CHAPTER III

ANALYSIS OF THE EARLY NEOLITHIC I POTTERY FROM SESKLO

In Chapters III and IV we will discuss the finds exhumed from Early Neolithic I strata at Sesklo. Since pottery is the only material represented in abundance and since it is the most useful for comparative purposes, we will treat it more exhaustively than the non-pottery finds. In the following sections we propose firstly to investigate the technological aspects of the pottery. Secondly we will establish a typology. Thirdly we will explore the relationship of certain technological phenomena to time and to typology. Consequent on the results of these inquiries we will discuss the possibility of creating a subdivision within Early Neolithic I at the end of the chapter.

III. 1. *The technology*

The underlying conclusions on the technology of the Early Neolithic I pottery of Sesklo are based mainly on data resulting from macroscopic research i.e. from study with the "naked eye" and with the help of a small hand-lens (x 6). However, a sample of eight sherds has been subjected to microscopic thin-section and X-ray diffraction analysis, carried out by Dr. C.J. Overweel (see also Appendix I). Together with the sherds a fragment of raw clay from the region of the Sesklo site and a random sample of schists, collected from the surface of the site, have been analysed. On a fairly small amount of the pottery (ca thirty sherds) re-firing tests have been carried out by Prof.Dr. H.J. Franken of the Leiden University Institute of Ceramic Technology.

In total, 6474 sherds have been subjected to macroscopic investigation. Only a small sample has been taken from the material exhumed during the 1962 and 1963 seasons in the deep trenches of the Akropolis. It consisted of 83 diagnostic, useful fragments. Of the rest, 832 fragments had been recovered from section B 2. The lowest level of the Early Neolithic I stratum here contained ceramics which belong to the earliest part of pottery-bearing Early Neolithic. The largest bulk of our material stems from section C, trenches 1, 2 and 3 – 5559 sherds in total. As mentioned already in the previous chapter, these trenches contain only Early Neolithic I material. The 1972, 1976 and 1977 seasons yielded respectively 2835, 1493 and 1231 pottery fragments.

III. 1. 1. *The clay*

Macroscopic study of the raw clay sample has revealed that the clay contains very small mica flakes (0.1 mm) as a non-plastic component and some sporadic fragments of mica-schists (1.0-1.5 mm in size). This corresponds entirely with our conclusion based on study of the sherds. Since all sherds without exception contain mica, the clay should have been micaceous. Although this does not prove for certain that it is a natural inclusion, it is highly probable. The fact that the amount of glitter in every single sherd is not the same is due to the presence of mica-schists in the added non-plastic component of the paste.

In the microscopic investigation of the thin-section of the raw clay, the non-plastics turned out to be rather fine grained quartz-biotite schists. The clay has, like the plastic component of the Sesklo sherds, a rather dirty appearance on account of numerous sericite flakes (0.01-0.5 mm). The clay contains iron oxides in disseminated form and as round and oblong granules.

In X-ray diffraction analysis it shows röntgen-patterns of quartz and illite, although the illite spacings coincide with those of muscovite. In addition the strongest lines of haematite are faintly visible. In

the heat-treated sample (heated for four hours at 1100°) mullite and haematite show up strongly; of spinel only the strongest 244 Å spacing is discernible.

The microscopic study of the thin-section of the sherds revealed that most contained quartz-biotite schists. The plastic member had the same appearance as the raw clay and contained the same type of iron oxides. It seems therefore not impossible that a similar raw clay was used to manufacture the pottery under investigation.

About ten sherds are of white colour, throughout. They have not been subjected to microscopic or X-ray diffraction analysis or to any refiring tests. We are quite certain that another kind of raw clay, containing mica but no iron oxides, has been used to manufacture this ceramic ware, which was eventually to become more common during Early Neolithic III.

III. 1. 2. *The non-plastic inclusions*

Macroscopic study of the sandy material, which should counteract shrinkage during drying and facilitate uniform drying of the pottery drew our attention to the variability of the grains of sand. Most seemed to be very smooth and rounded, whereas a few were coarse and angular. This led us to think that the non-plastics in the paste had possibly not been added on purpose, but rather that the clay had not been purified completely, making it unnecessary to add any tempering material. Although this may still be true for other sites, however, it is not the case with the Sesklo ceramic ware. Microscopic and X-ray diffraction analysis showed the raw clay to be relatively pure. Thin sections of the sherds showed that the larger part contained, apart from the fine-grained quartz-biotite schist, quartz-biotite-epidote-feldspar and quartz-epidote-muscovite schists. In one case pottery temper has been noticed among the non-plastics.

