Chapter – IV

THE DESCRIPTION OF THE CULTURAL MATERIALS
The explorations conducted at 72 different archaeological mounds in Muneru river valley has brought to light several artefacts such as pottery, ground stone tools, mullers, querns, pounders stetite disc beads, terracotta objects, iron slags, iron implements and clay beads of early farming cultures. Not withstanding to the geographical locations of the area, these materials have shown distinct variations in shape, size dimensions and technique of preparation etc.

On the basis of the differences in the make up of these artefacts, the identification of the cultural affects can be attempted. The hand made pottery of grey, pale grey, buff and brown wares with or without ship and burnishing techniques can be assumed to have belonged to Neolithic period whereas the wheel made pottery belongs to the subsequent cultures such as Megalithic and early historic periods. Even among these two periods show marked variations in the technique of pot preparation which is identified with the presence of inverted firing technique/ double firing technique which was resulted in the black and redware during Megalithic period which is distinctly absent during subsequent period i.e, early historic period.

The other artefactual materials such as ground stone tools, mullers, querns, pounders are usually associated with Neolithic period as it is held that the metallic tools are totally absent during this period under consideration except for a rare instance of a copper axe from the surface collection at Gunduluru in Sattenapalli taluq of Guntur District (not included in the present study) is an exhotic object and came to the area like other objects either in trade or commerce
activity. Hence, it is assumed that the Neolithic man was totally dependent on stone tools for his day-to-day use for carpentry and agricultural works. As already established elsewhere in India either by excavations or by other means the megalithic and early historic periods have witnessed the prolific use of metallic objects and as such there is larger occurrence of iron tools for the carpentry and agricultural activities. Hence, it is assumed that the use of stone implements were redundant during Megalithic and Early Historic periods. Hence a clear cut distinction is identified in the economy of early farming (David Raju, B 1985:). Cultural make up of Munneru river valley i.e., the Neolithic culture was associated with handmade pottery with or without slip and burnish and stone implements such as ground and polished stone axes, adzes, chisels and non-edge tools such as querns, mullers and pounders and stealite disc beats on one hand and the Megalithic and early historic periods with black and red ware and wheel made pots of brown ware, red ware, black ware and grey ware, iron objects, terracotta objects, clay bead etc., on the other. Thus the explorations conducted at the Munneru river valley from the 72 sites brought to light three distinct cultural entities, i.e., Neolithic cultural entities from 11 localities, Megalithic materials from 30 localities and early historic cultural entities from 69 localities.

In this connection, it may be observed that in the lower Munneru river valley, there occur multi-cultural sites such as Neolithic, megalithic and Early historic sites as the area itself provided congenial atmosphere such as fertility of soil, availability of water sources and raw materials, etc. where as in
the upper Munneru river valley the cultural entities are scattered and confined either to megalithic or early historic or to both as the area is mostly traversed by rugged hilly surfaces and red soils with out much facility for fertile lands and water sources.

POTTERY (Neolithic Period) :

The pottery during Neolithic period is essentially handmade and as such it has thick walls and finger impressions on either sides. The mouth portions of the pots are very wide so as to facilitate free movement of hand during clay modeling with either flared, or curved on high necked and everted rims. Certain of the rims are flattened on the top as well. The use of the techniques such as burnishing, dabber and luting are also observed on certain pot pieces which indicate that the advanced techniques were employed by the potter. A detailed discussion is given below to have more understanding about the preparation of pottery during Neolithic times at Muneru river valley.

The Body Clay :

The paste that was used for the preparation of pots at the Neolithic sites of Munneru river valley contains the clay mixed with gritty substances such as quartz sand or non gritty substances such as levigated fine clay. Allchin, F.R. (1960: 26-30) opined that the use of gritty substances produces fusion to the pots at the time of firing. Parameswaran, S. (1967:241) who studied the Maski pottery in a laboratory also confirmed the above observation theory when he found that
different gritty materials were used to provide fusion to the pottery at the time of firing.

Parameswaran, S. (1967:242) studies also indicated that granules that were used in the Maski pottery are angular to subangular but never rounded in structure. This, he took as an indication to prove that the clay used for pot preparation at Maski was not ‘water-borne’ deposit but on the other hand was lacustrine sediment probably acquired from ponds and tanks. Similar microscopic studies of the pottery by the writer from the Neolithic sites of Muneru river valley has confirmed the observations of Parameswaran. As all Neolithic sites of Muneru river valley fall under granetoid gneissic area and probably the clay available near the ponds was procured by the Neolithic potter for the pot preparation.

**Technique:**

All the Neolithic pot pieces recovered from the Muneru river valley were hand made. This is indicated by the presence of uneven surfaces and finger impressions on the pot pieces. However, scooping marks visible on the interior of majority of the sherds suggest that split bamboo or read might have been used by the potter to remove undulations and uneven surfaces and also to obtain thin walls to pot surfaces. In a considerable number of pots, the potter used Dabber technique to and seal the bottom portions and to provide even pot surfaces. In some of the high necked vessels, the technique of luting was identified where in the neck and the belley portions were made separately and luted together when
both were in leather hard condition. The lugs, handles, knobs, spouts, dish/bowl-
on-stands seems to have been luted to the pot body in similar technique.

**Shaping :**

The pottery was essentially hand made and at none of the excavated and explored sits of the pot mouldings are recovered. Further there was any evidence for the use of fast wheal. Hence it may be surmised that the Neolithic potter prepared the pots by hand moulding only. This is further indicated by the presence of wide mouths to all pots to facilitate early movement of hand freely inside the vessel in hand mouldings.

As already made to a reference, to the locally available clay was utilized for preparation of pottery. In this connection, it may be observed that the thickness of a pot is mostly guided by the core that was used during its preparation. If the core contains gritty substances, one cannot help except to prepare a thick walled vessel. Same is the case with the typology and the shape of a vessel. It is difficult to prepare sophisticated, designed, decorated and miniature pottery on the gritty core. The vessels that are prepared on gritty core are usually big in size such as storage vessels, etc. On the other hand, the fine core made on levigated clay of superior variety is suitable for preparation of miniature vessels with thin walls. The different shapes such as high necked or globular vessels, pinched lips, spouts, dish-on-stands, etc., are easy to be prepared on fine clay. Added to that, the surface treatment such as slip and burnishing is also very much guided by the core that was used in the preparation of pottery. The storage
vessels particularly meant for grain needs no burnishing. But the vessels, particularly used for domestic purposes such as eating, drinking, cooking and storing liquids essentially require burnishing as it seals the porus structure of the pots obtained in hand modeling.

Further there are a couple of spouts recovered from a few sites. These seems to have been prepared by rotating a lump of wet clay on a stick and luted it to the pot/bowl at a later stage by keeping the outer edge in an upward projection. Handles and knobs were luted at right angles to the nect or rim. The necks of the vessels are variously prepared such as concave, constricted and high etc. The bodies are globular/bulbous and carinated and the pot bases are round, flat, and disc shaped.

**Surface Treatment :**

**The slip :** A considerable number of sherds are treated with a thick ‘applied slip’. Allchin, F.R. (1960: 29) felt that the slip that is applied usually contained some ‘organic substance including mucilage or gum’. Some of the pots show self-slip, the application of the same clay solution on the body portion. A few pots contained simple wash which could have been applied with a piece of cotton or some such material. It is hard to determine whether the colour of the pottery was obtained due to the colour of the slip or difference in the firing process or due to the different mineral present in the clay. Lucas, A. (1948 :420) attributed that the red colour of the pottery might be due to the iron compounds in the clay which when heated would turn to red oxide. The grey and the associated shades
according to Lucas might be due to the presence of calcium carbonate in the clay which at different temperatures turned to different shades of gray colour. Childe (1937:44) on the other hand attributed that the colour of the pottery might be due to the Kiln (such as open or closed types) and heat (i.e. oxidizing and reducing conditions).

**Burnishing :**

Burnishing might have been done on pot bodies with the help of smooth pebbles or bone pieces when the pots are in leather hard condition. It gave the potter double advantage i.e. it sealed the pores structure and provided smooth and lustrous surfaces to the pot body. In this connection it may be noted that majority of the pots prepared on fine fabric have burnished surfaces where as the pots that are prepared on gritty substances seldom have burnishing. Usually burnishing was done in short strokes either horizontal or vertical and rarely criss-cross. Besides that the outer surfaces and the inner surfaces were also burnished in a considerable number fo miniature vessels and bowls depending upon the movement of hand.

