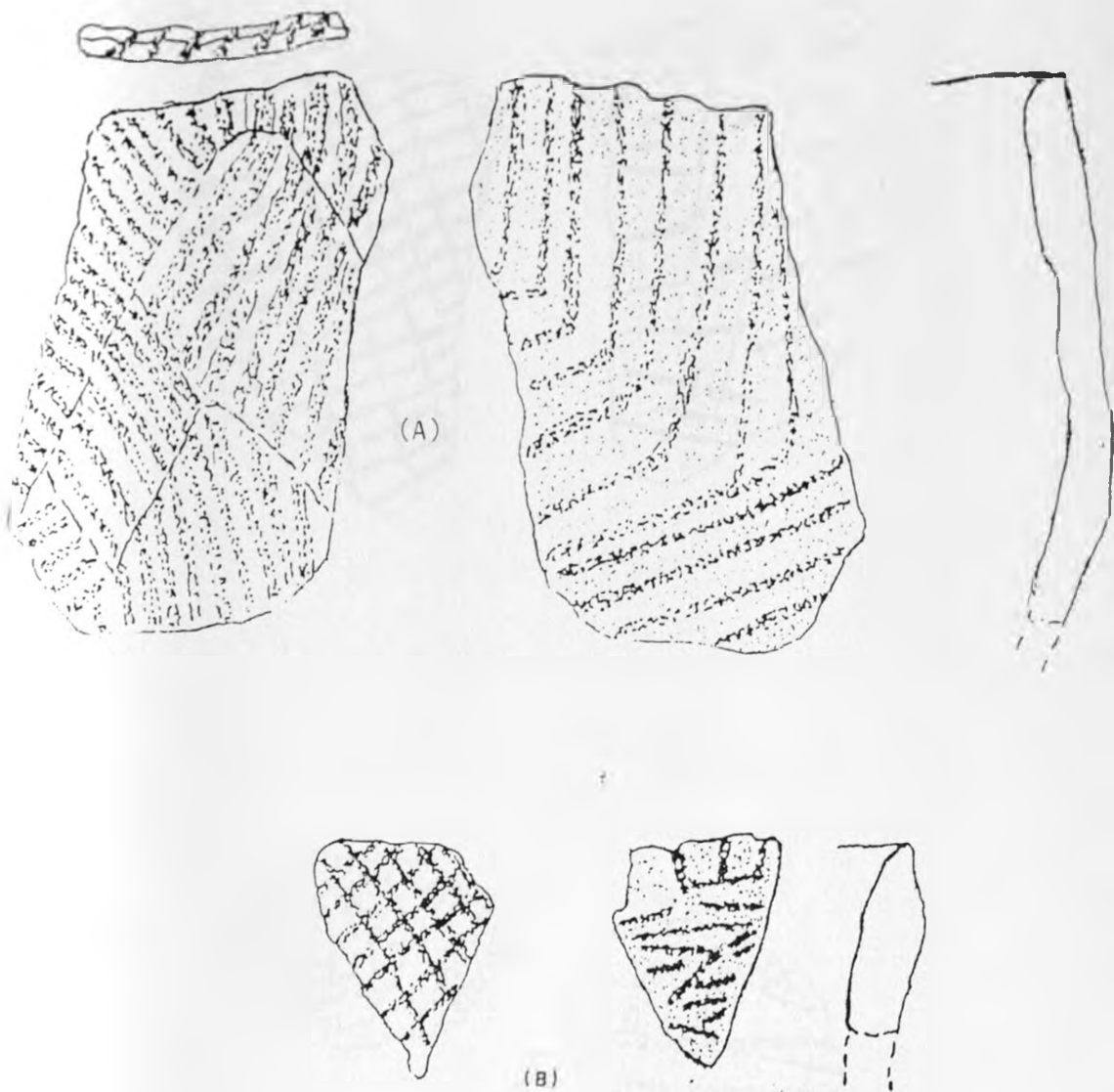
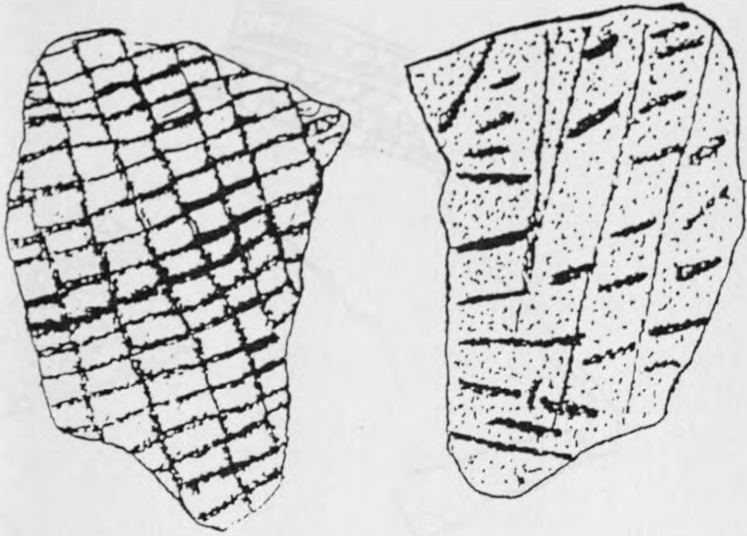


Fig.4.4 (a) Nderit rimsherd decorated with grooves in fields and internally scored.

(b) Nderit rimsherd decorated with cross-hatching grooves and internally scored.

(A)



(B)

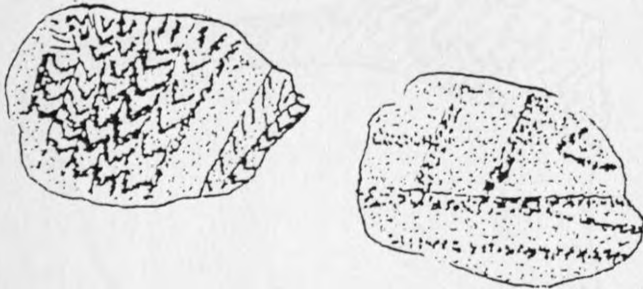


Fig.4.5 (a-b) Nderit bodysherds internally scored with haphazard grooves.

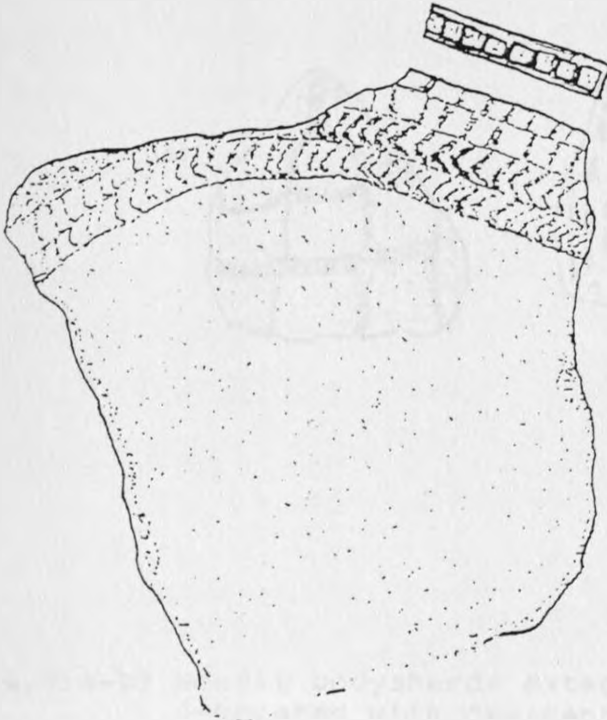
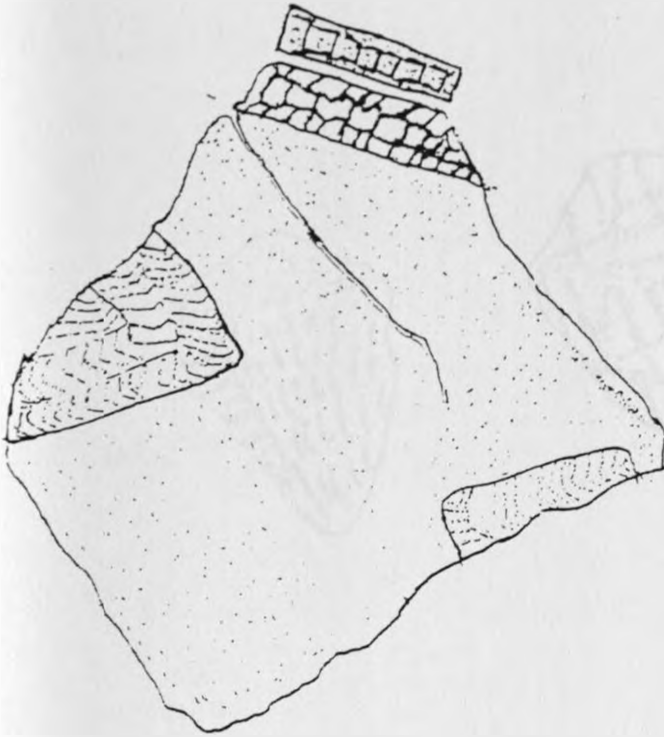


Fig.4.6 Rimsherd decorated with pendant triangles.

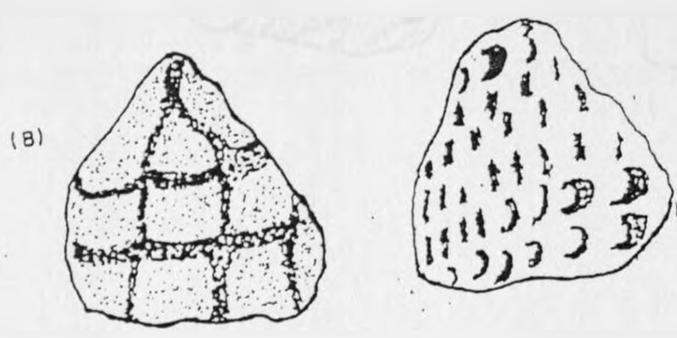


Fig.4.7(a-b) Nderit bodysherds externally decorated with crescentic marks.

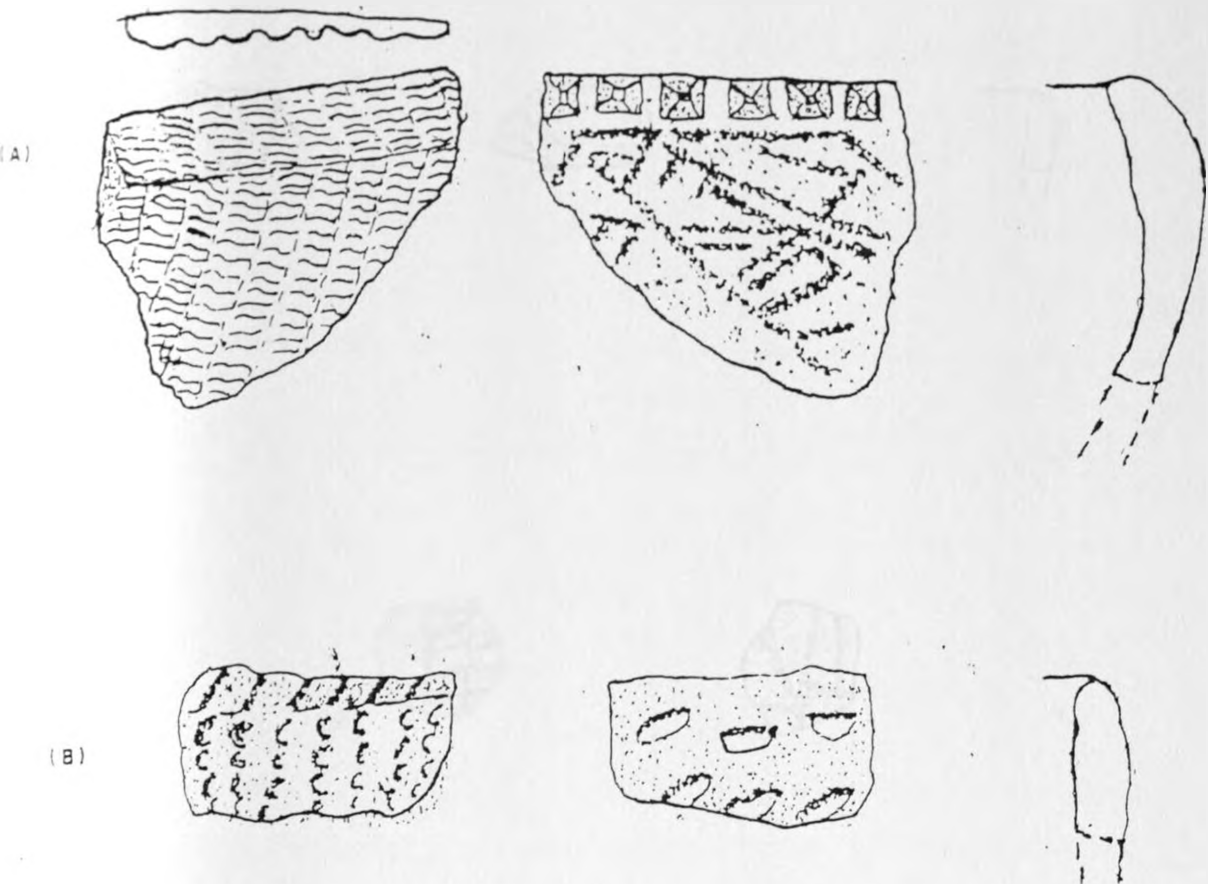


Fig.4.8(a) Nderit rimsherd internally scored with haphazard grooves.

(b) Nderit rimsherd externally decorated with crescentic marks and internally with evulsions.

(A)



(B)



Fig. 4.9 (a) Nderit rimsherd.

(b) Nderit bodysherd.