Among the random sample of schist collected from the surface was not a single example which corresponded exactly to the non-plastic material in the pottery, indicating that the tempering material had been rather carefully selected or that it had mostly been collected at the same spot, e.g. from a sandy area in a streambed.

For the macroscopic study of the sherd material we have divided the non-plastic inclusions into the following categories:

A1 Sand containing white elements < 4 mm and mica
A2 Sand containing white elements $\geqslant 4$ mm and mica
B1 Sand containing white < 4 mm and brown < 4 mm elements and mica
B2 Sand containing white $\geqslant 4$ mm and brown < 4 mm elements and mica
B3 Sand containing white < 4 mm and brown $\geqslant 4$ mm elements and mica
B4 Sand containing white $\geqslant 4$ mm and brown $\geqslant 4$ mm elements and mica

In explanation of the above:

1. We realised that most non-plastics would be sandy material.
2. White elements are mentioned because we are certainly dealing with quartz. The absence of limestone is proved by acid reaction tests.
3. Brown elements are in most cases brownish schist, in a few cases crushed potsherds.

Almost all the sherds are slightly porous. This is caused by the elusion of very fine sand or by the burning out of very fine organic matter. Some non-oxidised cores still contain very small fragments of carbonised organic matter. In view of the the thin-section analysis we may quite safely state that generally the non-plastic component consists of schists from 0.3-0.6 mm in size with larger fragments from 1.00-3.00 mm, which corresponds to categories A1 and B1. B3 is very rare, consisting of some ten sherds only.

III. 1. 3. *Colour and firing conditions*

Colour

We have used the Munsell Soil Color charts as a basis for recording colour. The colours in this system are arranged according to the three visual variables of colour: *hue*, the position of the colour in the spectrum; *value*, lightness or darkness; and

chroma, the purity of the colour. The colours are designated by symbols that define the three colour variables: hues by the initial of the hue name and a number indicating the position of the colour in the hue range. The hues in the soil colour charts are red, yellow-red and yellow. Positions in each hue range are numbered to 10. Four within each hue, 2.5, 5, 7.5 and 10, are included in the soil colour charts. Values are numbered from 0 for black to 10 for white, and decimals are used for interpolation. Neutral grey is 0 in chroma. Values and chroma readings are recorded as a fraction, with value as the numerator and chroma as the denominator (Shepard 1976, pp. 107-111).

Value	Chroma /2	/4	/6	/8
8/		LIGHT	FIRED	
7/	NON – OXIDISED.	UNCERTAIN.	BUFF OR RED FIRED.	
6/	LIGHT	LIGHT	LIGHT	
5/				
4/	NON – OXIDISED.	UNCERTAIN.	BUFF OR RED FIRED.	
3/	DARK	DARK	DARK	
2/				

During the course of recording the sherds, it became clear that the light and dark red/buff classes were rarely present. They occur far more often among Early Neolithic III wares, while the Sesklo A1 ware is always dark red fired.

We discerned the following colour classes during our study of the material:

Colour names	Hue	Value/Chroma
light non-oxidised	Entire range	N7 / and 6/1
dark non-oxidised	Entire range	N5 / to 1/1
oxidised light fired	Entire range (Yellower than 2.5 YR)	8/1 to 8/8
light uncertain "buffish"	Yellower than 2.5 YR)	7/ and 6/./2 –/4
light uncertain "reddish"	2.5 YR and redder	(7/ and) 6/./2 –/4
dark uncertain "buffish"	Yellower than 2.5 YR	5/ –1/./2 –/4
dark uncertain "reddish"	2.5 YR and redder	5/ –1/./2 –/4
(oxidised)light buff fired	Yellower than 2.5 YR	7/ and 6/. /6 –/8
(oxidised)light red fired	2.5 YR and redder	(7/ and) 6/. /6 –/8
(oxidised)dark buff fired	Yellower than 2.5 YR	5/ –1/./6 –/8
(oxidised)dark red fired	2.5 YR and redder	5/ –1/./6 –/8

The number of sherds which could be classified among the middle chromas was especially high. Theoretically this could be due to incomplete oxidation during the firing process or to the presence of a rather low amount of iron oxides in the plastic component of the clay. Since the latter is not the case, we have to conclude that most of the sherds have been either incompletely oxidised or slightly smudged at the end of the firing process. It has to be kept in mind that the weathering process has almost certainly influenced the colour of the sherd surface.