**Perforated Sherds :**

Perforated sherds are very few but they do occur at Kondapeta and Muppalla. On the basis of the raised burrows on the inner surfaces of the sherds, it is assumed that the perforations were made from the outer surface by a small pointed tool. The real significance of the perforated pottery is not clearly known. However, Paddayya, K. (1969: 450-53) suggested on the basis of ethnographic
evidence in Guntur District of Andhra Pradesh that these vessels were used for the preparation of a sweet locally known as ‘Palatalikalu’.

**Firing Process:**

No direct evidence of firing process was available at the Neolithic sites of Muneru river valley. Allchin, F.R. (1960: 30) conjectured on the basis of his observation on Piklihal that the pots might have been fired on the bare ground in the form of over rapid ‘flash firing’. The blakish nature of the interiors of the pots he conjectured that the pottery was not fired at a high temperature. Parameswaran, S. (1967: 249-50) observed that the pottery at Maski was baked at a temperature ranging between 500°C to 300°C. In the light of Parameswaran’s observations it can be assumed that the Neolithic pottery of the area under present investigation was fired at similar temperatures. Some of the thick sherds with gritty cores show dark sections which might be due to the non-penetration of sufficient heat into the interior of pot section. The bloachy sherds which constitute 18% of the total sherds of these sites might be due to the result of uneven distribution of heat in the kiln.

**The Decorated Sherds:**

The decorated sherds constitute an important class of the Neolithic pottery. There are 3 varieties of decorations:

1. Incised decoration
2. Finger tipped decoration and
3. Applique decoration etc.
**Incised Decoration:**

Sharp bone or wood might have been used to draw deep to shallow incisions depending upon the thickness of the pot body. The potter took enough care to provide clear margins without the raised edges and burrows along the incised lines. The design repertoire was essentially simple and contained vertical, slanting, horizontal and shows rarely criss-cross patterns on the neck and the shoulder portions.

**Finger Tipped Decoration:**

The finger tipped decorations were usually applied on the belley and neck portions in the form of horizontal band either in singular or double lines. In a few instances, rope pattern was also used.

**Applique Decoration:**

The shoulder and neck portions of the medium sized vessels are usually the areas of concentration for this decoration. The appliqué decoration was also found on some of the high necked vessels at the neck and body junction probably intended to cover the luting.

**CLASSIFICATION:**

All the credit goes to Allchin, F.R. (1960) who for the first time tried to bring out a systematic classification of South Indian Neolithic pottery. His main criterion of classification of pottery was the surface treatment, typotechnological features and the probable function and utility. He thus divided the
whole lot of Neolithic pottery recovered at Piklihal excavations into 5 groups, i.e., A₁, A₂, A₃, A₄, A₅. He attributed A₃ ware to early phase and A₄ and A₅ wares to the late phase while A₁ and A₂ wares to both the phases. Though Allchin tried to establish the first ever systematic classification of South Indian Neolithic pottery, he did not emphasise much on the role of paste that was used in the preparation of pottery.

The classification of Neolithic pottery by Nagaraja Rao, M.S. (1965, 1970), Peddayya, K. (1973) and Reddy, V.R. (1979) also have similar pitfalls.

In this connection, it may be observed that the thickness of a pot is mostly guided by the core that was used during its preparation. If the core contains gritty substances, one can not help except to prepare a thick walled vessel. Same is the case with the typology and the shape of a vessel. It is difficult to prepare sophisticated, designed, decorated and miniature vessels on the gritty core. On the other hand, the fine levigated clay is suitable for preparation of miniature vessels of different sizes and also miniature bowls, basins with thin walls. The different shapes such as high necked vessels, pinched lips, spouts, dish-on-stands, etc., are easy to prepare on fine clay. Added to that, the surface treatment such as slip and burnishing is also very much guided by the core that was used in the preparation of pottery. The storage particularly meant for storing grain, etc., need no burnishing. But the vessels, particularly used for domestic purpose such as eating, drinking, cooking and storing liquids, etc., essentially require burnishing as it seals the porus structure of the pots which might have
formed in hand modeling. Based on the typo-technological features, the surface treatment and the body clay, the pottery recovered from the archaeological mounds of Munneru river valley can broadly be divided into two fabrics ‘A’ and ‘B’, the former is coarser than the latter.

**FABRIC – A :**

Pottery prepared out of gritty core is considered as fabric A. The sherds of this fabric are sturdy and range in thickness between 1.5 cm to 3.5 cm. However, a very few sherds are less than 1 cm thick. These are devoid of slip and barnish. The incised and decorated sherds are also very limited. The pot forms in majority of the cases are very big and probably used for storing grains or water, etc. The pot forms that usually occur in this fabric include globular vessels, wide mouthed vessels and a few bowls. Coarse brown, coarse grey, coarse brown, coarse and red are the usual wares respectively present in the decreasing order of their preference in this fabric.

**Coarse Brown Ware :**

Coarse Brown ware amounts to 25.5% of the total pottery.

This ware is thick and sturdy and principally hand made. Majority of the sherds are devoid of surface treatment such as slip and burnishing and have crude surfaces. But, however, very limited number of sherds that are recovered from Kondapeta have slip and burnishing.
Coarse Gray Ware:

Coarse grey ware is also recovered from all the sites. The total availability of the ware is 35%. The slip and burnish is very much limited on this ware but however, a few sherds recovered from Kondapeta contain burnishing.

Coarse Buff Ware:

Coarse Buff ware is absent in the northern sites but occurs in the sites that are available on Krishna bank where its recovery is limited to 6%. The important feature of Coarse Buff ware is that the walls of the sherds are thin and are slipped and burnished. Majority of the pot forms are bowls and medium sized vessels.

Coarse Pale Grey Ware:

The coarse pale grey ware is almost absent in all the sites except 2% of pot pieces at Kondapeta.

Coarse Red Ware:

Coarse Red ware is found in a limited manner at the sites abutting the Krishna river, but prolific in northern Neolithic sites and forms 21% of the total availability. On typo-technological grounds and surface treatment the ware exactly resembles that of coarse brown ware.

Fabric B:

The pot sherds made out of fine clay are categorized here as fabric B.
The core contains levigated clay of superior variety and hence majority of the sherds are thin and do not exceed 2 cm in thickness. In contrast to fabric A majority of the sherds of this fabric contain slip and burnish. The incised and decorated sherds are also available in considerable numbers. The grey and pale grey and buff wares predominate over brown, red and black wares. Majority of the pot forms of this fabric are medium to small in size and mostly used for cooking, eating and drinking purposes. They include high necked vessels, miniature vessels, spouts, carinated vessels and a variety of bowls, basins and lids, etc.

**Fine Grey Ware:**

This is a predominant ware in fabric B and recovered from almost all the Neolithic sites of Muneru river valley but with larger proportion in lower Muneru valley and lesser proportion in the upper Muneru valley. In total it constitutes 35% of pot sherds in Fabric B. Majority of the sherds of the Fabric B sherds of this ware contain both slip and burnish.

**Pale Grey Ware:**

The Pale grey ware is another predominant ware in fabric B. It is predominantly available in the sherds that are recovered from the lower Muneru river valley especially on the sites where Muneru river joins river Krishna where it constitutes 25% of sherds. Almost all the sherds of this fabric contain slip and burnish.
**Brown Ware:**

The brown ware of fine fabric is constantly present in all the sites of Muneru river valley and constitute 16.5% of total ware. Except for a few brown sherds most of the sherds are devoid of both slip and burnish.

In the sites of lower Muneru river valley it constitutes around 18% total ware, but in the upper Muneru river valley. In the lower it is also present but with only 7%.

**Buff Ware:**

The Buff ware is available in considerable proportions in lower Muneru valley where it constitutes 8% of the total collected sherds. But however it is very rare in the sites of upper Muneru river valley. Majority of the sherds contain slip and burnish.

**Red Ware:**

It occurs in small quantity in the lower Muneru river valley but in a considerable numbers i.e. 10% in the upper Muneru river valley. Majority of the sherds are devoid of slip and burnish.