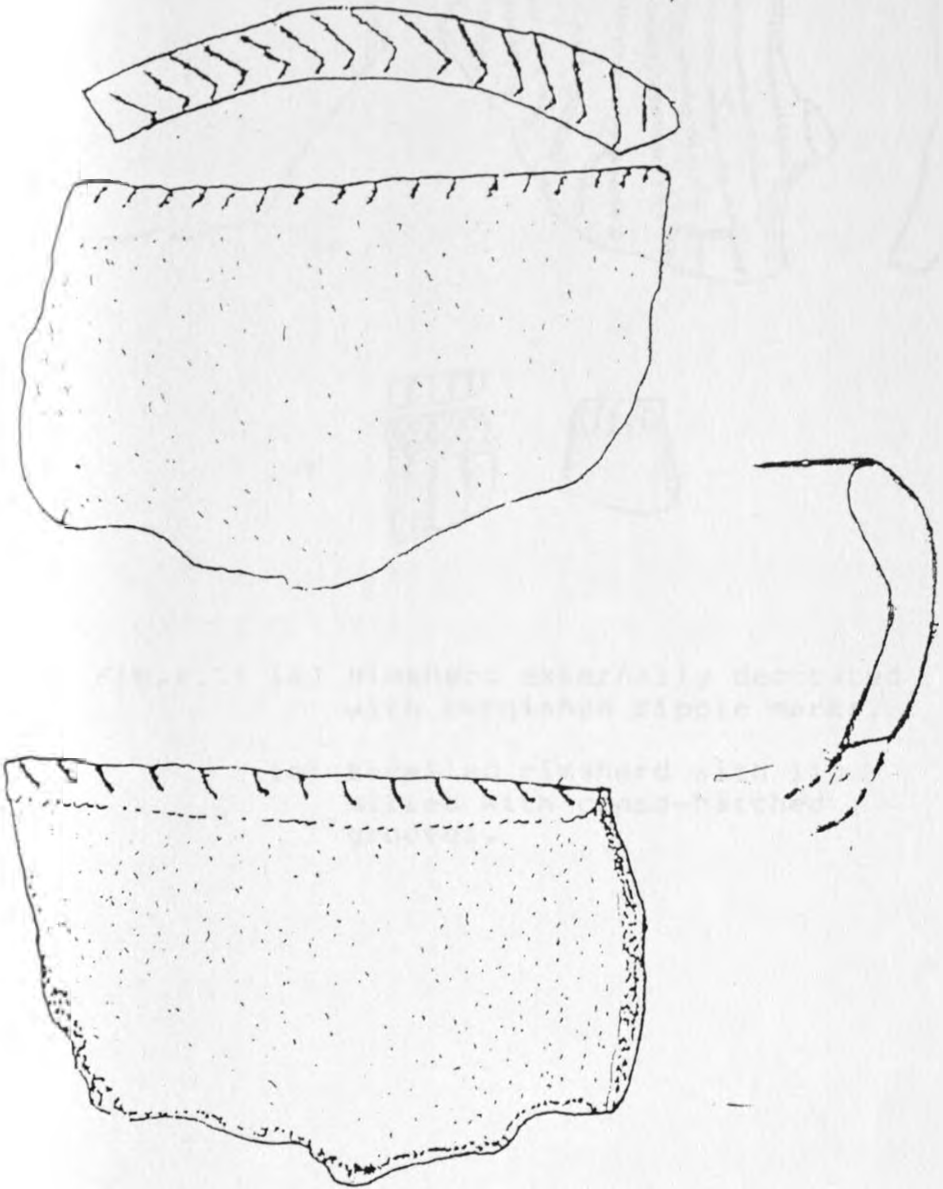


Fig.4.10 Plain rimsherd with a lip milled with grooves.

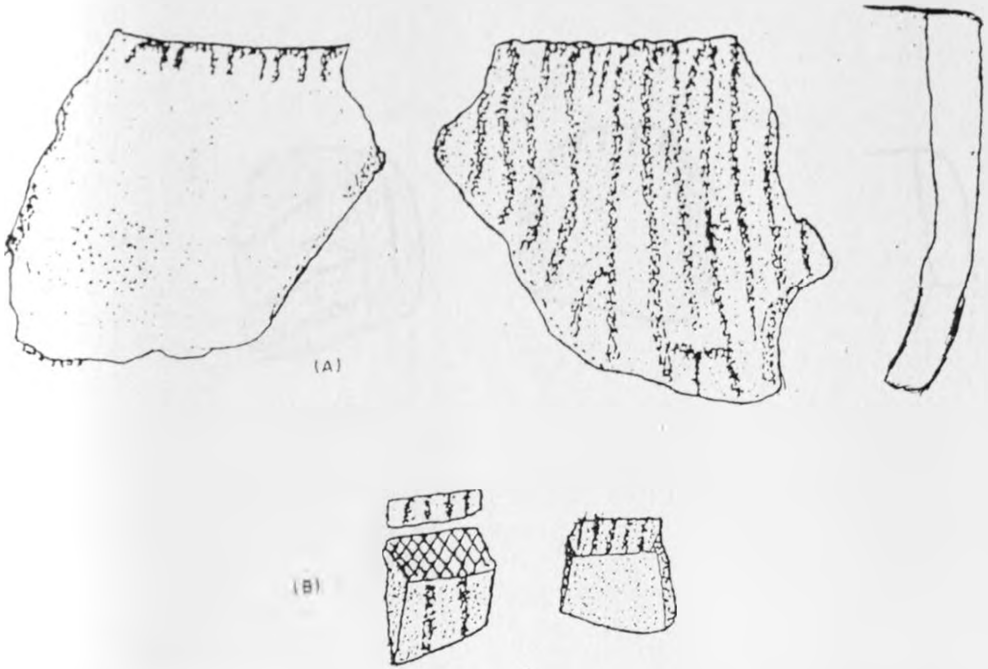


Fig.4.11 (a) Rimsherd externally decorated with burnished ripple marks.

(b) Bevelled rimsherd with lip milled with cross-hatched grooves.

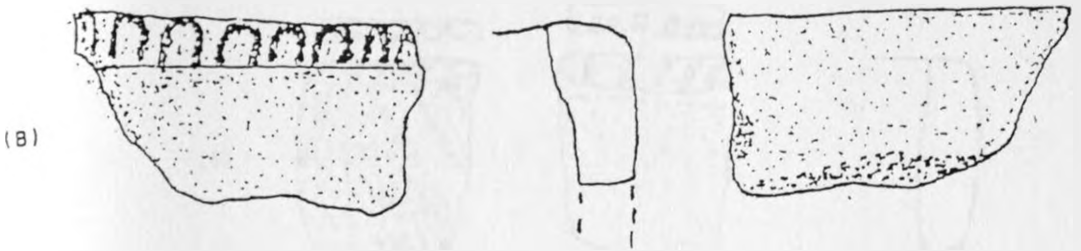
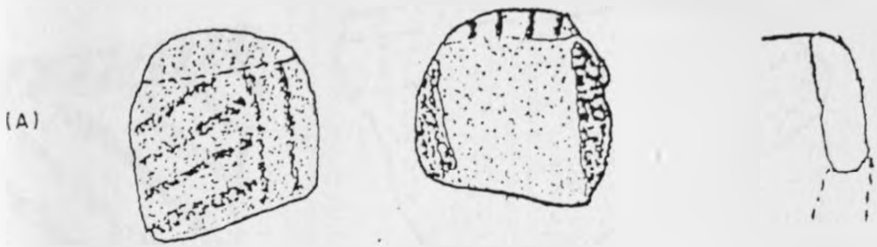


Fig.4.12 (a) Rimsherd decorated with vertical and slanted grooves.

(b) Plain rimsherd with lip milled with grooves.

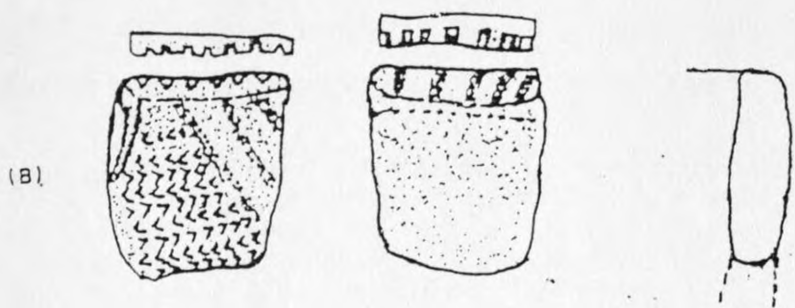
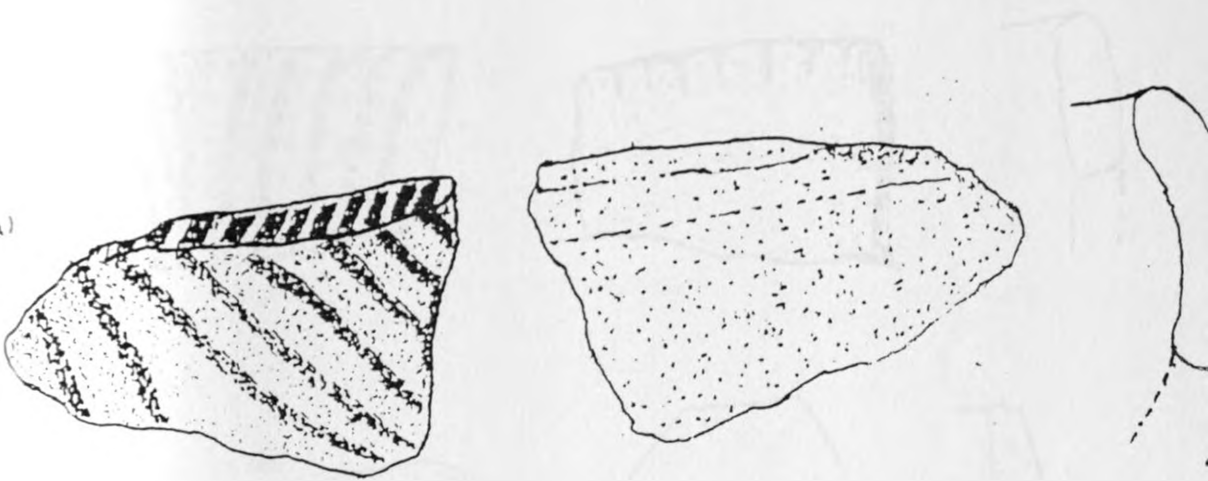


Fig.4.13 (a) Rimsherd milled with slanted grooves.

(b) Rimsherd decorated with stylus impressions and grooves in panels.

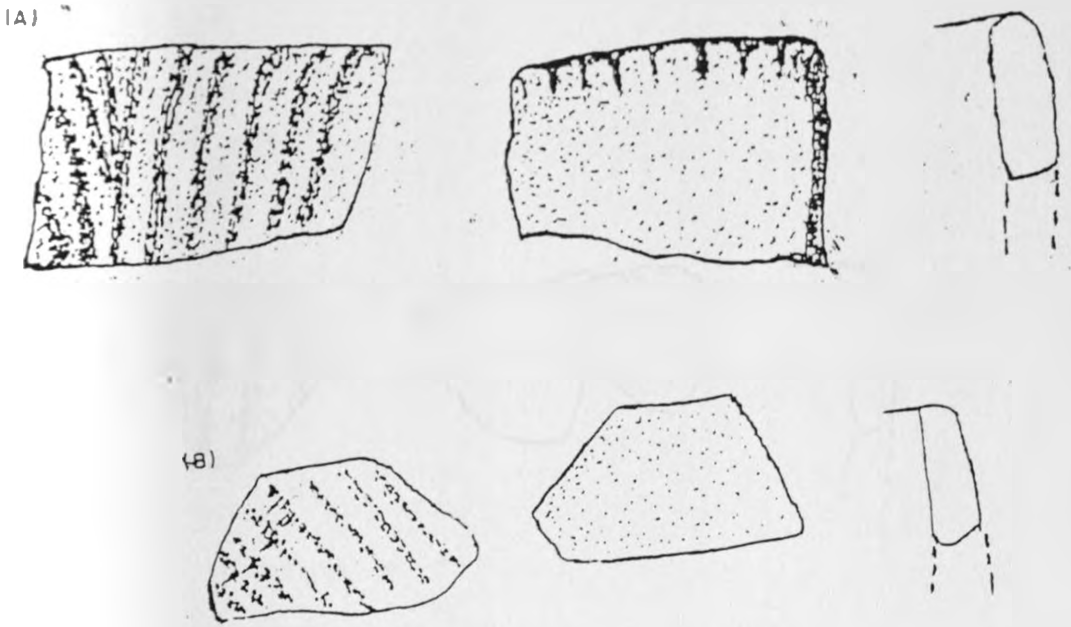


Fig. 4.14 (a) Rimsherd decorated with vertical ripple marks.

(b) Rimsherd decorated with slanted grooves.