To reach more specific conclusions on the colour the clay would assume when fully oxidised, re-firing tests have been carried out on a sample of some thirty sherds in the laboratory of Prof.Dr. H.J. Franken. Re-firing at a temperature of 900°C allowed two groups to be discerned. The first achieves a dark red fired colour, the second light red fired. Before re-firing, the second group consisted of light uncertain "buffish" coloured fragments only, whereas the first group contained the darker fragments (mostly dark uncertain "buffish" or "reddish") and some of the lighter ones. Re-firing at a temperature of 1000°C did not change these results. The two groups seemed to have slightly different tempering material: the first group had schists consisting largely of quartz, whereas the second group contained schists with a high mica percentage as non-plastic material. This could not, however, have influenced the colour. Probably raw clay from two different sources, which may have been situated close to each other, has been used in the manufacturing process.

Fragments with a reddish or buffish interior surface, but with a gray or black core, have not been completely oxidised. The phenomenon of dark

gray/blackish surfaces with a red or buff core will be discussed more fully under the heading firing conditions. Rather often the pottery surface has more than one single colour, which is especially clear on the larger fragments. It may even be a combination of red, black and buff. This too will be discussed below.

Firing conditions

We are convinced that actual firing of the Early Neolithic I pottery took place in an open fire. We have reached this conclusion for the following reasons:

1. The X-ray diagrams of the sherdsample from Sesklo indicate that the firing temperature was less than 812°C which can be achieved in an open fire.
2. Examination of Early Neolithic pottery from other Greek sites, both within Thessaly and beyond, indicated firing at bonfire temperatures, around 800° (Thessaly: Wace and Thompson 1912, p. 26; Servia: Ridley and Wardle 1979, p. 229, Tite and Maniatis, Nature 257, pp. 122-123).
3. No remains or indications of any ovens have been recovered, but many traces of open fireplaces have been discovered.
4. Modern firing experiments using an open fire show results quite similar to those of the Early Neolithic firing technique.

The occurence of both reddish and blackish colours on the same sherd indicates that the potters did not control the atmosphere completely during firing. In fact it is impossible to control it completely in an open firing system. The unevenness of colour is due to fluctuations in the atmosphere, such as shifting of the aircurrent, the playing of flames on the vessels etc. Some six percent of the vessels has a smudged surface (table 27). This may be accidental, due to insufficient draught, or it may have been done on purpose by the potter to improve impermeability to liquids. In that case he would have put moist grasses, shrubs or something similar on the fire at the end of the firing process.

III. 1. 4. *Forming and finishing techniques*

Forming techniques

The pottery originally considered to be the earliest is made of a very coarse tempered paste and has been fired at a rather low temperature, causing the biscuit to crumble at the breaks. The vessels have been modelled out of a lump of clay. Most have a plano-convex base. The vessel walls are thick and very irregular.

The other sherds, whether of medium or coarse ware, do not provide any information regarding forming technique. Coils were known, as indicated by the use of coils for ring bases. Some rim fragments of larger pots show a slight ridge several cm (5-10) below the rim. This indicates that the upper and lower parts had been made in different techniques. We think a combination of coil-building and modelling the most plausible. We will discuss the two techniques, beginning with the more simple modelling.

A. The vessel is modelled out of a lump of clay with the fingers. Paddle-and-anvil technique may be used to thin the vessel wall and to obtain a nice spherical shape. The hand may be used as a paddle and a smooth round stone, held against the inside of the pot as an anvil. This technique is not restricted to modelling but may have been used with coil-building too.
B. In the case of coil-building, a flattish or cup-shaped base is used and the vessel is built up from a series of horizontally placed coils. Each coil protrudes on both sides over the underlying one and is then smoothed down on interior and exterior, so that the coils are bonded together.