**Black Ware:**

It is constantly present in all the sites of Munneru river valley but in small quantity i.e., 6%. Almost all the sherds contain slip and burnish.
DESCRIPTION OF POT FORMS:

1. **Wide mouthed vessels with globular bodies** (fig. 5):

   This form is common for both fabrics A and B and occurs in brown, grey and red wares. The sherds of brown ware are usually devoid of surface treatment but the grey were contain slip and burnish. It is thick but in most cases brittle. It is present at majority of the Neolithic sites in Muneru river valley. This form might have served the function of storage purpose such as grain or water etc., Else ware these form ware also used for urn burials at sites such as Piklihal, Brahmagiri, Hallur, Tekkalakota, etc. The examples are:

   a) Fragment of a vessel with concave neck and short flared thickened rim flattened at the top.

   b) Variant ;of the above with flared rim (c.f. PKL\textsuperscript{1}. P1. 26:29G; TKK. FIG.16:c; SGK: P1.IX:XVIIIIf, HAL. Fig.11:5, 13:13; PLY, fig.13:T14a, TKK. Fig.20:c.

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1. References are to plates or figures and types in the respective reports of excatations. Abbreviation used for the sites are : Br. Brahmagiri; SGK. Sanganakallu; PKL. Piklihal, MSK. Maski; NGK. Nagarjuna Konda; Rly. Palavoy; TKK. Tekkelakota; HAL. Hallur; HMG Hemige.
2. **Wide mouthed big vessels with bulbous bodies (Fig. 5)**:

   This pot form is present mainly in the brown ware in all the neolithic sites of Muneru river valley. It is usually devoid of slip and burnish. It possesses thick sections and is mostly brittle in nature. This pot form is very common in South Indian Neolithic culture and serves similar functions as that of the former.

   a) Fragment of a vessel with short concave neck, flared rim and rounded edge.

   b) Same as above but with thin walls. 9c.f. Br. Fig. 20: T.37 and 40, SGK. Pl. IX: Xviii; PKL. Pl. 26; 29g, HAL, fig.11:5).

3. **Wide mouthed miniature vessels with globular bodies (fig. 5)**:

   It is a common form in fabrics A and B and available in all the sites of Neolithic sites of Muneru river valley. The pot forms occur at the sites near Krishna river are thin and contain slip and burnish whereas those that occur on the tributary rivers are devoid of surface treatment. This pot form might have been used for carrying water and cooking.

   a) Fragment of a brown vessel with concave neck.

   c) Same as above but with small everted rim and burnished surfaces.

   c.f. HAL. fig. 12, 14.

4. **High necked vessels with globular bodies (fig. 5)**:

   This form is present especially in grey and pale grey wares of fabric B and rarely in brown ware of fabric A. All the forms contain slip and burnish. It
appears that the rim is made separately and luted to the pot body. The forms recovered from the sites of Krishna river are mainly made out of fabric B but those that occur at tributary rivers of Muneru river valley are made on both the fabrics. However, those that are made on fabric B contain slip and burnish. This spot form is convenient for cooking, carrying and storing the liquids.

a) fragment of a grey vessel with out turned rim. (c.f. br. Fig. 22: T.52; SGK. Pl. XIX: xixk; MSK. Fig. 12: 29b; PKL. Pl. 34:27a and 28a; TKK. Fig. 17d;)

b) Same as above but with flattened rim. Decorated with horizontal appliqué band probably to cover luting. HMG. Fig. 14:1;

c) Similar to the above but with short straight neck and slipped and burnished surfaces.

5. **Vessels with tapering sides** (fig. 5 & 6):

Vessels of this class are very limited and are present only in fabric A of Kunikinapadu and Tatigummi. These are made of gritty core but thoroughly scooped and hence the walls are very even and thin. The surfaces are unslipped and unburnished. A few forms also contain appliqué decoration. The pot form is best suited for cooking, boiling water and storing grain and water.

a) Fragment of a brown vessel with constructed neck, out curved rim flattened on the top. TKK. Fig. 17b; SGK. Pl. VI: viic; PKL. Pl. 25: 20k; NGK. Fig. 25: la.

b) Same as above but with thinner walls and everted rim.

c) Same as above but with appliqué decoration.
6. **Miniature vessels with tapering sides** (fig. 5 & 6):

This form is similar to that of the previous one in many respects but differs in size, surface treatment and distribution. It is usually present in grey and pale grey wares of fabric B but rarely in brown ware of fabric A. All the forms contain slip and burnish. This form is exclusively found in sites adjacent to Krishna river and rarely in the sites on the upper Muneru river. It is useful for boiling liquids, storing food and drinking.

a) Fragment of a grey vessel with thickened everted rim.

b) Same as above but with flattened rim.

c) Same as above but with a groove on the rim. Cf. cf. HAL. Fig. 15:5.

d) Same as above but with collared rim.

7. **Narrow mouthed vessels with globular bodies** (fig. 6):

This form is prolific in all the Neolithic sites and occurs in both the fabrics. All the forms that occur in the sites close to river Krishna in grey, buff and brown wares and contain slip and burnish but those that occur in the sites on the upper Muneru river valley are devoid of surface treatment. This form is convenient for carrying liquids and cooking purposes.

a) Rim fragment of a vessel with high concave neck and flared rim. (cf. HAL. Fig. 11: 6; HMG. Fig. 14: 5,6;)

b) Same as the above but with beaded rim. (cf. TKK. Fig. 17C; Br. Fig. 22: T.49; SGK. Pl.VI: viiq, PKL. Pl.32:270)
8. **Lota shaped vessel with collared rims** (fig. 6):

   This form is found in almost all the sites but prolific in the sites located on the banks of river Krishna. All the forms are slipped and burnished. This form is useful for drinking and cooking purposes.

   a) Fragment of a grey vessel with slipped and burnished surfaces.
      K D P layer 6.

   b) Same as the above but with unburnished surfaces.

   c) Miniature vessel same as the above.

9. **Miniature vessels** (fig. 6):

   Miniature vessels occur only in grey ware of fabric B at majority of sites. All the shards contain thick slip and are smoothly burnished. These vessels are useful for drinking, eating and boiling liquids.

   a) Fragment of a miniature vessel with short concave neck and out turned rim, slipped in grey and burnished.

   b) Fragment of a miniature vessel with straight sides, everted rim and burnished surfaces.

   c) Same as above but with flattened rim.

   d) Same as above but grooved on the top.

10) **Hemispherical bowls**: (fig. 6 & 7):

    Hemispherical bowls occur in all the sites especially in grey, pale grey and buff wares of fabric B and rarely in grey and brown wares of fabric A.
The surfaces of bowls of fabric B are burnished whereas the bowls that are present in fabric A are devoid of burnishing. The functional aspects of these bowls indicate that they are used for boiling liquids, storing and serving the food and eating.

a) Fragment of brown ware with featureless rim flattened on the top. The surfaces are devoid of slip and burnish.

b) Same as above but of grey burnished ware.

c) Same as above but with a groove on the edge.

d) Similar to the above but internally sharpened rim.

e) Same as above but everted rim. (cf. Br. Fig. 21: T 46A; PKL. Pl.31:7j; TKK. Fig. 15e; HAL. Fig. 13:9;)

11) **Straight sided deep bowls** (fig. 7):

This form is present in all the sites, put its frequency is much limited. The sherds made on fabric B are slipped and burnished. These bowls are good for storing and boiling liquids and also useful as containers for serving food.

a) Fragment of a bowl with featureless rim rounded on the top.

b) Same as above but with thin sections and the inner and outer surfaces sharply taper at the rim. (cf. HAL. Fig. 12: 6; HMG. Fig. 14: 12)
12) **Convex sides bowls (fig. 7):**

Convex sided bowls prolificly occur in all the sites. Slip and burnishing is found on all the pieces made on fabric B but in a limited number. The convex bowls that were recovered from the Krishna river area are normally made on fabric B where the pieces that were collected from the sites of the tributaries of Muneru river valley are usually made on fabric A. The deep convex sided bowls serve the functions such as boiling liquids, cooking, storing the food, eating and serving.

a) Fragment of a coarse brown ware with featureless rounded rim.  
(cf. HAL. Fig. 14: 2; HMG. Fig. 15: 18.)

b) Same as above but with burnished surfaces, thin walls and grooved on the exterior. (cf. HAL. Fig. 11:2, HMG. Fig. 15: 19;)

c) Same as above with burnished surfaced, and out curved rim.  
(cf. TKK. Fig. 19: 6; PKL. Pl. 25: 14b and 14c.)

d) Same as above but with carinated rim and slipped and burnished surfaces.