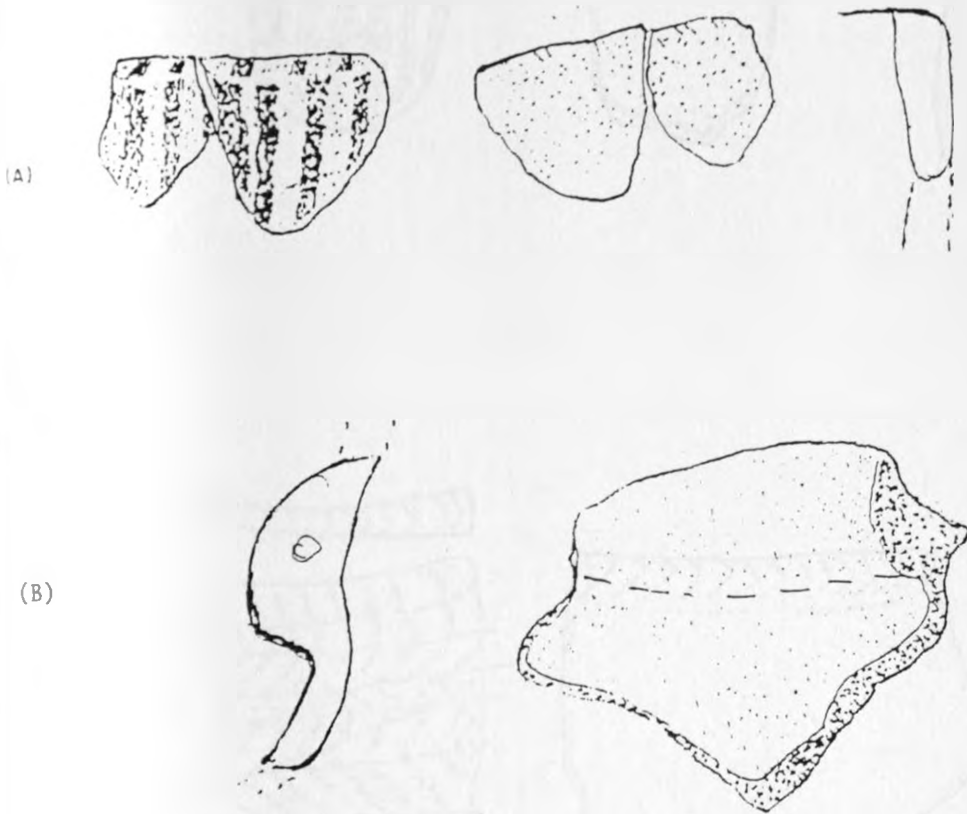


Fig.4.15 (a) Rimsherd decorated with vertical grooves.

(b) Neck of a pot.

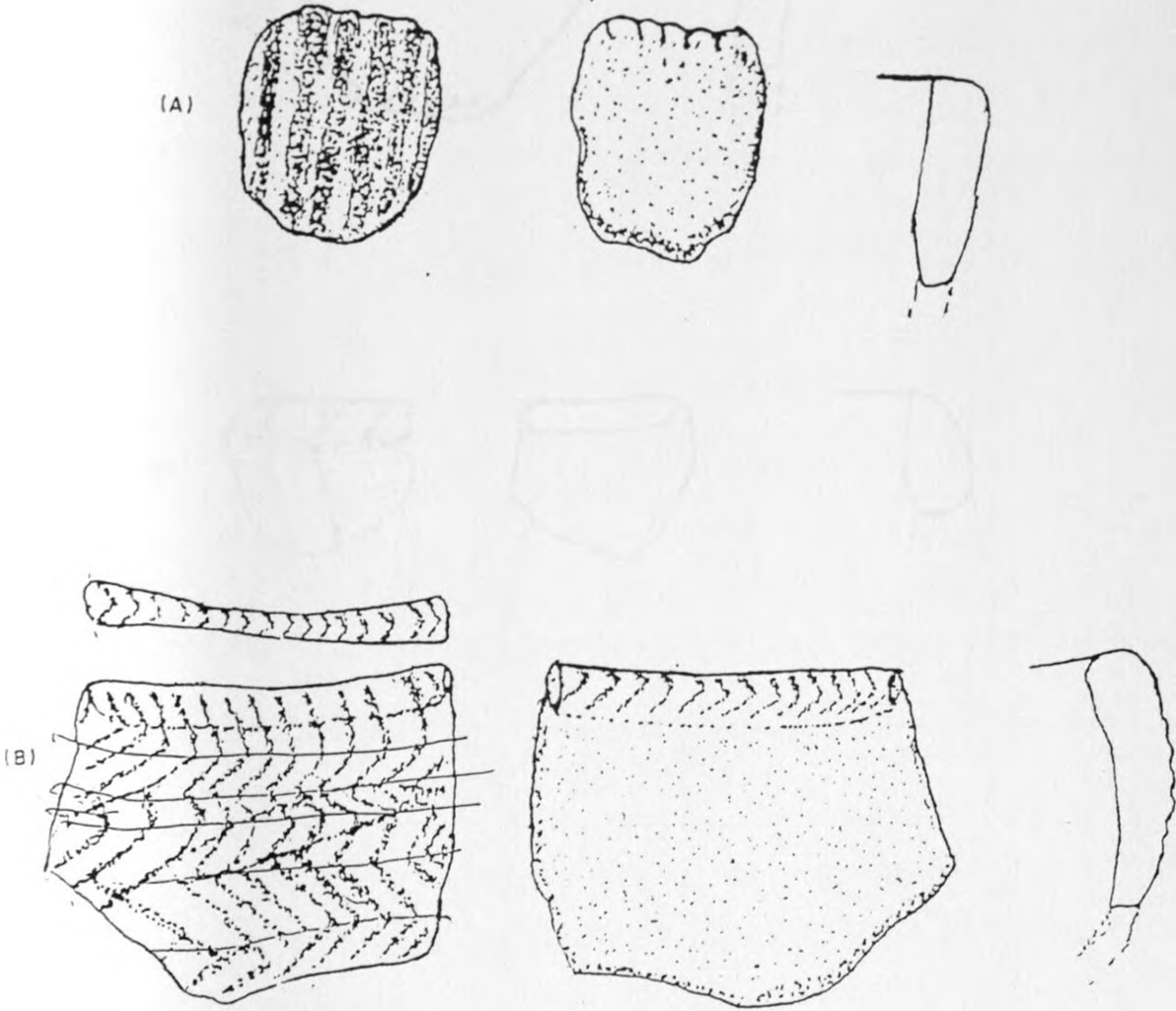


Fig.4.16 (a) Rimsherd decorated with vertical grooves.

(b) Rimsherd decorated with sigzag grooves.

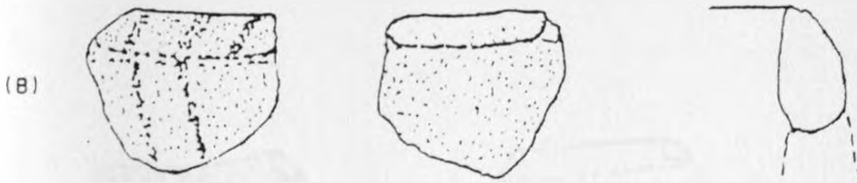


Fig. 4.17 (a) Rimsherd decorated with grooves.

(b) Bevelled rimsherd decorated with vertical grooves.

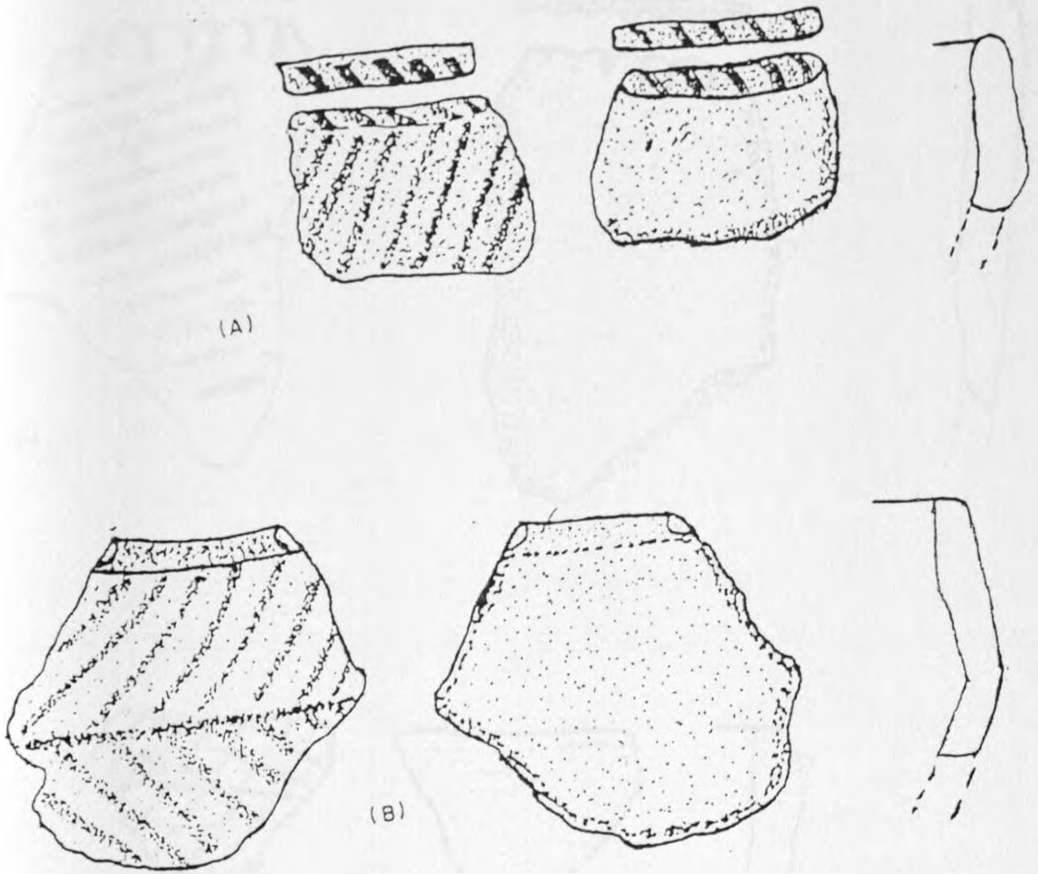


Fig. 4.18 (a-b) Rimsherds decorated with slanted grooves.

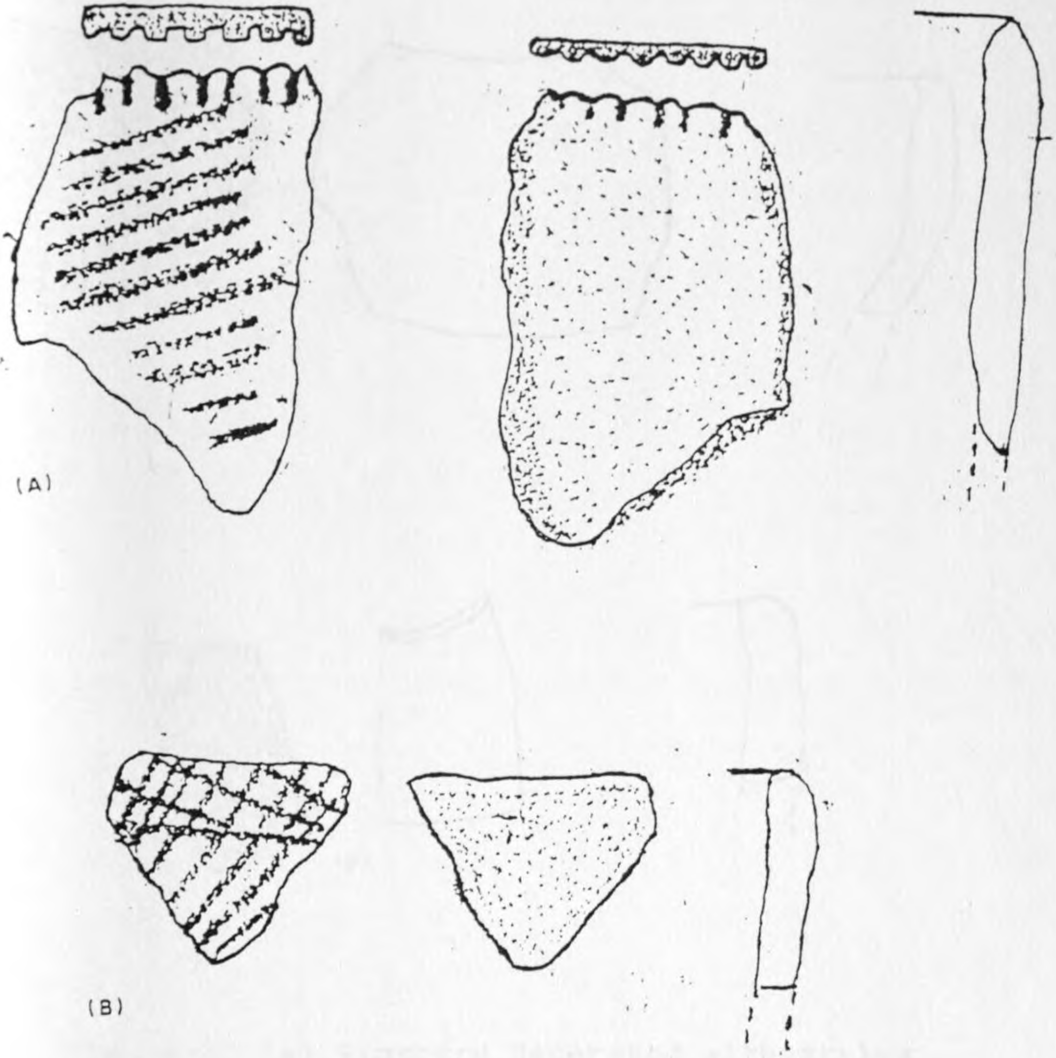
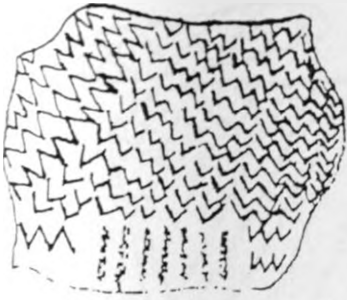
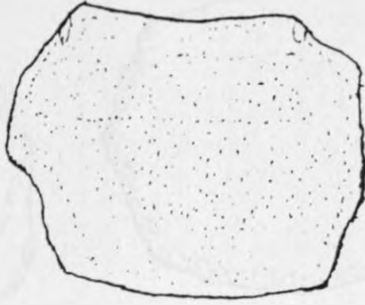


Fig.4.19 (a) Rimsherd decorated with slanted grooves.

(b) Rimsherd decorated with cross-hatched grooves.



(A)



(B)



Fig. 4.20 (a) Rimsherd decorated with stylus impression and grooves in panels.

(b) Rimsherd decorated with stylus impressions in rows.