With this general outline of both techniques in mind, we will proceed to discuss the construction of the different sections of the vessel one by one.

The base

a. Rounded base: a lump of clay modelled in a cuplike shape (fig. 11 no 19).
b. Plano-convex base: probably a rounded base

which has sunk down (fig. 11 no 17).

c. Flat base: a lump of clay shaped into a round disc (fig. 11 no 18).
d. Ring base (''Standring''): a coil applied to a rounded (fig. 11 no 22-23) base and smoothed down onto the exterior surface of the vessel. In some cases a very low ring base has apparently been modelled together with the bottom of the vessel (fig. 11 no 21), but these are always very low and hardly deserve the name ring base. They are probably flat bases of which the centre has become a trifle concave during the drying process. The sides are worn by use.
e. Flat-footed base: a round disc of clay placed under a plano-convex base (fig. 11 no 20).

The belly

The belly of small- and medium-sized shallow vessels has probably been modelled together with the base out of a lump of clay. With medium- or large-sized vessels, the odds are that the lower part has been modelled whereas the upper part was made in coil-building technique. Probably in most cases coils of the same diameter were used, resulting in a cylindrical shape. The required spherical shape was then given to the vessel by working it from the inside. In this process, the vessel walls are of course stretched and thinned. The tool used could have been a well rounded pebble or a bone implement. Apparently when part of the vessel wall became too thin, an additional piece of clay was applied to the interior surface.

With large open bowls, coils of different diameter may have been used.

The Early Neolithic I pottery does not include any carinated or necked vessels, therefore the form of the vessel is indicated by the belly shape (cf. III. 2.).

Shoulder, rim and lip

We certainly do not consider it correct to create a typology for Early Neolithic I pottery based on rim shapes, the more so since most irregularities occur in the shaping of the rim and lip. Even if in general the pots are built quite regularly, larger rim fragments may show irregularities in thickness and may have as much as three lip forms, e.g. blunt, flattened and tapered. Although questioning the necessity, however, we have drawn up a list of the rim/lip shapes occuring among Early Neolithic I pottery. We have divided it into two sections, a. wall changes of the rim and b. lip form.

a. Wall changes
   1. Unchanged
   2. Thickened
   3. Thinned
   4. Turned out/up

b. Lip form
   1. Blunt
   2. Flattened
   3. Tapered symmetrically
   4. Tapered inside
   5. Tapered outside
   6. Rolled/folded over.

Wall change 4 should supposedly combine with lip form 6, but this is apparently not the case with Early Neolithic I pottery. The combination occurs often in the subsequent Early Neolithic phases.

Studying several of the flattened rims closely, we noticed a kind of construction line. Apparently the lip was not everywhere of the same thickness and height. Cutting this evenly would possibly not have produced a very nice finish. Instead the overlap was being folded inwards and smoothed over the interior surface, creating a slightly flattened effect and sometimes causing a thickening of the rim too.

Accessories

The pottery of Early Neolithic I is undecorated, but quite often has such accessories as lugs. Most of them are pierced, but in a few cases plain ones occur. Pierced lugs are already found on the very first pottery, both on the very coarse clumsily made ware and on the other wares from the stratigraphically lowest levels. The lugs were joined to the pot when it was already leather-hard. The plane of joining is either well smoothed or has traces of pinching/pressing, as shown by some detached lugs. The ends of the lugs were always smoothed down over the exterior surface of the pot.