13. **Convex sided miniature bowls (fig. 7):**

There is not much of a difference in the form, technique and distribution of miniature convex aided bowls from that of the earlier form but for the differences in the functional aspect. These bowls are mostly useful for
drinking, eating and serving purposes. These bowls usually occur in fabric B only.

a) Fragment of a bowl with featureless rim with rounded edge and high burnish. (cf. TKK. Fig. 19e; PKL. Pl.24; 4j and pl. 33: 5m; HAL. Fig. 11: 10; HMG. Fig. 15: 17)

b) Same as above but with everted rim. (cf. PKL. Pl. 24: 13;

14) **Narrow mouthed bowls (fig. 7)**:

These bowls are in the shape of globular vessels without the neck and rim. These are extremely limited and found only in grey and brown wares of fabric B. The distribution of the form is mostly confined to the sites located on river Krishna and occasionally in the adjacent areas. These forms are slipped and burnished.

a) Fragment of a grey bowl with featureless and internally curved edge. (cf. HAL. Fig. 14: 4; HMG. Fig. 16: 33;)

b) Fragment of a brown bowl with closing mouth and internally sharpened edge.

15. **Shallow bowls** : (fig. 7 & 8):

Shallow bowls are common in all the Neolithic sites under consideration and usually prepared on fabric B. In majority of the forms both the surfaces show slip and burnish. It is present in fabric B at the sites located on the tributary in the Muneru river. This form is very much useful for serving, and eating food.
a) Fragment of a brown bowl with featureless rounded rim (cf. HAL. fig. 13: 1; HMG. fig. 5: 14;)

b) Grey bowl same as above but bifacially sharpened rim. (cf. HAL. fig. 12: 2; HMG. fig. 15: 27;)

c) Same as above but with everted rim. (cf. PKL. P1. 31: 11m; SGK. pl. VIII: XVa, TKK. fig. 15:b;)

16. Carinated bowls : (fig. 8) :

The carinated bowls are present occasionally in fabric A and B in Brown, red and grey wares. Only the sherds made on the latter contain slip and burnish. This form is mainly available in the sites close to on Krishna river and occasionally at the adjacent regions. It is useful for eating and storing liquids.

a) fragment of a brown bowl with internally sharpened featureless rim and unburnished surfaces. (cf. TKK. fig. 19: g; PKL, pl. 31: 50b;)

17. Dishes (fig. 8) :

Dishes are found mostly in lower Muneru river valley and rarely Upper Muneru river valley. All these sherds contain burnishing irrespective of the fabric on which they are made. This form is useful for serving, eating and storing the cooked food.
a) Shallow dish of a brown ware with featureless rim and burnished surfaces. (cf. MSK. fig. 24: 1g; PKL. Pl. 11: 11; NGK. Fig. 25: 7a; TKK. fig. 19: a.)

b) Miniature sized dish same as above but of grey ware with featureless rim.

18. Lids (fig. 8):

Lids are very limited but occur in both the fabrics as Kondapeta and its adjacent sites. The surfaces are usually free from surface treatment except in a rare instance. Lids are usually luted to the bowls after they were made separately.

a) Lid of brown ware with featureless rim and unburnished surfaces.

b) Thin lid same as above but with burnished surfaces. (cf. PKL. Pl. 24: 1a;)

19. Basins (fig. 8):

This pot form is very limited and occurs in grey and brown wares of fabric B and posses burnishing on interior and exterior surfaces. The function which this form serves includes both serving and storing the food.

a) Fragment with out curved rim and burnished surfaces. (cf. HAL. fig. 13: 4; PKL. Pl. 25: 12c;)

b) Same as above but with everted rim.
20. Bases (fig. 8 & 9):

The bases that are recovered include disc bases, flat bases and round bases, which are distributed in majority of the sites. While flat bases and disc bases occur in both the fabrics A & B, the round bases occur only in fabric B. The bases that are made on fabric A are thick and sturdy and usually unburnished, whereas those made on fabric B are smoothly burnished, including at the bottom.

**Disc bases** (Fig. 8):

Disc bases are very thick and probably belong to storage jars. Among the disc bases two varieties can be described such as plain bases and mat impressed bases. In the plain bases the bottom portion is plain, but either burnished or unburnished. The mat impressions might have been produced as the wet pots are kept on a mat after its preparation to get them dried before firing or process takes place; or the wet clay must have been kept on a small mat to turn it round in the process of pot shaping instead of the potter moving round the wet clay in pot modeling. The mat impressed bases are found exclusively in the sites such as Kondapeta, Pallagiri, and Kunikipadu. On the basis differences in the mat impressions, it can be discerned that three different materials such as date palm, thatched leafs and reeds might have been used by Neolithic folk for mat preparation.

a) Disc shaped base with date palm mat impression.

b) Disc shaped based with reed mat impression.
c) Flat base of a medium sized pot with slipped and burnished surfaces with thatched leaf mat impression.

d) Disc shaped heavy base of brown ware devoid of mat impressions and surface treatment. (Not illustrated)

e) E. Round base of a bowl with slipped and burnished surfaces. (not illustrated)

21. Spouts (fig. 9) :

The spouts are made on fabric B and show slipped and burnished surfaces. Of the recovered spouts two varieties i.e. tubular spouts and Channel spouts are discerned. Among the tubular spouts there occur two sizes i.e. short spouts (1.9 – 3.5 cm) and long spouts (5.5 – 8 cm) from the sites such as Kondapeta, Pallagiri and Senagapadu. The above evidences indicate that shorter and longer and tubular spouts were available on the sites located on Krishna river bank most probably a tradition extended all along the Krishna river from Bellari area where this tradition was predominately seen.

a) Long sized tabular spout of buff ware with slipped and burnished surfaces. (cf. HAL. fig. 12, 16; HMG. fig. 5, 17, PKL. Pl. 28, 44a, b,c,d.)

b) Same as above but of short size. (PKL. Pl. 25: 24a)

c) Miniature bowl with straight sides with spout missing. Slipped in grey and smoothly burnished. (fig. 19, No.1)
d) A fragment of a convex sided bowl with a channel spout. The surfaces are slipped in grey and smoothly burnished (fig. 19, No.2). (cf. HAL. fig. 12, 8; HMG: fig.5: 11, 15:16).

22. Handles (fig. 9):

Two types of handles i.e. lug handles and knob handles are recovered from a couple of sites. There are usually attached to the bowls. The lug handles are of two types i.e., lugs with rounded ends and lugs with square ends. These are prepared by pressing the featureless rim to opposite sides at the time of preparing the bowl. The knob handles on the other hand appear to have been prepared separately and luted to the body of the bowl/vessel. These handles might have facilitated to carry hot bowls/vessels.

a) Fragment of square lug attached to a convex sided bowl. (cf. HAL. fig. 14:7;)

b) Fragment of a rounded lug. Cf. HAL. fig. 14: 9;

c) Fragment of a conical shaped handle.

d) Fragment of a square shaped knob.

Decorated ware:

The decorated sherds comprise of incised, appliqué and finger tipped decorations and available from most of the sites.
23. **Incised decoration** (fig. 10):

It appears that a sharp bone or stick might have been used by the Neolithic potter for lying incised decorations. The potter has taken maximum care to provide deep to shallow incisions depending upon the thickness of the pot. In a couple of occasions, the outer surfaces of the pot is pierced with a pointed object to obtain dotted lines. The design repertoire is essentially simple and consists of oblique, vertical or criss-cross patterns on the shoulder and neck portions of pots.

a) Shoulder fragment of a vessel containing vertical strokes.

b) Same as above with slanting strokes.

c) Shoulder fragment of a vessel with latticed design connected at the bottom by pinched dots.

d) Shoulder fragment of a grey vessel with chevrons to the left. Below the chevrons two applique knobs resembling that of nipples of a mother.

e) Body fragment of a grey vessel with incised oblique slashes.

24. **Applique decoration** (fig. 10):

Applique decorated sherds are found especially in grey burnished ware of fabric B. This decoration is usually applied as a thin horizontal bank on the shoulder portion of a medium to small sized vessels and rarely on the interior of the bowls below the rim. Majority of the sherds that are decorated with appliqué design contain slip and burnish. It is also observed that the appliqué decoration was used on a couple of pots to cover the luting.
a) Fragment of a high necked vessel with a horizontal appliqué band.

b) Fragment of a pale grey cylindrical necked vessel with appliqué band which is intended to cover luting.

c) Fragment of a shallow bowl with appliqué band in the interior below the rim.