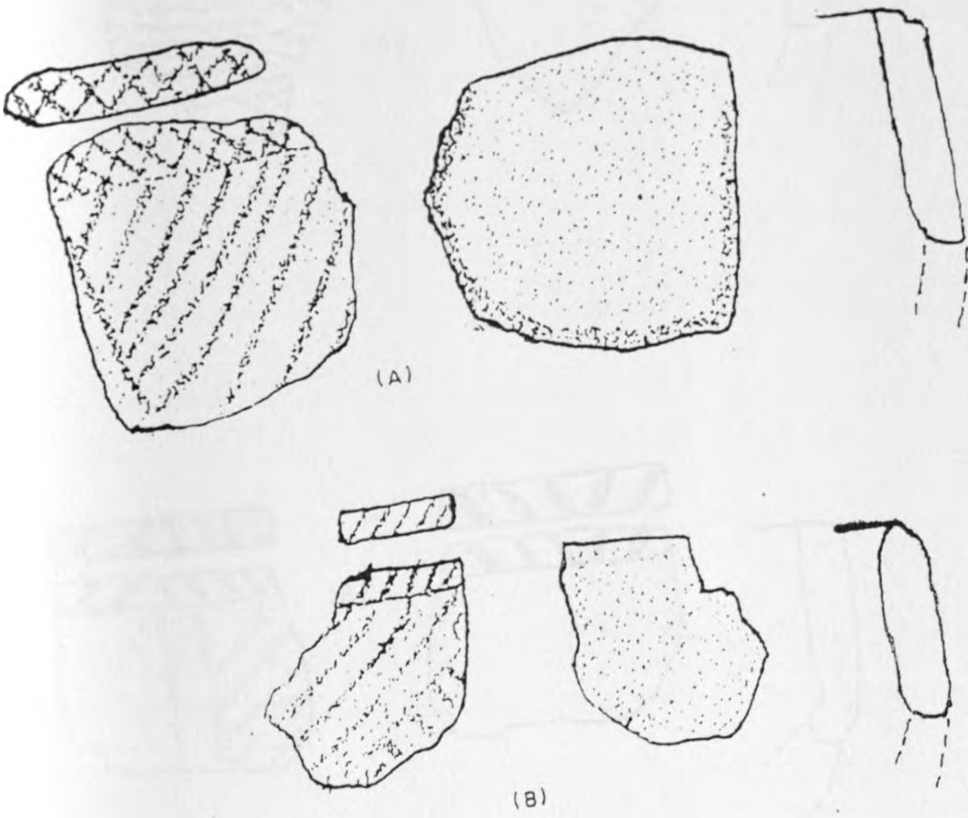
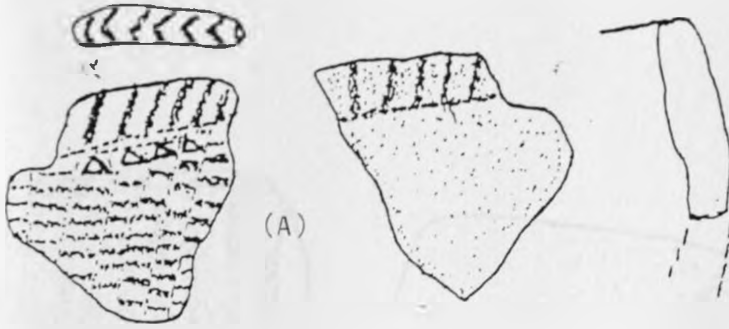
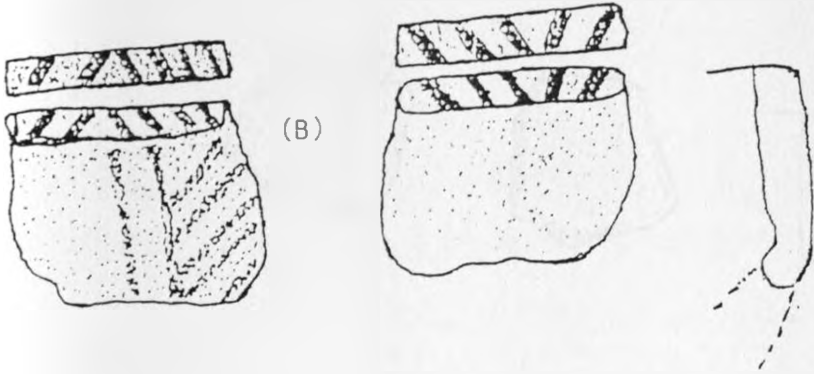


fig. 4.21 (a) Rimsherd decorated with slanted grooves.

(b) Rimsherd decorated with vertical and slanted converging grooves.



(A)



(B)

Fig. 4.22 (a) Rimsherd decorated with horizontal grooves in rows.

(b) Rimsherd decorated with vertical and slanted grooves.

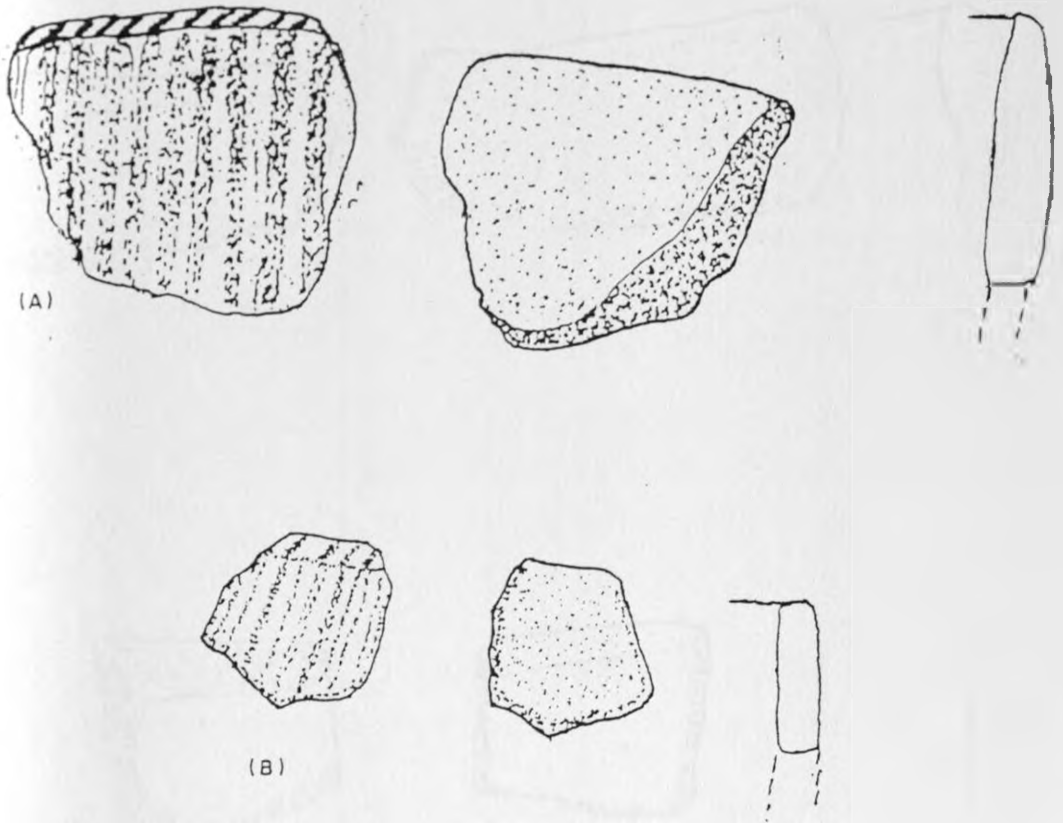
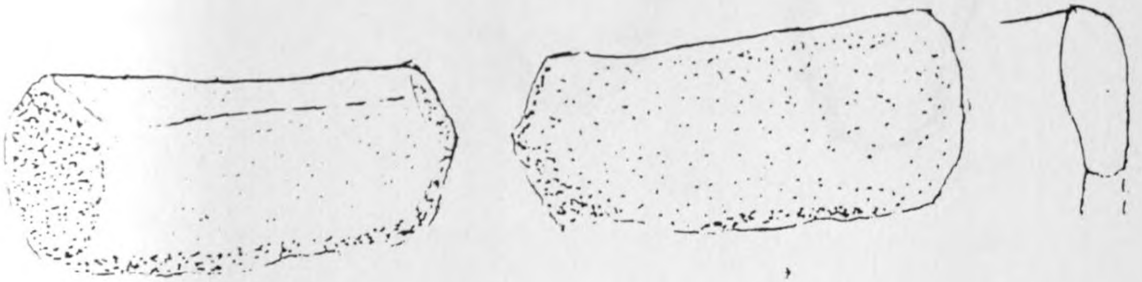
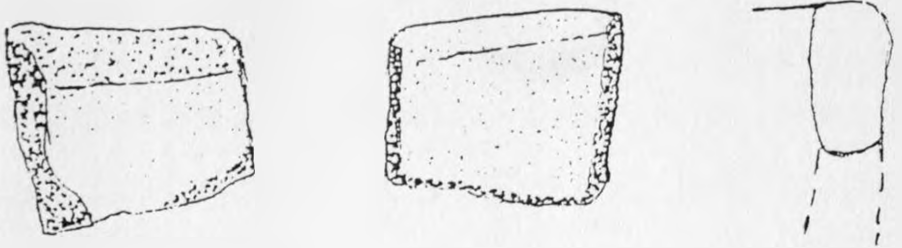


Fig. 4.23 (a-b) Rimsherds decorated with vertical grooves.



(A)

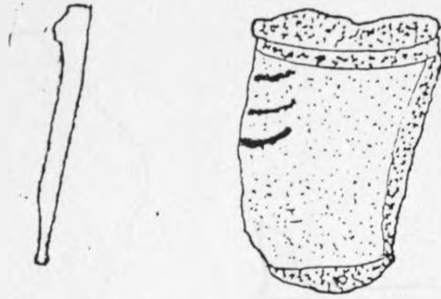


(B)

Fig. 4.24 (a-b) Plain rimsherds.



(A)



(B)

Fig. 4.25 (a) Bodysherd decorated with grooves.

(b) Fragment of a figurine.

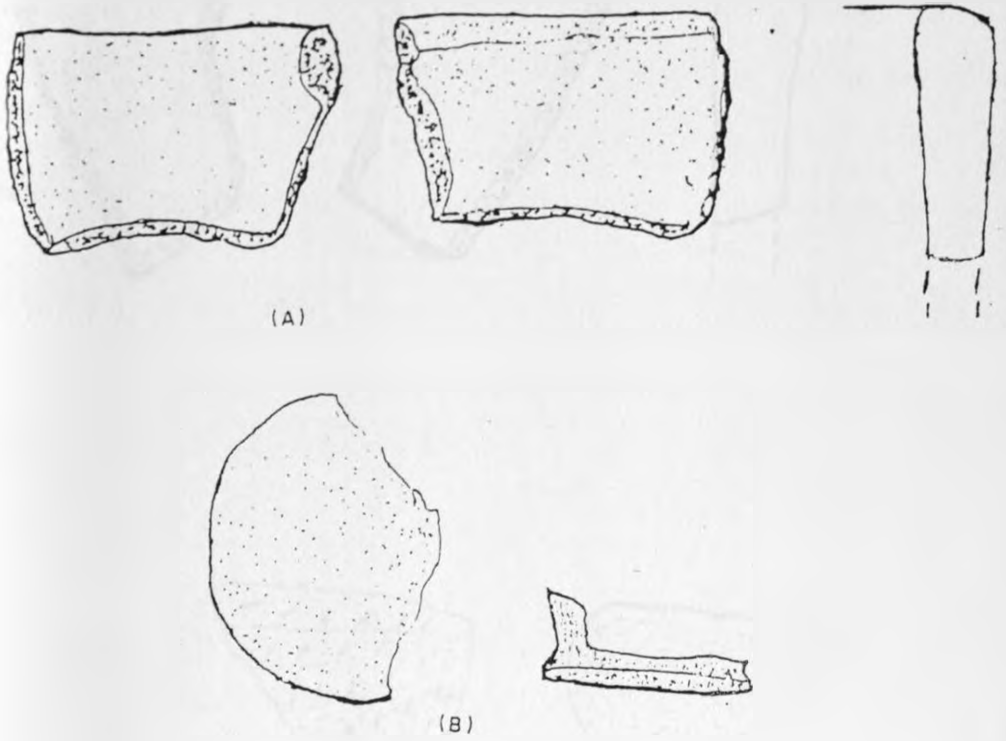
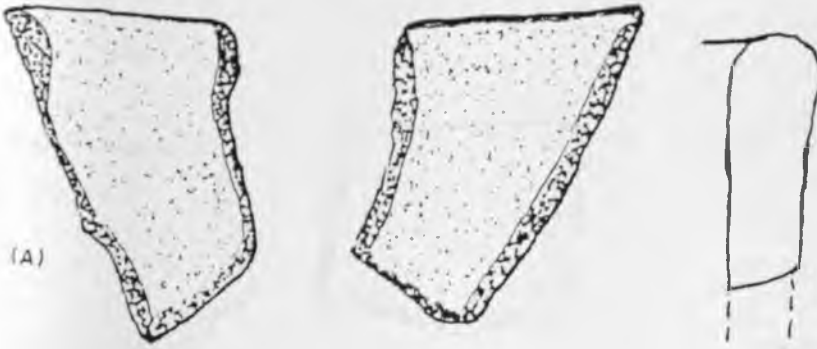
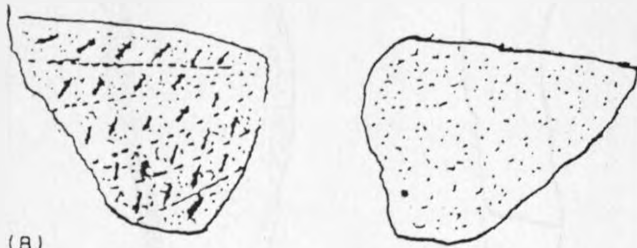


Fig. 4.26 (a) Plain rimsherd.

(b) Disk base.



(A)



(B)

Fig. 4.27 (a) Plain rimsherd.