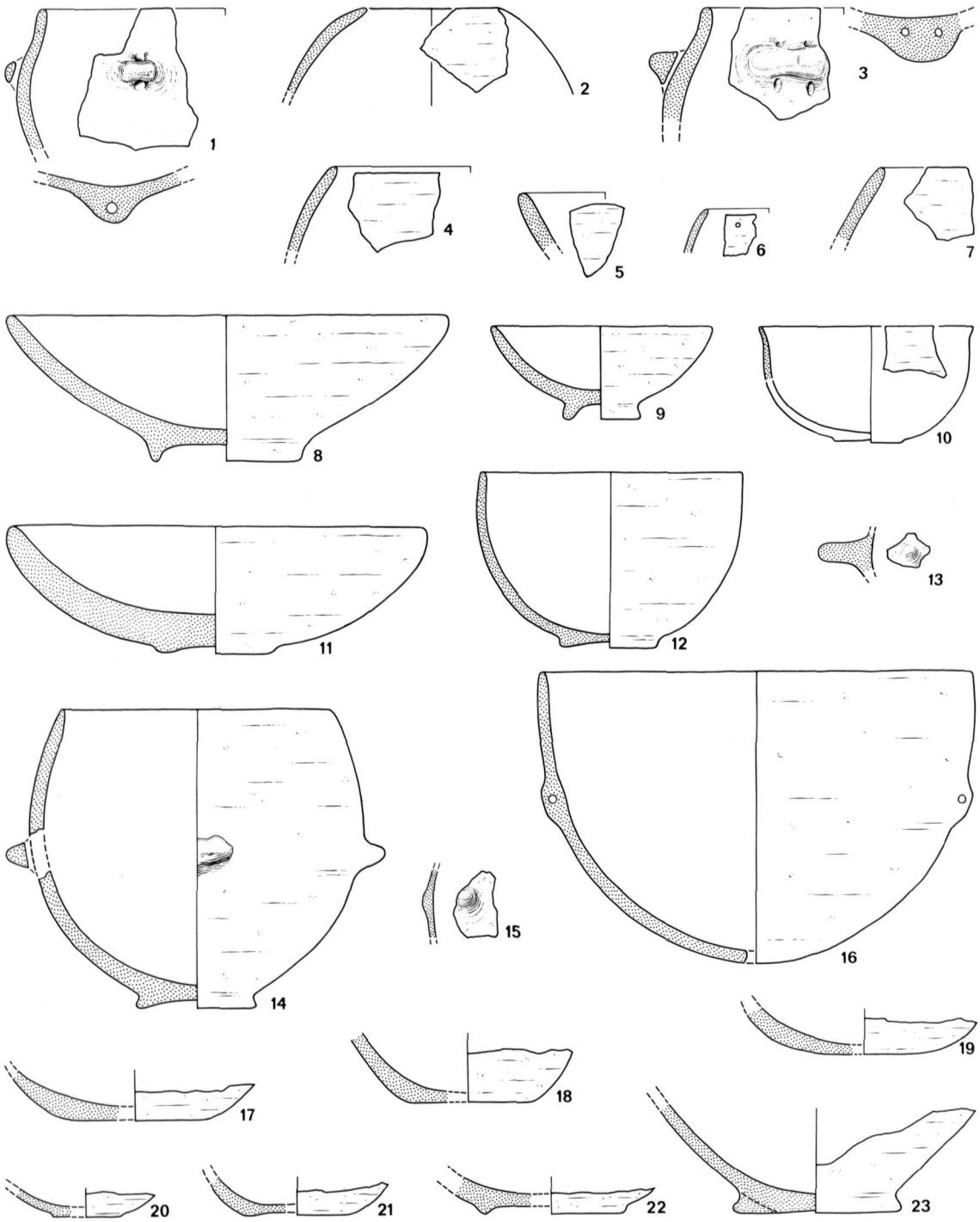

Fig. 11 Early Neolithic I pottery.

Lugs were always finished in the same way as the exterior surface of the vessel, indicating that they were joined to the pot before it was finished.

Surface finish

Nearly all Early Neolithic I pottery has smoothed or – less often– burnished interior and exterior surfaces. The number of rough walled vessels amounts to less than 0.1% of the total. On the whole, pottery with smoothed interior and exterior surfaces is predominant. Really highly polished surfaces are rare. We wonder, however, whether in many cases the burnished surface has been subjected to strong weathering, causing the larger part to disappear also since the burnish is generally quite streaky and fugitive. This has been noticed by several other archaeologists studying Early Neolithic material. The quality of the surface finish and especially of items like burnish and slip depends greatly on soil conditions.

Some of the typical features we discovered in the study of the surface finish are the following:

a. Undulations on the interior surface. According to Shepard (1976 p. 185) these could be surface traces of the coils, but we suppose the pottery generally to be too well scraped and smoothed to leave any such marks.
b. On the interior surface one discovers, seldom, the traces left by the fingers when smoothing the vessel wall.
c. Traces of hard sharp tools, like obsidian or flint flakes, on the interior and – rarely – the exterior surface. These tools have been used to remove the superfluous paste. The traces are either horizontal or oblique.