25. **Red ochre painted sherds** (fig. 10):

There are altogether 18 red ochre painted sherds recovered from different neolithic sites from Munneru river valley. All the sherds are miniature in size and prepared on fabric B. Allchin (1960: 48) thinks that hematite powder mixed with water was used as the paint. The painted motifs are horizontal or vertical bands usually on the rim and rarely on shoulder or neck portions. At a few instances the red ochre is smeared from neck to belly portion. The paintings are fragile and get erased even if touched upon and hence the real function which it served is difficult to conjecture. At Brahmagiri (Wheeler, R.E.M. 1948: 232), Tekkelakota (Nagaraja Rao, M.S., and K.C. Malhotra (1965; 31), Hallur (Nagaraja Rao, M.S., (1971: 29) etc., the red ochre painted vessels are associated with burial.

a) Rim fragment of a convex sided black bowl with out-curved rim; painted with red ochre on the rim and whole of the exterior.

b) Same as above but with everted rim and painted on the rim and whole of the exterior.
Fig. 10
Fragment of a deep pale grey bowl with tapering sides and internally curved featureless rim. Red ochre paintings on edge of the rim portion.

c) Fragment of a straight sided black bowl painted with red ochre on the rim and whole of the exterior.

d) Fragment of a convex sided bowl with internally sharpened rim, painted with red ochre on the rim edge.

e) Fragment of a convex sided bowl with bilaterally sharpened rim with red ochre based on the inner edge.

f) Body fragment of a vessel with a red ochre band along the carinated portion.

GROUND STONE INDUSTRY:

Of the 82 neolithic sites 73 sites have preserved the evidences for ground stone tools while the remaining nine sites did not yield any as the neolithic levels have been covered either by the succeeding cultural debries or concealed by the present village occupation.

The distribution of ground stone tools varies from site to site. More than half of the tools (759:5.41%) have been recovered from altogether 11 sites; 50 and above tools at each site. 456 (32.09%) tools have been recovered from 22 sites where the frequency of occurrence ranges between 11-50 tools per site; 33 sites have yielded 199 (14%) specimens, the frequency being 2-10 tools per site, while the remaining 7 sites have yielded only solitary specimen (0.49%).
RAW MATERIALS:

The raw materials used for the preparation of the edge ground stone and non-edge ground stone tools include igneous, metamorphic and sedimentary rocks. The igneous rocks such as Dolerite and Basalt was used for the preparation of ground stone in the form of dykes, sills etc., include axes fro the hardness and durability and these are locally available in the form of dykes and sills. The non edge ground stone tools on the other hand were prepared on metamorphic rocks such as micaeous schists, granite gneisses and quartzites. Lumps of vain quartz have also been exploited for using them as hammers. (Reddy, V.R. 1978:4). The petrological analysis of the rocks show that dolerite (56%) basalt (32%) and charnockite (12%) was used for edge ground axes while the non-edge ground tools were made on quartzite (68%), quartz (15), granite (11%) and sandstone (6%).

Basing upon the functional utility, the ground stone tools can be divided into two groups i.e. a) edge ground stone axes and b) non edge ground stone tools, the former is basically used for cutting and savaging purposes while the later are domestic implements and used for food processing such as pounding, powdering etc.,

TECHNOLOGY:

The technique used for the fabrication of the edge ground stone tools were discussed time and again by different scholars. Allchin, F.R. (1960: 85-86) and Reddy, V.R. (1978: 43–45) recognized 3 basic techniques such as flaking,
pecking and grinding employed in the preparation of edge ground stone tools. Of the 3 techniques flaking was already known since Paleolithic period while pecking and grinding were introduced for the first time during Neolithic times (Mc. Carthy, F.D.: 1949).

Foote, R.B. (1916:85) observed 4 stages in the preparation of ground stone tools such as flaking, pecking, grinding and polishing. Subba Rao, B. (1949:143-44) and Sankalia, M.D. (1964: 79-82) retained the four-stage preparation of ground stone tools proposed by Foote. Allchin, F.R. (1957:323) on the other hand, proposed 5 stages such as rough (primary) flaking, fine (secondary) flaking, pecking, grinding and over all grinding. If we consider polishing of Foote and over all grinding of Allchin are one and the same, the latter’s 2nd stage i.e., fine (secondary) flaking is an extra stage.

In this context, it may be noted that all these Techniques were not used uniformly and all the specimens that were used sparingly on different tools depending upon the specific requirement. A few stones already having the required shape were converted into an axe by trimming and grinding at the edge. Similarly some tools were pecked and edge ground while a few were flaked and edge ground. Only in rare occasions all these techniques were used in combination on a single specimen. After all, preparing a stone tool is a laborious process and requires a lot of time and energy and hence whenever there is a possibility of avoiding any technique, the Neolithic folk of Muneru river valley did not hesitate to do so.
Flaking was employed to give a rough shape to the stone where as pecking was used to remove high angularities and projections produced during flaking. Allchin, F.R. (1957: 323) suggested discoid or cylindrical hammers as the probable tools utilized for this purpose. Grinding was done in a specially made grooves or on a rock surfaces using sand and water. The lustrous shining to the tools might have been obtained by applying grease or oily substance (Sankalia, H.D. 1964: 80).

**TYPOLOGICAL CLASSIFICATION OF GROUND STONE TOOLS:**

The typological classification of ground stone tools of South Indian neoliths was first attempted by Foote, R.B. (1916: 20-21). He recognized two basic artifact types on the basis of the technique and shape such as ground and polished stone axes and unpolished stone axes. Among the edge ground stone axes he recognized 40 groups, while among the non edge ground stone axes 25 groups. Besides these, he divided celts into 12 types, chisels into 6 types and axe hammers into 2 types etc. Though the attempt made by Foote was first of its kind and deserves appreciation, the criteria he adopted in dividing the sub-groups and types on the basis of the shape of butt, blade, thickness, etc., has created confusion and ambiguity. Later on, Subba Rao, B. (1948: 33) recognized 10 type among the axes by taking into consideration the external from and portion other features including cutting edge and sections butt. However, he failed to realise the functional aspect of the tools and hence included axe hammers, adzes and
chisels in axe group (Reddy, V.R. 1978: 45). The classification of Worman, E.C. (1949:181-201) and Seshadri, M (1956:54) also carries similar drawbacks.

Allchin, F.R. (1957, 328-332; 1962; 311-14) gave more emphasis on the functional aspect of the ground stone tools and classified the Neolithic stone artifacts of Karnataka into 5 major groups such as edge tools, points, rubbers, hammers and miscellaneous objects, which were again divided into sub-groups. Basing upon the taxonomy proposed by Allchin, the present writer classified the whole lot of ground stone artifacts into two major groups such as edge tools and non-edge tools. The edge tools are basically cutting implements which includes the axes, adzes, chisels, and picks where as the non-edge ground tools such as hammers, rubbers and etc., are domestic equipment used for pounding, powdering and passing of food products.

Of the total stone implements collected from Central Coastal Andhra, the edge tools and non-edge tools constitute respectively 799(56.23%) and 622 (43.77%) specimens. Among the 799 edge tools, the edge ground tools constitutes 451(31.74%) specimens while the non ground edge tools comprise 348 (24.48%).

**EDGE GROUND STONE TOOLS**

Of the 89 edge ground tools recovered from Munneru river valley axes comprise 58 specimens and thus constitutes one of the major components in pecked and ground stone industry. The criteria taken for recognition of an axe is bifacially ground surfaces and median cutting edge. All except 8 sites have
yielded axes. More than half of the axes have been recovered from 3 sites namely Pallagiri, Kondapeta, and Kasarabada where the collected axes are 30 in number constituting 54.44%.

Among the 58 ground stone axes that are recovered from the Neolithic sites 25 (44.92%) axes are full specimens and were recovered at various stages of preparation, whereas the remaining 33 (55.08%) axes are broken pieces. Of the 25 full axes 18 specimens have ground edges, 4 have non-ground edges and the remaining 3 have reworked edges. Among the broken axes, 20 specimens possesses only cutting portion, 7 have butt portion whereas the remaining 6 have body portion.