(b) Bodysherd decorated with grooves in rows.

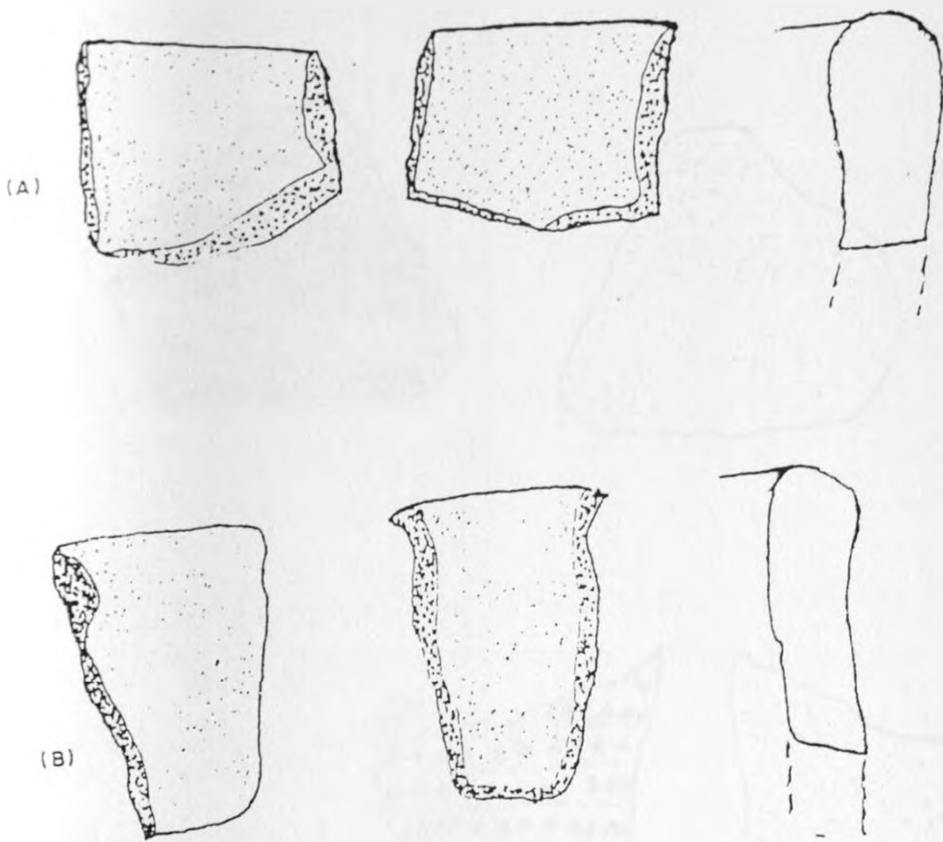
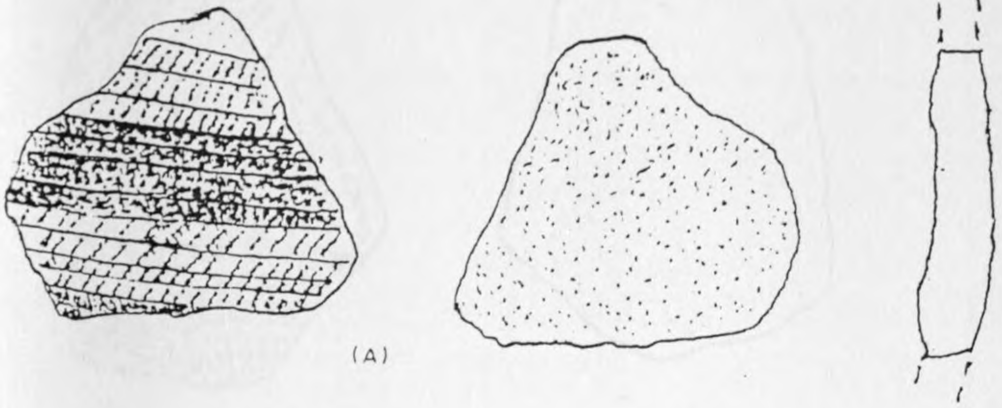
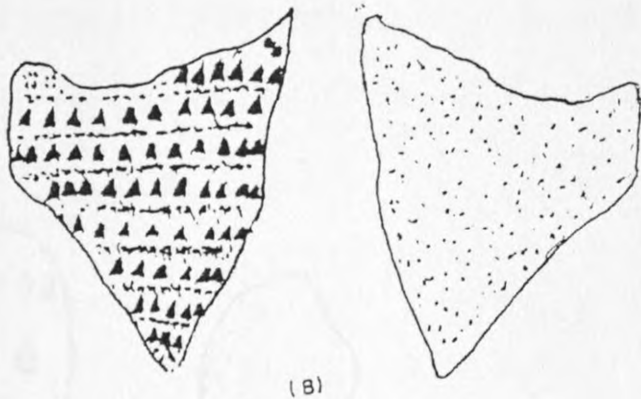


Fig. 4.28 (a-b) Plain rimsherds.



(A)



(B)

Fig. 4.29 (a) Bodysherd decorated with grooves.

(b) Bodysherd decorated with stylus impression in rows.

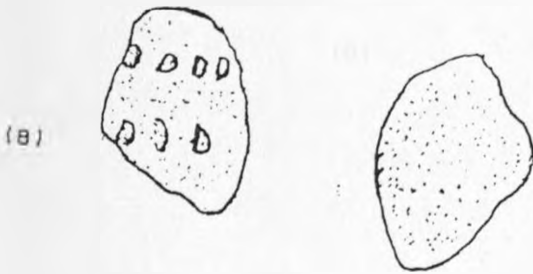
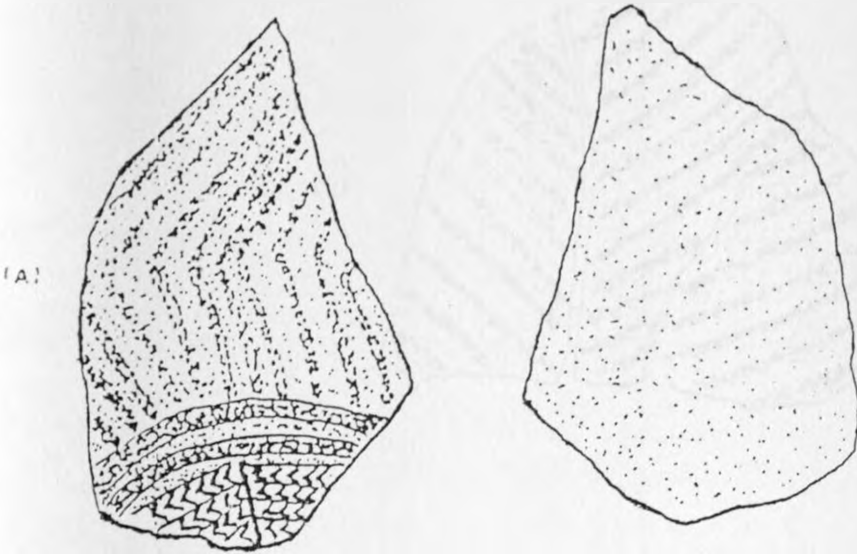


Fig.4.30 (a) Bodysherd decorated with vertical and horizontal grooves and stylus impressions in fields.

(b) Bodysherd decorated with crescentic marks.

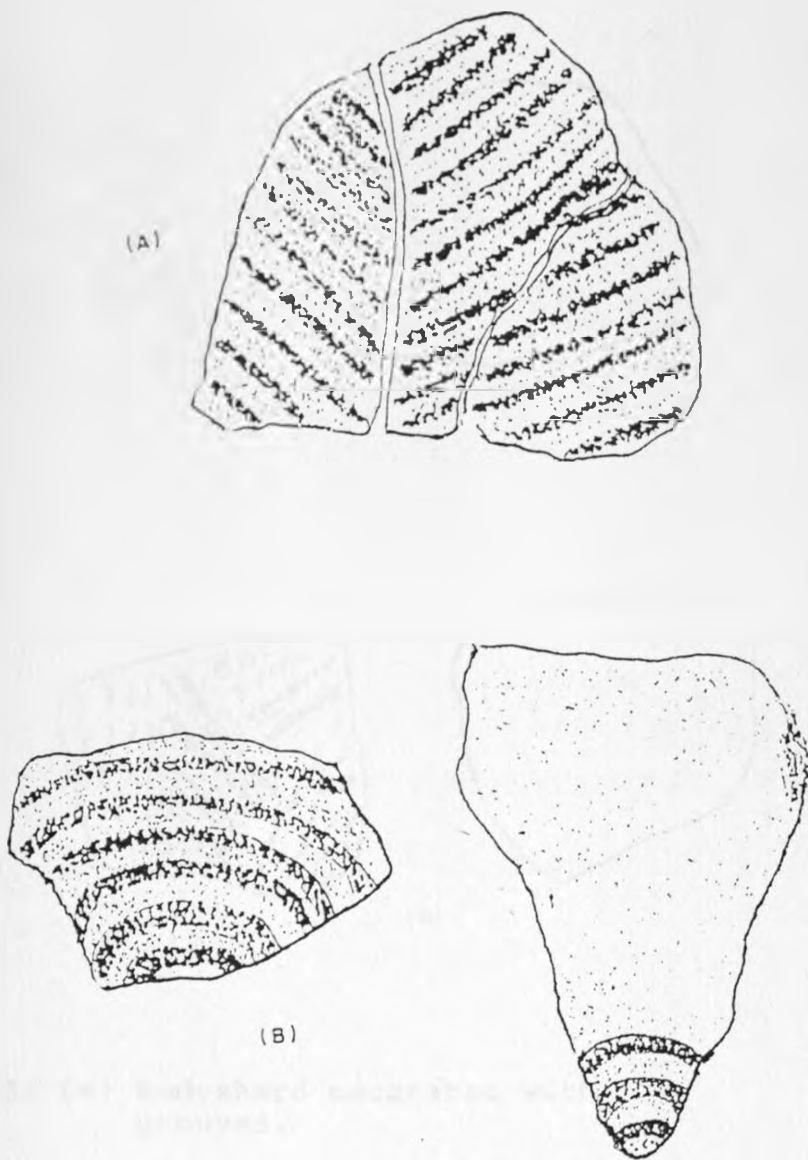
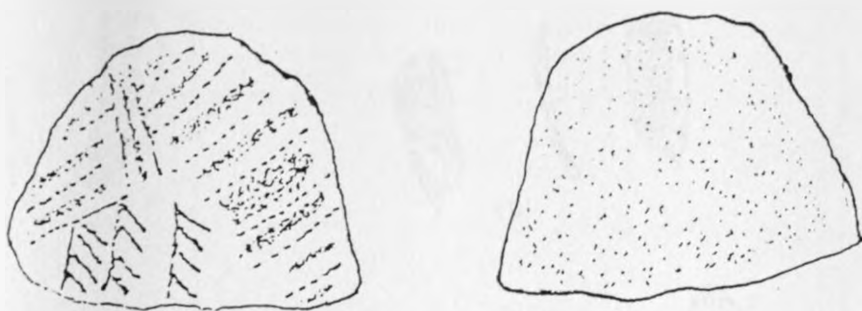
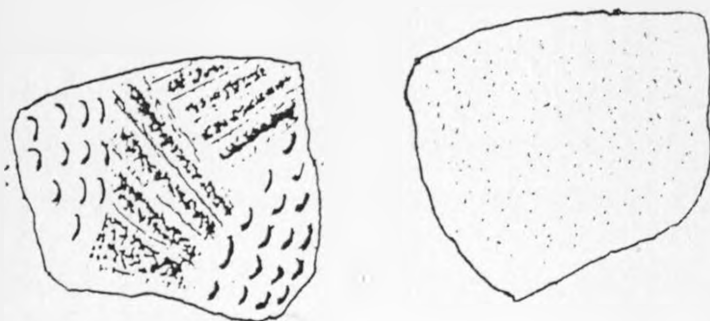


Fig. 4.31 (a-b) Bodysherds decorated with grooves.



(A)



(B)

Fig. 4.32 (a) Bodysherd decorated with grooves.

(b) Bodysherd decorated with grooves and crescentic marks in panels.



Fig. 4.33 (a-e) Utilized obsidian flakes.

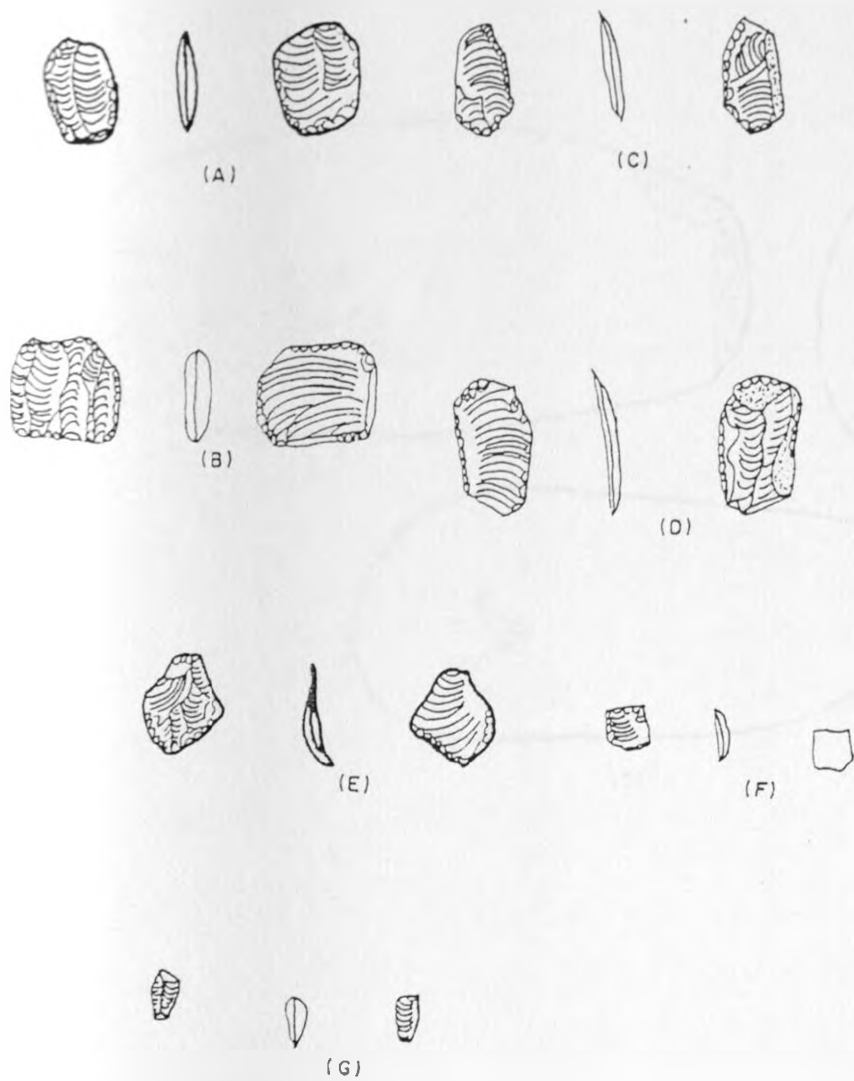


Fig. 4.34 (a) outil eccaille.
 (b-e) Obsidian flakes.
 (f) Outil eccaille.
 (g) Obsidian flake.