Smoothing

Smoothing was done partly during the process of building, when pinching the coils or working away the fingerprints and during the scraping of the vessel wall. This is done when the paste is already firm. In most cases, however, a special effort has been made to get an evenly smoothed surface, i.e., most traces of scraping have disappeared.

Burnishing

In the preliminary stage of burnishing, the leather-hard surface may have been wetted slightly and then rubbed very intensively. The actual creation of the gloss required a dry surface, which was rubbed repeatedly and very intensively. The more intensive the rubbing, the more shiny the gloss became.

Opinions differ regarding the conditions of the vessel surface at the beginning of the actual polishing. According to Shepard (1976 p. 76-77, 122-123) a high lustre cannot be obtained after the surface has dried. But according to Vitelli (Vitelli 1977 pers. comm.), who has experimented a lot with Greek clay in attempts to reproduce the manufacture of Early Neolithic pottery, it is impossible to attain a high lustre unless the pot is completely dry. When the vessel surface is still slightly moist, the surface can be made shiny; the more intensively it is polished, the higher the lustre becomes. However, on firing, this lustre disappears completely. Potters experimenting with Sesklo clay agreed fully with Vitelli's statement (Nikolorakis 1978, pers. comm.).

III. 2. *Pottery typology*

In general a pottery typology is based on ware and vessel form. In the latter case complete vessels are generally used as the point of departure. Although the amount of material available is quite large – of a total of 6100 sherds about 1625 are of diagnostic value – there are practically no complete or reconstructible vessels. The pots are mostly broken into small fragments, which cannot be joined. This is a general problem at settlements, including Greek Early Neolithic sites. From this point of view, it is remarkable that the extensively excavated site at Nea Nikomedeia has yielded a fairly large number of reconstructible vessels. There are a few reconstructed Early Neolithic I pots from Sesklo itself and from other sites in Thessaly, e.g. Soufli Magoula and Achilleion, but our typology is largely hypothetical, based on wall inclination of rim fragments.

We have arranged the material first of all according to types of ware, although we have no indica-

tion whether this is correlated with manner of use during Early Neolithic I.

Since the colour of Early Neolithic I ceramics is of secondary importance, we will not make any addition to the good, but rather complicated, typology of Greek Neolithic pottery developed by Tsountas (1908 p. 157 ff) and Wace/Thompson (1912 p. 13 ff).

In the categorisation of the different vessel forms some problems have risen. For practical reasons we have chosen to use a coventional terminology. But judging the terminology proposed by Shepard (1976 p. 230-236) to have great advantages, we have also divided the Early Neolithic I pottery according to this system. These latter ascriptions are mentioned in brackets after the ''standard'' names. There are two simple unrestricted shapes – spherical and ellipsoid – and two simple restricted ones – spherical and ovaloid. Even here some problems arise, e.g. the difference between a standing ellipsoid vessel – a deep bowl – and a horizontal ellipsoid vessel – a shallow bowl.

III. 2. 1. *Very coarse and crude ware*

Total sample: some forty fragments, ten of diagnostic value.
Temporal distribution: restricted to building phase 1 (stratum C).
Appearance: crudely made undecorated ware; very poorly fired. Biscuit crumbles at the breaks.
Paste: sandy porous; in all cases micaceous. Biscuit slightly pitted as result of burning out of fine organic matter and washing out of some sandy fragments.
Non-plastic inclusions: in addition to the natural inclusions of the raw clay, a temper has been used consisting of sand, including quartz fragments and pebbles occasionally larger than 10 mm. Generally it is distributed irregularly throughout the paste.
Colour: surfaces are mostly of dark uncertain colour. The core is generally oxidised, in only one case black. There are a few examples combining a dark non-oxidised surface with a fully oxidised core. One fragment is entirely dark, non-oxidised and one fragment has light, non-oxidised surfaces mottled with black.
Surface finish: in all cases wet-smoothed only, rather roughly.
Accessories: a few pierced lugs, rather clumsily made.

Convex-walled, open bowl (spherical unrestricted vessel) .

We have one reconstructed vessel of this form: a rather straight-walled, medium-deep, open bowl with a plano-convex, almost flat base. It has a vertically pierced lug directly below the lip. The vessel wall is of rather irregular thickness.