The discerning the general features of the axes only the complete ground stone axes are taken into consideration as it is unscientific to make generalizations on broken specimens. Of the 25 axes, 16 (72.02%) are triangular, 4 (12.5%) are trapezoidal, 3 (10.71%) are rectangular and 2 (4.77%) are sub-triangular in shape. The cross sections of these tools vary considerably. The axes with oval cross section are predominant and amount to 18 (55.35%) specimens whereas the others are represented by lenticular (8:23.21%), rhomboidal (4:10.71%), rectangular (2:4.76%), circular or plano convex (1:1.79%).

NON-EDGE GROUND AXES (PL. XII A):

This category constitutes the stone axes which are flaked, but not ground. There are 5 specimens in the category 3 from Kondapeta and 2 from Pallagiri. Allchin discerns two stages in such as rough (primary flaking and fine
(secondary) flaking was used to give shape to the tool. He opines that the former hammer stone technique was used to give rough shape and in the latter cylinder hammer technique was used to give fine shape by removing high angularities. The recovered specimens show that there are 2 specimens whose bodies are roughly flaked and thus retain high ridges. Where as 3 specimens show shallow flake scars resembling that of scalar retouch (fig. 16:1). The occurrence of these axes at Kondapeta and Pallagiri in association of the bi-product flakes suggests that these locations might be the manufacturing centres for the ground stone axes. The comparative analysis of the non-edge ground tools with those of the edge ground tools in length, breadth, and thickness indicate that the former are big in size than the latter. It indicated that fairly big sized tools might have been prepared initially which might have been reduced in size in due course on account of reworking and resharpening of the blade.

**REWORKED AXES:**

There are 11 axes in this category collected from 6 sites. These were originally ground stone axes where cutting edges might have been blunted or damaged due to prolonged use. Such axes were reflaked and grounded at the edge portion the make them workable tools. The Neolithic folk might have felt that reworking was a time saving process as the preparation of new ground stone axes is time and energy taking process. Of the reworked axes 6 specimens the working edge is alone bifacially reflaked (fig.16:2) while in the other six specimens the whole of the body is reflaked (fig.16:4). However, a few patches
of the originally ground surfaces are still visible. The tools that are large in dimensions are alone subjected for reflaking when compared to the originally prepared edge ground axes (fig.16:1). However, those reworked axes that are recovered from Dhamsalapuram, China mandeva are small in size whose length do not exceed more than 10 cm. This might be due to the location of these sites which are away from the manufacturing centres and hence the Neolithic folk might have reflaked and grounded the blunted or damaged tools for several time and it has resulted the reduction of foot size. In this connection it may be noted that the reworked tools that are found at the manufacturing centres such as Kondapeta, Pallagiri, etc., (fig. 16:3) are big in size and are above 15 cms. In length. Further, it also be noted that the edge damaged tools below 10 cms. In length are also used as axe hammers in several sites.

**EDGE-GROUND AXES**:

These comprise 62 specimens recovered from 9 sites. Of these 43 are full shaped specimens while the remaining are either damaged or broken axes. The basic techniques employed in the preparation of these tools include flaking, pecking, and grinding. Techniques which are used in different combinations depending upon the necessity during the preparation of tools. Taking into consideration the different combination of techniques employed in making the edge ground axes, the 43 full shaped specimens are divided into five sub-groups such as:
1. edge alone ground stone axes with the absence of flaked and pecked surfaces;

2. edge ground axes with flaked surfaces;

3. edge ground axes with pecked surfaces;

4. edge ground axes with flaked and pecked surfaces; and

5. edge ground axes with flaked, pecked and polished surfaces.

1. EDGE GROUND STONE AXES WITHOUT FLAKED AND PECKED SURFACES:

   There are 6 axes of this category coming from 4 sites. These tools were prepared on the shaped flat stones having flaking and grinding only at the edge portion. The tools of this kind have lenticular (fig. 13:6) or rectangular cross sections. The presence of these axes at China mandava, Mallavaram, Senagapadu and Jugguru whose locations were far of from the Krishna indicates that the Neolithic folk to the south of the area did not give much preference for the techniques for the preparation of tools but on the other hand only the functional utility was given much priority.

2. FLAKED AND EDGE GROUND AXES:

   These specimens constitute a predominant variety among the edge ground axes. There are 18 tools of this category distributed across 7 sites. The tools are big in size and range between 12 cms. In length. All these axes have thoroughly flaked surfaces and bifacially ground edges (fig.14:1). Pecking is conspicuous by its absence in these axes. The high flake ridges found on the tools might have been resulted from the use of hammer stone and cylinder hammer
techniques. Most of the tools of this class are distributed in the sites located close to the Krishna and Muneru river confluence.

3. PECKED AND EDGE GROUND AXES:

There are altogether 5 tools of this class recovered from 4 sites. All the tools are trapezoidal, triangular (fig. 13:6) or sub-triangular (fig. 30:5) in shape with lenticular or rectangular cross sections. Pecking was done with the help of cylindrical hammers. It is not clear whether the cutting edge was trimmed prior to grinding as no traces of the flake scars are visible. Tools of this class are principally obtained from the sites located away from river Krishna.

4. FLAKED, PECKED AND EDGE GROUND AXES:

The collection contains 11 axes of this category from 5 sites. All the 3 basic techniques such as flaking, pecking and grinding are used in their preparation. All these specimens are thick, medium in size with either oval (fig. 15:2) or rhomboidal cross sections. The butt is either pointed or truncated while the side margins show alternative flake scars (fig. 14:1). These tools are mostly distributed in the sites located near Krishna and Muneru confluence. The presence of these axes near confluence area and their absence in the northern sites of Muneru river indicates basic differences in the choice of techniques for the preparation of the tools.
5. GROUND AND POLISHED AXES:

There are 5 axes in the present collection obtained from 3 sites. These tools are medium in size and contain either oval or lenticular cross sections. These axes are fully ground and polished surfaces and show no traces of earlier workings (fig. 13:6). Sankalia attributes the polished surfaces for an intensive rubbing and the use of grease or oily substances. No extra efficiency is attributed to these tools by polishing the surfaces save perhaps that they appease the eye (Reddy, V.R.1978:46).

ADZES (PL. XII B):

Adzes are differentiated from axes on the basis of the cross-sections, the nature and position of the blade and the functional utility. These tools invariably possessed leveled blade and plano-convex (fig. 14:1) or rarely concavo-convex (fig. 15:2) cross sections. Coghlan (1943:29) opened that an adze is “a tool for chipping or slicing away the surface of the wood. The cutting edge stands transversely, that is, at right angles to the handle. Its level is ground on the inner face only, while the entire outer face is slightly rounded”.

There are altogether 18 adzes in different stages of preparation from 6 sites. Of these, 16 adzes are recovered from sites across the Krishna and its adjacent areas whereas the remaining 2 specimens are recovered from the sites of northern Muneru river valley. Of the 18 adzes, 10 are found in full shape while the remaining are fragments. Basing upon the morphological features the adzes can broadly be divided into two groups such as:
1. Unifacially flaked and ground adzes and

2. Bifacially flaked and ground adzes.

1. UNIFACIALLY FLAKED ADZES:

There are 6 adzes which fall under this category from 3 sites. These specimens are made on either natural or buffeted flakes in which the under surface is naturally flat while the upper surface is bulging on account of flaking from side margins. A few specimens retain cortex too. These tools possess longitudinal central ridge and provide triangular or plano-convex cross-sections. The cutting edge is obtained by grinding the flat under surface. The use of either natural or buffeted flakes having flat under surfaces is probably a time saving process.

2. BIFACIALLY FLaked AND GROUNd ADZES:

There are altogether 4 specimens, which fall under this category coming from 2 sites. These implements are bifacially flaked from the side margins such that one of the faces is retained flat under surface whereas the other in convex upper surface with a longitudinal ridge. However, perfect flat under surfaces were rarely obtained as those of Unifacially flaked adzes.

In this context, it may be mentioned that the presence of adzes in South Indian Neolithic context is very limited. Foote, R.B. (1916: 20-21) records adzes for the first time in the South Indian neolithic context while Wheeler, R.E.M. (1948 :249), Subba Rao. B. (1948:149), Allchin, F.R. (1960: 89) and
Nagaraja Rao, M.S. and Malhotra (1965: 59) reported sporadic occurrence of adzes in Raichur and Bellari region of Karnataka State. In South Western Andhra Pradesh also the adzes are very meager (Reddy. V.R. 1978: 47). The relative rarity of adzes in the border states and South Western Andhra against their frequent occurrence in Krishna and Munneru confluence area probably under thickets of forests at the rise of food producing communities.