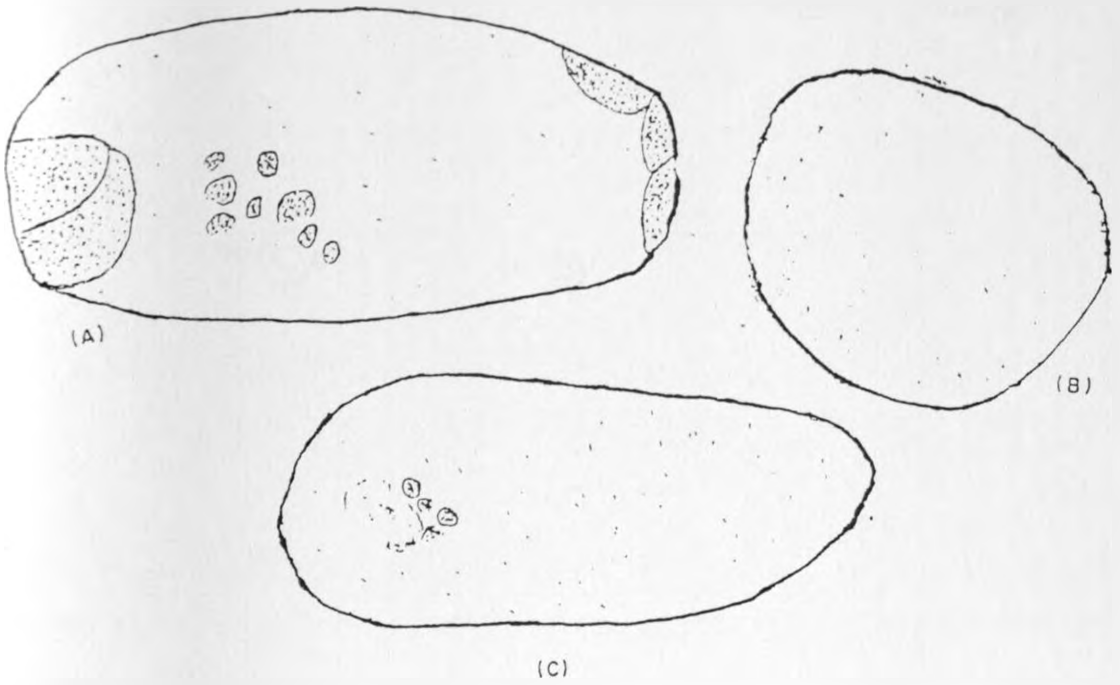


Fig.4.35 (a) Utilized grinding stone rubber with marks of red ocre.
(b) Disk-shaped grinding stone rubber.
(c) Utilized grinding stone rubber.



Fig. 4.36 (a-i) Ostritch eggshell beads.

(j-l) Pre-Cambrian (beryl) rock beads.

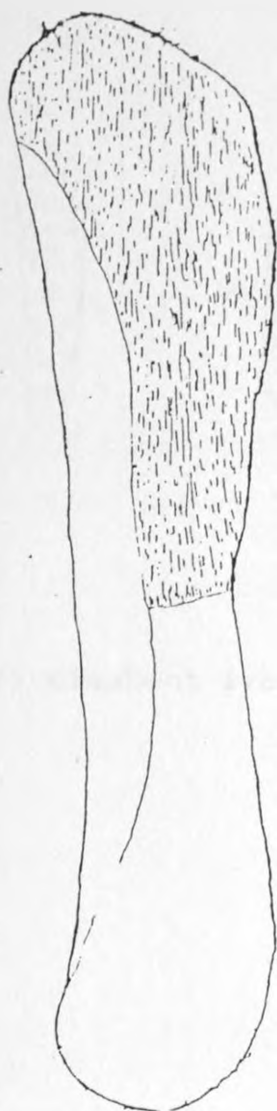


Fig. 4.37 Fragment of a stone bowl
(platter)

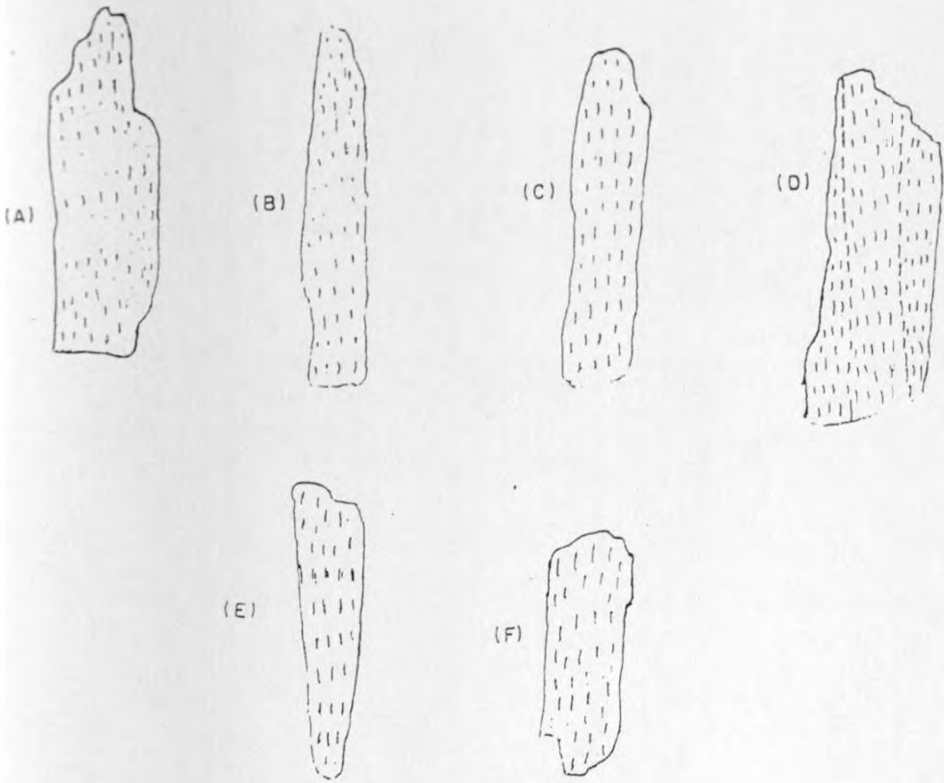


Fig. 4.38 (a-f) Elephant ivory fragments.

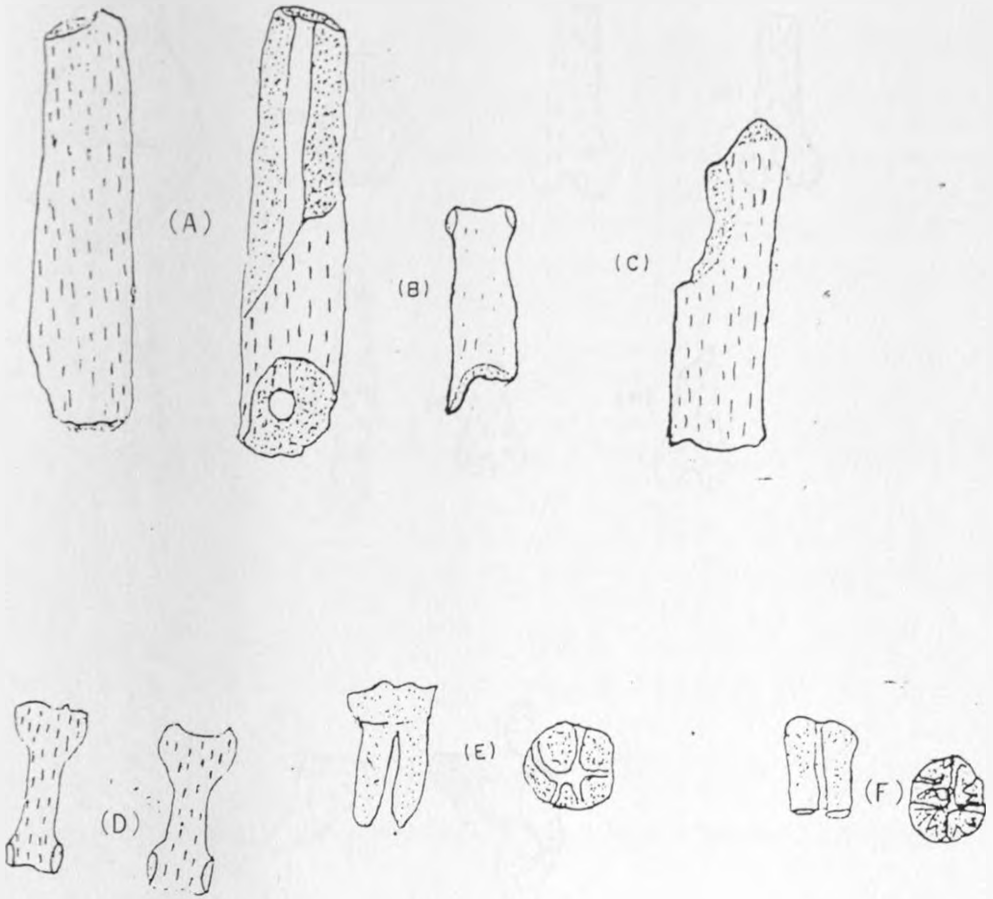


Fig.4.39 (a) Mammal bone shaft.
 (b) Human metacarpal.
 (c) Human fib.
 (d) Human front phalange.
 (e) Human lower molar.
 (f) Human lower molar(crown).

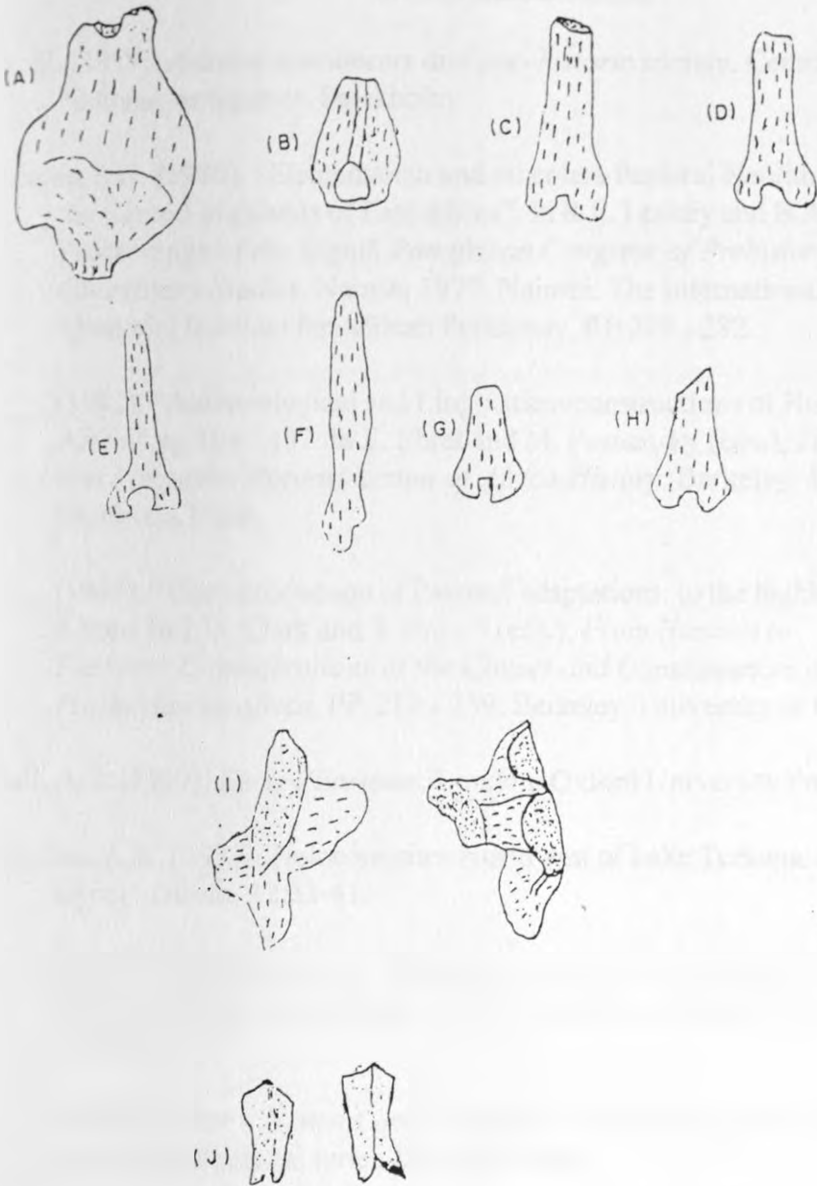


Fig. 4.40 (a-h) Fossilized catfish spines.