**CHISELS (PL. XII C)**:

Chisels are essentially wood working tools. They are elongated narrow tools with thick butt ends and medium cutting edges. Allchin, F.R. (1957: 329) calls them as narrow celts. Foote, R.B. (1916: 200) classified them into 6 types on the basis of morphological features. Later on, more chisels were reported by Subba Rao, B. (1949” 120), Allchin, F.R. (1960:89-90) and Nagaraja Rao, M.S., (1965:60).

There are altogether 6 chisels made on dolerite from 3 sites. Of these 4 are full in shape while the remaining 2 are fragments. All the full- chisels contain thick and truncated butts and retain battering marks on the butt end, which indicates that they are put to heavy use. As for as the technique of preparation, none of the specimens bears flaked surfaces, but 5 specimens bears flaked surfaces, but 5 specimens exhibit original rock surfaces (fig.14:3) and rarely pecked marks. The edge is symmetrically ground probably after a preliminary dressing. It is likely that elongated nodules of suitable shape and size are put to use after the edge preparation. The cutting edge in 3 specimens is straight
whereas in the remaining 3 it is semi-convex. The cross-sections in 4 specimens is rectangular (fig.14:1) and in the remaining it is oval.

**PICKS (PL. XII D):**

The collections have yielded 6 picks from two sites, i.e., Kondapeta and Pallagram. Picks are narrow and elongated tools with flat or slightly concave undersurface and arched upper surface. The cross section is usually rectangular. These were principally prepared on Basalt chunks of longitudinal profile with a simple flaking to obtain edge and the central ridge (fig.14:5). Majority of the specimens are ground all over the body (fig.14:4). These picks show close similarities with those of Nagarjunakonda (Subrahmanyam, R. et. Al. 1975: pl.l IX: 65-69) but differ in shape and technology from those specimens illustrated and discussed by Subba Rao, B. (1948: pl. XXIII No.2. 7-9 and 11012). The specimens of the latter category are somewhat crude in their appearance as they were prepared almost by ‘chipping with a blunt butt end and a narrow sharp working edge’.

The picks can be divided into two groups –

Single ended picks and double ended picks constituting respectively 2 and 4 specimens. The single ended picks contain thick and snapped but ends. The longitudinal body gradually slopes to meet the flat undersurfaces at straight cutting edge.
The double ended picks on the other hand possess humped middle portions which gently slope to either side to meet flat under surfaces to produce oblique cutting edges and thus have plano-convex cross sections. The edge positions are ground while the remaining body portion show the signs of either flaked or pecked marks (fig.14:4). These picks might have filled to a plough share and used to remove the weeds and also to loosen the soil in agricultural activity.

**FLAKE TOOLS:**

There are altogether 42 flake tools from the surface collections. On the basis of shape and probable function, these flake tools are divided into points (7: ) scrapers (18: 48.3%) and flake baldes (15: 36.7%).

Points occur from 3 sites. Of the 7 points 2 are leaf shaped (fig.17:3). While the remaining 5 are simple points of symmetric (3) and asymmetric (2) (fig.17:9) shapes. The retouch is confined only at the tip position.

**SCRAPERS:**

Scrapers form a major group among flake tools. All the scrapers contain flat dorsal surface and bulging ventral surface. These are of 2 types – side, scrapers, end scrapers representing respectively by 6 and 3.

The scraping edge of side scrapers is confined to both sides. The rectangular and oval shaped flakes might have been choosen for the preparation of side scrapers. The end scrapers made on end flakes by bold retouch on ventral
surface to obtain scraping edges. The principal shapes of these tools are oval and triangular (fig. 17:11).

**FLAKE BLADES:**

There are 12 flake blades in the collection and of which 7 are full and the rest are fragments. These are thin and slender, rectangular in shape (fig. 17:4,5,6) and have central mid ridges and parallel sides. All these specimens exhibit triangular or trapezoidal cross sections.

**THE NON EDGE GROUND TOOLS**

The non edge ground tools are basically kitchen tools and used for pounding and preparing paste of grain substances. The predominate raw material used for the preparation of the non edge ground tools is quartize occasionally granite, dolerite and sand stone. As Muneru river flows through Kurnool and Cuddapah formation, and hence there is no darth for quartzite which is available in the form of Pebble in the river sections. Pecking is the chief technique employed for the preparation of these tools supplemented occasionally by flaking. The packing technique has enabled Neolithic man to fashion a piece of stone practically in any shape he desired, and particularly the round surfaces and reduced the wastage of time and energy (MC earthy F.D. 1949. 162). The smooth surfaces found on majority of the tools appear to have been obtained not due to grinding but because of the continuous domestic use. The non edge ground tools are of two kinds viz., the non-domestic and domestic implements. In the first
category falls the tools such as hammers, while in the second category tools such as rubbers, saddle-querns etc.

**HAMMER STONES**

Foote, R.B. (1916-20) was first to recognize several sub types in hammer stones basing upon the technique of preparation and functions. Allchin, F.R. (1957; 327) on the other hand divided hammer stones into three groups such as 1) Spheroid or discoid hammers, 2) Cylindrical hammers and 3) Axe hammers (or pestles). However, Reddy, V.R. (1978: 61) raised objection for keeping axe hammers in hammer group in view of their “distinctive origin and function”, and hence, he kept the axe hammers as a separate group. In this connection, it may be mentioned that in the choice of raw material, the technique of preparation and morphological features, there occur differences among true hammers and axe hammers but functionally both are one and the same. Since the present writer’s attention is more on the functional aspect of stone tools, axe hammers are also placed in the group of hammers but with a separate identity.

There are altogether 79 hammer stones in the present collection recovered from 11 sites. While majority of the sites yielded one or two specimens, the maximum number of hammer stones are recovered from 3 sites such as Kondapeta, Pallagiri, and Kunikinapadu. On the basis of the technique of preparation and morphological features, the hammers can be divided into 4 groups such as 1) Axe hammers; 2) Spheroid hammers; 3) Discoid hammers and 4) Cylindrical hammers.
AXE HAMMERS:

Axe hammers are originally prepared as ground stone axes and in course of time get converted as hammers as the cutting edges of these tools are either broken or blunted due to prolonged use. They differ from the other hammers in the raw material, technique of preparation etc., though functionally both serve the same purpose.

There are altogether 11 axe hammers in the present collection recovered from 4 sites. Of these 6 specimens are full in shape whereas the remaining are fragments. These are made on dolerite (8 specimens) and basalt (3 specimens). The bruised marks on either ends on these specimens indicate that these tools were considerably used for battering and pounding purposes of food grains.

HAMMER STONES: The collections has yielded three types of hammer stones such as sphroid hammers (9 Nos.) discoid hammers (12 Nos.) and cylindrical hammers (5 Nos.). The pebbles made on quartzite is principally used for the pinpose and height have been used for different works depending upon the size, shape and weight of the tool. While all the tools show bruised marks on either ends of their body indicating that they might have been used for primary flaking of stone tools, Allchin F.R. (1960:86) opained that the cylindrical hammers might have been used for secondary flaking of stone tools. Besides these the tools might have been used for pounding and powdering of food grains as well.
RUBBING STONES (PL. XI E):

Rubbing stones are those, which might have been used for grinding and pounding purposes of food grains. Reddy, V.R. calls these tools as domestic tools while Nancy, K. 91977) considered them as food processing equipment. There are altogether 43 specimens in the present collection, recovered from 9 sites. The flat pebbles of quarts and quartzite might have been used for the purpose.

Foote, R.B. (1916 : 20) identified rubbing stones as mealing stones and classified them as flat rubbers and rounded rubbers. Allchin, F.R. (1957:327) classified them as rubbers and discoid rubbers. According to him the former is Foote’s “corn crushers” whereas the latter “mealing stones”, Sankalia, H.D. (1964 : 87-88) classified the rubbing stones as mullers and plano-convex mullers.

On the basis of shape and probable function, the whole lot of rubber stones that are obtained in Muneru River Valley can be divided into 4 groups such as spheroid rubbers (5 Nos.) discoid rubbers (8 Nos) oblong rubbers (11 Nos.) cylindrical rubbers (10 Nos.) Plano-convex rubbers (6 Nos.) and Triangular rubbers (3 Nos.).