(i) Bovid right cervical vertebra.

(j) Bovid tooth.

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GLOSSARY

Most of the definitions used in this glossary come from Rice (1987) and Shepard (1956).

Artifact

An object of any type made by human hands.

Attribute

A feature or characteristic of style form, or technology of an artifact that forms the basis for analysis, as in classification, also called a variable.

Base

The bottom of the pot when placed in an upright position.

Burnish

A method of producing a luster on an unfired clay surface by rubbing it while leather hard. with a smooth object to compact and align the surface particles.

Category

Grouping created within a previously unclassified set of objects.

Carination

A breakpoint on the vessel often characterised by a change in the size of the vessel.

Ceramic

High fired, usually vitrified cooking and serving utensils and art objects.

Chroma

Saturation, purity or strength of colour.

Classification

Ordering objects into groups based on their degree of similarity with one another.

Clay

One of several hydrous alumina-silicate minerals that are formed by decomposition of rock, chiefly granite and have the property of plasticity.

Coiling

The method of hand building an object of clay by successive addition of ropes or coils of clay.

Comb- stamp

Comb-like marking on the vessels for decorative purposes.

Decorative design element

A decorative unit that cannot be broken further into smaller units.

Decorative designs

The patterning of decorations on the surface of a vessel normally take shape of bands or uniform on the surface

Decorative design element

The patterning of the decorative elements either as separate or touching designs.

Emersion

The suspension of a pot in a viscous mixture of water and clay.

Evulsed Stylus

A decorative technique where clay is pinched to elevate a part of it leaving a cave-like hollow often taking a lunar shape.

Groove

A kind of decorative technique where broad lines are made on the surface of the vessel.

Incision

Markings on the clay vessel which are expressed in small lines.

Lid

The cover that is placed on the lip of pots made of clay.

Lug

Pot handle normally placed on the neck.

Motif

A fixed combination of design elements that form a larger component of the decoration.

Mouth

The orifice or opening of a hollowware vessel.

Neck

The part of a vessel between the shoulder and the rim.

Paint

The action of applying a pigment.

Paste texture

A clay or mixture of clay and added materials.

Pattern

Any, design with regularly repeated parts.

Pigment

A colouring materials, usually a mixture of colorants, clay, water and a binder, organic or inorganic.

Pottery

Low-fired, non -vitrified objects including cooling, serving and storage vessels.

Provenience

The geographical / geological origin or source of an artifact.

Reduction

A chemical reaction characterised by addition of electrons where oxygen is removed from a substance during firing.

Rim

The area between the lip or margin and the side wall or neck of a vessel.

Rim milling

A technique of putting impressions on the rim often by pressure or dragging of a sharp object across the wet rim clay.

Rim profile

A type of illustration of a rim based on the vertical cross -section.

Rim Shape

The cross-section of the rim.

Ripple marks

Consistent, parallel marks left on the vessel after an incomplete burnishing.

Sampling

The process of selecting a small number of units from a larger whole, called population.

Sand

A particle size grade ranging from 2mm to 0.05mm in diameter.

Sherd

A term archaeologists use to refer to a broken fragment of pottery.

Secondary burial mound

Where an aggregate of bodies from primary graves are reburied together.

Shoulder

The upper part of the body of a restricted vessel, the portion between the maximum diameter and the orifice or neck.

Slip

Fluid suspension fine clay and water, used to coat vessel body before firing.

Style

Often refers to decorative or surface embellishment.

Stylus impressions

Consistent markings on the vessel as decorations.

Tapered

Narrowing towards the orifice of the vessel.

Temper inclusions

Mineral or organic material usually non-plastic added to a clay to improve its working, firing and drying properties.

Type

A non-random cluster of attributes.

Value

The intensity, brilliance or lightness/darkness of a colour.

Viscosity

The resistance of a fluid to shear or flow, the thickness or stiffness of a fluid.

Ware

A class of pottery whose members share similar technology, fabric and surface treatment.

APPENDIX

This section consists of the data collected in the analysis to this work. This include both metrical and non-metrical as the case may be.

Table A.1 GaJi 23 Distribution Of Surface Finds

| SQUARE NO. | POTTERY | OBSIDIAN | MCS | QUARTZ | HUMAN BONES | FISH | OES BEADS |
|---------------|---------|----------|-----|--------|-------------|------|-----------|
| 120.50/111.00 | | 1 | | | | | |
| 120.00/112.00 | 18 | 1 | | | 1 | | |
| 120.50/112.00 | 14 | | | | | | |
| 120.00/112.50 | 34 | | | | | | |
| 120.50/112.50 | 21 | 1 | | | 1 | | |
| 120.00/113.00 | 3 | 1 | | | | | |
| 120.50/113.00 | 17 | 1 | | | | | |
| 120.25/113.50 | 10 | | | | | | |
| 120.50/113.50 | 10 | | | | | | |
| 120.00/114.00 | 2 | 2 | | | | | 1 |
| 120.50/114.00 | 2 | | | | | | |
| 120.00/114.50 | 3 | | | | | | |
| 120.50/114.50 | 4 | | | | | | |
| 120.00/115.00 | 9 | | | | | | |
| 120.50/115.00 | 13 | | | | | | |
| 120.00/115.50 | 8 | 2 | | | | | |
| 120.50/115.50 | 3 | 2 | | | | | |
| 120.00/116.00 | 8 | | | | 1 | | |
| 120.50/116.00 | 9 | 1 | | | | | |
| 120.00/116.50 | 12 | | | | | | |
| 120.50/116.50 | 9 | | | | | | |
| 120.00/117.00 | 15 | | | | | | |
| 120.50/117.00 | 16 | 1 | | 2 | | | |

| SQUARE NO. | POTTERY | OBSIDIAN | MCS | QUARTZ | HUMAN BONES | FISH | OES BEADS |
|---------------|---------|----------|-----|--------|-------------|------|-----------|
| 120 00/117 50 | 10 | | | | | | |
| 120 50/117 50 | 11 | 1 | | | | | |
| 120 00/118 00 | 24 | | | | | | |
| 120 50/118 00 | 12 | | | | | | |
| 120 00/118 50 | 22 | | | | | | |
| 120 50/118 50 | 12 | 1 | | | | | |
| 120 00/119 00 | 37 | | | | | | |
| 120 50/119 00 | 24 | 1 | | | | | |
| 120 00/119 50 | 38 | | | | | | |
| 120 50/119 50 | 17 | | | | | | |
| 121 00/111 00 | 3 | | | | | | |
| 121 00/111 50 | 9 | | | | | | |
| 121 50/111 50 | 4 | | | | | | |
| 121 00/112 00 | 10 | 2 | | | | | |
| 121 50/112 00 | 9 | 1 | | | | | |
| 121 00/112 50 | 22 | | | | | | |
| 121 50/112 50 | | | 3 | | | | |
| 121 00/113 00 | 3 | | | | | | |
| 121 50/113 00 | 6 | | | | | | |
| 121 00/113 50 | 3 | | | | | 1 | |
| 121 50/113 50 | 11 | 1 | | | | | |
| 121 00/114 00 | 8 | | | | | | |
| 121 50/114 00 | 12 | | | | | | |
| 121 00/114 50 | 3 | | | | | | |
| 121 50/114 50 | 13 | | | | | | |
| 121 00/115 00 | 14 | | | | | | |
| 121 50/115 00 | 2 | | | | | | |
| 121 00/115 50 | 17 | | | | | | |
| 121 50/115 50 | | | 1 | | | | |
| 121 00/116 00 | 12 | | | | | | |
| 121 50/116 00 | 14 | | | | | | |
| 121 00/116 50 | 10 | | | | | | |
| 121 50/116 50 | 24 | | | | | | |

| SQUARE NO. | POTTERY | OBSIDIAN | MCS | QUARTZ | HUMAN BONES | FISH | OES BEADS |
|---------------|---------|----------|-----|--------|-------------|------|-----------|
| 121 00/117 00 | 22 | | | | | | |
| 121 00/117 50 | 46 | | 1 | | | | 1 |
| 121 50/117 50 | 9 | 2 | | | | | |
| 121 00/118.00 | 8 | | | | | | |
| 121 50/118.00 | 7 | 1 | | | | | |
| 121 00/118.50 | 9 | 1 | | | | | |
| 121 50/118.50 | 15 | | | | | | |
| 121 00/119.00 | 14 | | | | 1 | | |
| 121 50/119.00 | | | | 1 | 1 | | |
| 121 00/119.50 | 11 | | | | | | |
| 121 50/119.50 | 4 | | | | | | |
| 122.00/112.00 | 3 | | | | | | |
| 122.50/112.00 | 8 | | | | | | |
| 122.50/112.50 | 2 | | | | | | |
| 122.00/113.00 | 7 | | | | | | |
| 122.50/113.00 | 4 | 1 | | | | | |
| 122.00/113.50 | 15 | | | | | | |
| 122.50/113.50 | 9 | | | | | | |
| 122.00/114.00 | 7 | | | | | | |
| 122.50/114.00 | 7 | | | | | | |
| 122.50/114.50 | 14 | | | | | | |
| 122.50/115.00 | 5 | | | | 1 | | |
| 122.00/115.50 | 12 | | | | | | |
| 122.50/115.50 | 14 | 2 | | | | | |
| 122.00/116.00 | 9 | | | | | | |
| 122.50/116.00 | 11 | 1 | | | | | |
| 122.00/116.50 | 13 | | | | | | |
| 122.50/116.50 | 7 | | | | | | |
| 122.00/117.00 | 10 | | | | | | |
| 122.50/117.00 | 23 | | | | | | |
| 122.00/117.50 | 14 | 1 | | | | | |
| 122.50/117.50 | 32 | | | | | | |
| 122 00/118 00 | 15 | | | | | | |

| SQUARE NO. | POTTERY | OBSIDIAN | MCS | QUARTZ | HUMAN BONES | FISH | OES BEADS |
|---------------|---------|----------|-----|--------|-------------|------|-----------|
| 122.50/118.00 | 14 | | | | | | |
| 122.00/118.50 | 10 | | | | | | |
| 122.50/118.50 | 10 | | | | | | |
| 122.00/119.00 | 7 | | | | | | |
| 122.50/119.00 | 2 | | | | | | |
| 122.50/119.50 | 4 | | | | | | |
| 123.00/112.00 | 11 | | 1 | | | | |
| 123.50/112.00 | 9 | | | | | | |
| 123.00/112.50 | 8 | 1 | | | | | |
| 123.50/112.50 | 3 | | | | | | 1 |
| 123.00/113.00 | 4 | | | | | | |
| 123.50/113.00 | 11 | | | | | | |
| 123.00/113.50 | 8 | 1 | | | | | |
| 123.50/113.50 | 9 | 1 | | | | | |
| 123.00/114.00 | 11 | | | | | | |
| 123.50/114.00 | 37 | | | | | | |
| 123.00/114.50 | 14 | | | | | | |
| 123.50/114.50 | 15 | | | | | | |
| 123.00/115.00 | 21 | | | | | | |
| 123.50/115.00 | 13 | | | | | | |
| 123.00/115.50 | 17 | | | | | | |
| 123.50/115.50 | 6 | 1 | | | | | |
| 123.00/116.00 | 20 | | | | | | |
| 123.50/116.00 | 10 | 1 | | | | | |
| 123.00/116.50 | 12 | | | | | | |
| 123.50/116.50 | 13 | 1 | | | | | |
| 123.00/117.00 | 19 | | | | | | |
| 123.50/117.00 | 35 | | | | | | |
| 123.00/117.50 | 18 | | | | | | |
| 123.50/117.50 | 27 | | | | | | |
| 123.00/118.00 | 8 | 1 | | | 1 | | |
| 123.50/118.00 | 34 | | | | | | |
| 123.00/118.50 | 9 | | | | | | |

| SQUARE NO | POTTERY | OBSIDIAN | MCS | QUARTZ | HUMAN BONES | FISH | OES BEADS |
|---------------|---------|----------|-----|--------|----------------|------|--------------|
| 123.50/118.50 | 11 | | - | | | | |
| 123.00/119.00 | 10 | | | | | | |
| 123.50/119.00 | 6 | 1 | | | | | |
| 123.00/119.50 | 7 | | | | | | |
| 123.50/119.50 | 10 | | | | | | |
| TOTAL | 1545 | 35 | 6 | 3 | 7 | 1 | 3 |

OES - Ostrich eggshell bead

MCS - Microcrystalline Silica

Table A.2 GaJi 23 Stone Rubbers (mm)

| CAT. NO. | LENGTH | WIDTH | THICKNESS | DESCRIPTION |
|----------|--------|-------|-----------|---|
| 848 | 91.92 | 20.06 | 36.03 | Use wear on edges and surface, marks of red ochre on the surface, probable use as bipolar evidenced by presence of the use marks. |
| 827 | 80.99 | 17.34 | 32.31 | Use wear marks on both proximo-distal edges and surfaces. Surface marks probable relics of use as a bipolar. |
| 839 | 39.95 | 29.76 | 36.67 | Disk-shaped may be as a result of use in grinding. No evidential wear marks surface smooth with few unstandardized notches. |