The Spheroid rubbers are differentiated from the spheroid hammers on the basis of raw material, technique and probable function. The battering marks on either ends and smooth surfaces on both the surfaces indicate that they were used for double purpose i.e. pounding and powdering. The food grains or by rolling the same on quarn to prepare wet gravel for domestic purpose.
DISCOID RUBBERS (PL. IX C):

These rubbers are disc shaped with flat surfaces and round sides. All these specimens show that they were used for double purpose i.e. pounding and powdering or preparing wet paste for domestic purpose by rotating it on a flat quern in clock-wise and anti-clockwise or forward and backward movement.

CYLINDRICAL RUBBERS:

There are altogether 10 specimens in the present collection. These specimens might have been used by way of to and fro movement by rolling the implement on a plan surface for domestic use. When compared with the other rubbers the strength that is to be exerted on the cylindrical rubbers while in use is very less as these move effortlessly on a flat base. The bruised marks on either ends of these specimens provide the evidences of their use in pounding as well.

PLANO-CONVEX RUBBERS:

The shape of these specimens appears to have been obtained due to prolonged use in two different direction. The tools might have got flat under surface because of their use in both circular and forward-and-backward movements on a plain surface, while the convex surfaces due to the to-and-fro movement on saddle querns. Since the specimens are of considerable length, both hands could be employed while in use. The bruised marks on either ends indicate that these tools were also used for pounding purposes. May be due to these added advantages, these tools were numerous and available at a majority of the sites that occur in all the three zones.
TRIANGULAR RUBBERS:

The triangular rubbers have long bodies and triangular cross-sections. There are altogether specimens in the present collection. The triangular cross sections on these tools might have been due to their unifacial rubbing on a flat or saddle quern in a circular rotation or forward or backward movement.

STEATITE DISC BEADS:

The collection has yielded 10 steatite disc beads. All these beads are thin, flat and disc shaped with a cylindrical perforation at the center. Parallel scratches are present on all the beads indicating that they were cut by a saw like instrument. The side margins are perfectly circular in shape with variation in size and thickness. The size of steatite disc beads range between 2 – 3.3 cm. and vary in thickness between 0.22 to 0.1 cm.

All the steatite disc beads under consideration are recovered in fully prepared condition and none of them show different stages of preparation. In this context, it may be noted that the steatite is not locally available and the nearest place where steatite nodules are available is eastern ghats on Gundlakamma river roughly 100 KM from the are under consideration (Vasudevan, D. et. al., 1973). This feature might indicate that the beads were manufactured elsewhere and brought to Munneru valley in a fully prepared condition probably on account of trade contact.
MEGALITHIC POTTERY

Pottery occupies an unique place to make a distinction between the megalithic and early historic periods as the other antiquities of these cultures from the surface look almost the same. Besides the pottery, the megalithic culture is represented by other antiquities such as iron implements, clay beads etc.

Gururaja Rao (1983) divided the megalithic pottery into two groups i.e. domestic pottery and burial pottery. The burial pottery which is handmade is consisted of coarse and unpolished receptacles like the burian urns, the sacriphagi and their lids. The domestic pottery on the other hand is wheel made and is comprised of 3 wares viz., all black, black and red, red and coarse red etc. The paste used in the preparation of the pots except in coarse red ware is made of fine levigated clay of superior variety and hence do not have any sandy particles in the core.

There are difference of opinion among the scholars about the preparations of megalithic pottery. In firing process also it appears that different methods were employed for different wares. The coarse red and polished red ware seems to have been fired in an open kiln and hence the surfaces turned red on account of oxidization. The black polished ware is fired in a closed kiln under reducing conditions and hence both inner and outer surfaces turned to black. The pots of black and red ware on the other hand were fired under reducing condition possibly by inverted method. Krishna Murti (1965:226) suggested that the black and red ware was fired on open platforms with slots provided at equal distances.
Beneath the platform apertures were provided for feeding the flames. The pots were kept with the rims inverted into these grooves and the rest of the portion exposed. The interior portion of the pot was always filled in or pasted with combustible materials. When the pots were fired, the exposed surfaces turned red on account of oxidization while the interior and rim portion turned black due to the in direct contact of flames. The important factor observed in firing process is the distribution of heat uniformly and hence the bloachy surfaces are extremely limited.

Except the coarse red and red polished ware, the lack polished and black and red wares are plain and undecorated. The sections are thin and uniform on account of wheel modeling. But when they are kept under wet conditions for a long time, they usually wither away particularly this is the cause with all black ware potteries probably due to illfining.

Some post firing scratches of linear designs called graffiti are found on the exterior of the black polished and black and red pottery. They were probably incised with a pointed instrument on the pot surface after the pots were fired.

DESCRIPTION OF POT FORMS (Megalithic, Fig. 12):

1. Fragment of a vessel of brown ware with a grooved rim and slight cordon round the neck and a multigrooved shoulder. The core is slightly gritty and polished in black (Fig. 12.6).
2. Fragment of a vessel with clubbed rim with a grooves round the neck. The sections are thin and made up of levigated clay of superior variety. Surface is brown and polished (Fig. 12.1)

3. Fragment of a dull grey vessel with an applied cord-like band below the rim and a row of notches in the interior. The sections are thin and uniform (Fig. 12.7).

4. Fragment of a vessel with thick everted rim with slight bending. The core is fine and burnt to brown colour (Fig. 12.9).

5. Fragment of a vessel with dull redware roughly polished with heavy beaded rim. The sections are thin and uniform with parallel groves on the belley. Black polished ware (Fig. 12.10).

6. Fragment of a gourd shaped vessel with slightly everted rim and weekly grooved shoulders. The core gritty and unpolished (Fig. 12.11).

7. Fragment of a globular vessel in black ware, possibly salt glazed with grooved shoulder and body. The sections show levigated clay of superior variety in its preparation (Fig. 12.12).

8. Fragment of a vessel of dull grey ware with flared rim, externally grooved and pronouncedly corrugated shoulder. Sections thin and wheal made.

9. Fragment of a vessel slipped and polished in red colour with beaded rim and grooved shoulder. The sections thin and wheel made (Fig. 12.15)
10. Fragment of a black vessel, heavily polished with flat and incurved rim.

The core fine and levigated (Fig. 12.8).

11. Fragment of a vessel with black inside and red outside; with thick rolled rim and a pronounced internal groove. The sections coarse and unslipped.

Early Historic Pottery:

The differentiation of megalithic and early historic pottery is very difficult on account of similar technique of preparation. All the pots of these period are when made and as such we find similarity in shape, size and thickness. However, the presence of black and red ware which is conspicuous by its presence in Megalithic period and absence in Early Historic period is taken as a main diagnostic interia. In surface collection, there is every possibility of mixing of the cultural entities of different cultures, we can not fix up the size of settlement in a site during these period. However, an attempt is made here to distinguish the early historic pottery from that of megalithic depending upon the other criteria i.e., the absence of black and red ware and surface treatment of pottery.

1. Fragment of a meniature deep black and red ware bowl with pointed rim.

The sections thin and probably prepared in inverted firing (Fig. 11.2).

2. Fragment of a polished black and red ware dish with carination and incurved rim. The sections are thin and smooth (Fig. 11.1).

3. Fragment of a deep meniature black bowl with flattened rim. The sections thin and polished (Fig. 11.4).
4. Fragment of carinated bowl of highly polished black ware with everted rim. The sections thin and grooved on the shoulder (Fig. 11.3).

5. Fragment of globular black and red polished bowl with thin everted rim and internal groove. The sections thin and uniform.

6. Fragment of a unique straight sided bowl of black highly polished ware with thin and uniform walls sharpened rim and multiple grooves (Fig. 11.5)

7. Fragment of a deep carinated bowl of black and red ware with an everted rim. The sections thin, uniform and the body contain heavy polish.

8. Fragment of miniature bowl of black polished ware with globular body, beaded rim and slightly ridged shoulder (Fig. 11.10).

9. Fragment of a dish or red ware with straight neck and carinated body. The sections thin and heavily polished (Fig. 11.8).

10. Fragment of a basin with slightly clubbed rim and grooved inside. The shoulder is smooth but grooved in double lines. The sections thin and slipped in red colour (Fig. 11.9).