Table A.3 GaJi 23 Stone Tools (mm)

| CAT. NO. | LENGTH | WIDTH | THICKNESS | DESCRIPTION |
|----------|--------|-------|-----------|--------------------------------|
| 0830 | 22.28 | 11.68 | 2.36 | Backed Blade |
| 0831 | 26.64 | 10.35 | 2.89 | Backed Blade |
| 0833 | 24.92 | 8.63 | 1.28 | Flaked with backed edge |
| 0856 | 17.72 | 10.24 | 1.76 | Segmented blade (let) |
| 0908 | 15.04 | 7.28 | 1.53 | Backed edge |
| 0918 | 10.87 | 13.67 | 1.64 | Segmented blade with back edge |
| 0933 | 11.17 | 5.91 | 2.50 | Backed edge |
| 1102 | 15.37 | 10.63 | 4.95 | Burr |
| 1289 | 22.74 | 10.63 | 1.59 | Flakes with edge damage |
| 1363 | 7.24 | 4.12 | 1.74 | Outils écaillés |
| 1486 | 5.94 | 5.39 | 1.70 | Outils écaillés |
| 1652 | 13.46 | 15.34 | 3.81 | Outils écaillés |
| 1760 | 11.39 | 4.68 | 0.73 | Edge-damaged |
| 1761 | 11.58 | 6.14 | 1.73 | Backed edge |
| 1769 | 16.66 | 11.31 | 5.33 | Notch |
| 1818 | 21.39 | 8.37 | 2.06 | Segmented, backed blade (let) |
| 1866 | 12.39 | 19.65 | 2.52 | Backed edge |

| CAT. NO | LENGTH | WIDTH | THICKNESS | DESCRIPTION |
|---------|--------|-------|-----------|----------------------------------|
| 1869 | 5.17 | 4.24 | 0.69 | Segmented Blade (let) |
| 1878 | 16.84 | 10.05 | 1.86 | Segmented flake with edge damage |
| 1895 | 13.19 | 9.92 | 3.14 | Outils écaillés |

Table A.4 GaJi 23 Beads (mm)

| CAT. NO | DIAMETER | THICKNESS | DESCRIPTION |
|---------|----------|-----------|--|
| 0896 | 13.10 | 5.95 | Green bead, ovalish in shape, perforated, polished. |
| 0897 | 4.14 | 1.51 | Ostrich eggshell, polished, perforated |
| 0927 | | 4.34 | Green bead, semi-circular shaped, perforated on the wall, polished possibly re-used. |
| 0929 | 4.86 | 1.35 | Ostrich eggshell, polished, perforated |
| 0931 | 4.64 | 1.62 | Ostrich eggshell, polished, thin, rounded-wall relatively wide perforation |
| 0945 | 6.31 | 3.64 | Green bead, rounded, polished, perforated. |
| 0946 | 3.86 | 1.66 | Ostrich eggshell, polished and perforated. |
| 1130 | 4.61 | 0.95 | Ostrich eggshell, polished, large perforation, thin angular wall |
| 1335 | 5.95 | 1.92 | Ostrich eggshell, unpolished and unfinished |
| 1536 | 4.15 | 1.65 | Ostrich eggshell, polished, rounded perforated |
| 1543 | 7.03 | 2.11 | Ostrich eggshell, polished, thick wall, wide perforation |
| 1824 | 4.57 | 1.20 | Ostrich eggshell, polished, thin wall which is rounded, perforate |

Table A.5 GaJi 23 Flake Measurements

| CAT.NO. | LENG. | THICK | WIDTH | | | | |
|---------|-------|-------|-------|------|-------|-------|------|
| | | | | 0912 | 16.32 | 8.47 | 2.02 |
| 0829 | 12.72 | 11.33 | 4.60 | 0913 | 11.24 | 7.95 | 1.24 |
| 0834 | 7.97 | 7.13 | 1.32 | 0914 | 10.40 | 4.83 | 1.20 |
| 0835 | 12.35 | 7.44 | 2.30 | 0915 | 12.21 | 5.05 | 1.28 |
| 0837 | 12.54 | 5.11 | 1.82 | 0916 | 6.15 | 2.34 | 1.09 |
| 0838 | 15.32 | 14.64 | 3.95 | 0917 | 4.01 | 10.06 | 1.96 |
| 0850 | 18.98 | 8.16 | 2.26 | 0942 | 26.75 | 6.15 | 2.69 |
| 0852 | 16.21 | 4.88 | 1.04 | 1287 | 14.64 | 10.63 | 1.95 |
| 0859 | 11.95 | 7.74 | 1.52 | 1290 | 3.69 | 2.55 | 0.52 |
| 0860 | 15.98 | 18.12 | 4.65 | 1295 | 6.19 | 5.43 | 1.01 |
| 0861 | 18.11 | 5.25 | 1.49 | 1297 | 3.81 | 9.56 | 1.15 |
| 0899 | 7.84 | 10.67 | 2.49 | 1298 | 6.95 | 6.70 | 0.86 |
| 0900 | 6.51 | 5.66 | 0.68 | 1300 | 9.03 | 5.35 | 1.52 |
| 0901 | 15.77 | 13.84 | 3.29 | 1301 | 6.19 | 7.97 | 1.55 |
| 0902 | 15.31 | 7.59 | 1.59 | 1302 | 14.32 | 9.28 | 2.50 |
| 0903 | 12.73 | 6.85 | 1.07 | 1303 | 13.57 | 7.74 | 1.48 |
| 0904 | 17.17 | 5.25 | 1.70 | 1352 | 17.87 | 14.56 | 3.75 |
| 0905 | 19.95 | 11.24 | 4.69 | 1354 | 24.69 | 7.07 | 1.58 |
| 0907 | 15.68 | 5.35 | 0.85 | 1357 | 13.58 | 4.79 | 1.05 |
| 0910 | 14.00 | 5.02 | 1.31 | 1358 | 11.96 | 7.61 | 1.30 |
| 0911 | 17.81 | 13.35 | 8.72 | 1365 | 5.28 | 4.77 | 1.14 |
| | | | | 1366 | 4.45 | 5.68 | 1.08 |

| | | | | | | | |
|--------|-------|------|------|--------|-------|-------|------|
| 1368 | 7.57 | 4.11 | 1.33 | 1528 | 16.93 | 9.60 | 2.48 |
| 1369 | 4.45 | 6.03 | 1.29 | 1529 | 17.78 | 6.90 | 1.87 |
| 1373.1 | 5.79 | 2.51 | 1.09 | 1530 | 13.14 | 11.44 | 2.61 |
| 1373.2 | 4.90 | 2.24 | 1.00 | 1597 | 15.66 | 7.84 | 1.77 |
| 1373.3 | 4.11 | 2.95 | 0.57 | 1598 | 11.30 | 7.47 | 2.22 |
| 1373.4 | 2.74 | 2.63 | 0.57 | 1602 | 10.11 | 4.87 | 1.42 |
| 1427 | 3.79 | 6.75 | 1.13 | 1649 | 16.62 | 15.56 | 6.37 |
| 1494 | 14.56 | 5.03 | 1.11 | 1650 | 18.90 | 8.92 | 1.75 |
| 1498 | 12.49 | 5.01 | 1.16 | 1654 | 22.36 | 8.04 | 5.10 |
| 1499 | 8.21 | 7.30 | 1.44 | 1655 | 10.06 | 13.36 | 3.50 |
| 1500 | 5.50 | 3.84 | 0.67 | 1656 | 15.44 | 9.51 | 2.26 |
| 1501 | 5.93 | 2.48 | 0.46 | 1657 | 12.64 | 8.86 | 2.19 |
| 1507 | 6.03 | 6.56 | 2.11 | 1659 | 15.05 | 9.71 | 3.29 |
| 1508 | 10.12 | 6.76 | 1.82 | 1660 | 9.82 | 10.36 | 2.78 |
| 1509 | 9.18 | 8.32 | 1.47 | 1661 | 14.67 | 8.62 | 0.51 |
| 1514 | 13.21 | 7.89 | 1.65 | 1669 | 5.11 | 8.85 | 2.45 |
| 1517 | 9.69 | 8.28 | 1.02 | 1671 | 6.55 | 4.70 | 0.74 |
| 1519 | 11.82 | 7.02 | 2.06 | 1672 | 5.85 | 3.60 | 1.51 |
| 1521 | 10.23 | 7.26 | 1.11 | 1673.1 | 5.22 | 4.08 | 1.68 |
| 1522 | 15.50 | 5.07 | 1.65 | 1673.2 | 4.16 | 2.08 | 4.15 |
| 1525 | 22.20 | 9.61 | 3.78 | 1673.3 | 6.76 | 4.31 | 1.68 |
| 1527 | 18.62 | 8.29 | 2.08 | 1696 | 15.08 | 8.89 | 2.26 |

| | | | | | | | |
|--------|-------|-------|------|--------|-------|-------|------|
| 1698 | 13.21 | 12.63 | 3.21 | 1853 | 8.57 | 8.53 | 1.61 |
| 1699.1 | 7.89 | 7.52 | 1.38 | 1854 | 7.90 | 4.31 | 1.30 |
| 1757 | 9.94 | 3.55 | 0.94 | 1857 | 8.02 | 9.62 | 2.05 |
| 1759 | 7.17 | 5.58 | 0.60 | 1873 | 5.71 | 8.09 | 2.31 |
| 1765 | 14.80 | 4.68 | 4.70 | 1878 | 5.46 | 5.91 | 1.65 |
| 1766 | 12.33 | 6.55 | 1.61 | 1887.1 | 12.6 | 8.49 | 2.41 |
| 1767 | 10.94 | 8.89 | 1.08 | 1887.2 | 5.51 | 1.47 | 0.50 |
| 1768 | 16.49 | 9.84 | 3.15 | 1895 | 12.53 | 10.32 | 1.50 |
| 1780.1 | 9.50 | 5.81 | 1.09 | 1895.1 | 5.87 | 6.79 | 0.57 |
| 1780.2 | 10.84 | 5.18 | 1.25 | 1895.2 | 5.05 | 3.22 | 1.16 |
| 1787 | 9.42 | 6.24 | 2.09 | 1902 | 23.03 | 10.79 | 1.88 |
| 1790 | 12.65 | 5.52 | 1.38 | | | | |
| 1804 | 14.47 | 7.09 | 1.94 | | | | |
| 1805 | 25.91 | 7.53 | 2.42 | | | | |
| 1807 | 12.08 | 7.99 | 1.18 | | | | |
| 1816 | 19.66 | 11.49 | 1.84 | | | | |
| 1817 | 18.96 | 10.03 | 2.40 | | | | |
| 1820 | 8.62 | 4.23 | 1.25 | | | | |
| 1829 | 14.84 | 4.03 | 0.81 | | | | |
| 1830 | 7.03 | 7.38 | 1.88 | | | | |
| 1838 | 13.85 | 7.43 | 2.06 | | | | |
| 1839 | 7.91 | 4.39 | 1.23 | | | | |

Table A.6 GaJi 23 Weight Of Flakes

| Cat. No. | Weight (g) | Cat. No. | Weight (g) | Cat. No. | Weight (g) |
|----------|------------|----------|------------|----------|------------|
| 0827 | 82.35 | 0900 | 0.02 | 0943 | 0.11 |
| 0829 | 0.66 | 0901 | 0.65 | 1102 | 0.92 |
| 0830 | 0.89 | 0902 | 0.19 | 1287 | 0.29 |
| 0831 | 0.97 | 0903 | 0.08 | 1289 | 0.31 |
| 0833 | 0.33 | 0904 | 0.13 | 1290 | 0.01 |
| 0834 | 0.07 | 0905 | 0.89 | 1295 | 0.02 |
| 0835 | 0.21 | 0907 | 0.06 | 1297 | 0.03 |
| 0837 | 0.01 | 0908 | 0.25 | 1298 | 0.03 |
| 0839 | 30.65 | 0910 | 0.07 | 1300 | 0.05 |
| 0848 | 128.25 | 0911 | 1.55 | 1301 | 0.08 |
| 0850 | 0.34 | 0912 | 0.21 | 1302 | 0.40 |
| 0851 | 0.33 | 0913 | 0.09 | 1303 | 0.13 2 |
| 0852 | 0.06 | 0915 | 0.09 | 1304 | 0.42 |
| 0856 | 0.39 | 0916 | 0.01 | 1352 | 0.80 |
| 0859 | 0.13 | 0917 | 0.05 | 1354 | 0.26 |
| 0860 | 0.88 | 0918 | 0.29 | 1357 | 0.09 |
| 0861 | 0.18 | 0933 | 0.30 | 1358 | 0.13 |
| 0899 | 0.18 | 0942 | 0.37 | 1363 | 0.06 |

| | | | | | |
|--------|------|------|------|--------|------|
| 1365 | 0.03 | 1527 | 0.35 | 1672 | 0.02 |
| 1366 | 0.02 | 1528 | 0.21 | 1673.1 | 0.03 |
| 1369 | 0.03 | 1529 | 0.27 | 1673.2 | 0.01 |
| 1373.1 | 0.01 | 1530 | 0.25 | 1673.3 | 0.01 |
| 1373.2 | 0.01 | 1597 | 0.18 | 1696 | 0.29 |
| 1373.3 | 0.01 | 1598 | 0.17 | 1697 | 0.20 |
| 1373.4 | 0.01 | 1601 | 0.07 | 1698 | 0.46 |
| 1427 | 0.02 | 1607 | 0.01 | 1699.1 | 0.08 |
| 1494 | 0.07 | 1649 | 1.85 | 1728 | 0.29 |
| 1496 | 0.05 | 1650 | 0.29 | 1757 | 0.04 |
| 1498 | 0.08 | 1651 | 0.48 | 1759 | 0.03 |
| 1499 | 0.04 | 1652 | 0.89 | 1760 | 0.04 |
| 1500 | 0.01 | 1654 | 0.89 | 1761 | 0.14 |
| 1501 | 0.06 | 1655 | 0.58 | 1765 | 0.08 |
| 1508 | 0.01 | 1656 | 0.39 | 1766 | 0.01 |
| 1509 | 0.07 | 1657 | 0.16 | 1767 | 0.06 |
| 1514 | 0.11 | 1659 | 0.39 | 1768 | 0.33 |
| 1517 | 0.05 | 1660 | 0.28 | 1769 | 1.00 |
| 1519 | 0.13 | 1661 | 0.17 | 1780.1 | 0.04 |
| 1521 | 0.05 | 1663 | 0.28 | 1780.2 | 0.07 |
| 1522 | 0.01 | 1669 | 0.10 | 1787 | 0.13 |
| 1525 | 0.79 | 1671 | 0.02 | 1790 | 0.08 |