Comparing the other five rim fragments we noted that the wall thickness does not change or is slightly thinned towards the lip. The lip is more or less blunt. The rim may be slightly more inclined inwards or outwards than in the reconstructed bowl. Rim diameters varied between 10 and 15 cm. The wall thickness between 8 and 13.5 cm.

This kind of vessel shape may have pierced lugs as accessories.

Hole-mouthed jar (Spherical restricted vessel) (fig. 11 no 2).

''Reconstruction'' of this vessel form is based on three rim fragments only. Due to the irregularity of the ware it is very hard to tell anything about changes in wall thickness of the rim. The lip is generally more or less flattened. Since no ring fragments or basescars have been discovered in this type of ware, we assume the base to have been convex or plano-convex. The diameter of the three rim fragments varies between 8 and 16 cm. The wall thickness measures between 7 and 13 mm. We presume that this vessel form did not have accessories.

III. 2. 2. *Coarse ware*

Total sample: 245 fragments, including 113 of diagnostic value.
Temporal distribution: occurs throughout Early Neolithic I but rare in stratum A.

Appearance: handmade undecorated ware of reasonable quality. Rather well fired. Generally not entirely oxidised.
Paste: highly micaceous. May be slightly porous, due to the burning out of fine organic material or by the elusion of fine sand.
Non-plastic inclusions: in addition to natural inclusions, other tempering material consisting of grains of schist and quartz, which can be as large as 8 mm., and of finer grains of feldspar and epidote. May also include finely crushed potsherds. The non-plastics are distributed rather unevenly throughout the paste.
Colour: the surface is in most cases dark uncertain or dark non-oxidised. Light uncertain surfaces occur far less often. Very few are light non-oxidised. Almost one third has a non-oxidised core.
Surface finish: mostly well smoothed surfaces. In a few cases burnished.
Accessories: horizontally and vertically pierced lugs.

Open bowl with flaring wall (ovaloid unrestricted vessel) (fig. 11 no 5).

Only two rim fragments have been recovered. Moreover there is not a single reconstructed example. So we have to assume the shape, which we think to be a shallow open bowl. It was probably supported by a ring base – judging by comparison with the similar bowl type in medium ware. The rim fragments do not show changes in wall thickness. One lip is blunt, the other slightly tapered. It was not possible to measure the rim diameter. The wall thickness varies from 6-13 mm. The fragments had no accessories.

Convex-walled open bowl (spherical unrestricted vessel).

A reconstructible fragment has been recovered, consisting of a shallow bowl with an almost vertical wall and a plano-convex base. A similar example has been recovered from the Early Neolithic I stratum at Soufli Magoula. The shape is somewhat surprising since the convex-walled open bowl has generally been assumed to be rather deep. This now seems doubtful although we do not see any reason why a deep bowl of hemispherical shape could not coexist with the shallow type. Most of the vessels probably had a plano-convex base, as do our two examples.

The 27 rim fragments in most cases show no change in wall thickness. Occasionally they are slightly thickened or thinned; one fragment has a slightly everted rim. Most lips are blunt, a few tapered and a few flattened. The 12 rim diameters which could be measured vary between 15 and 25 cm., the majority having a diameter of between 18 an 22 cm. The wall thickness measures between 7 and 12 mm.

The vessels have pierced lugs as accessories. They are situated either on the rim, 2 to 3 cm. below the lip, or above the point where the diameter starts to diminish.

Slightly closed globular jar (ovaloid restricted vessel) (fig. 11 no 1).

Only 31 rim fragments have been recovered. There are no reconstructed examples from other sites in Thessaly either. We assume this kind of jar to have been a deep globular pot with a slightly inclining wall. It was supported by a plano-convex base or a ring base. The rims do not show much variation in wall thickness. In a few cases they are thickened. Some are slightly upturned. Most lips are blunt, a few slightly flattened, a few tapered. The rim diameters (16) which could be measured range between 15 and 25 cm, the majority having a diameter of between 18 and 22 cm. The wall thickness measures between 7 and 12 mm.

The only accessories are vertically or horizontally pierced lugs. They are either situated a few cm. below the lip or at the maximum diameter of the pot. One rim fragment has a lug with two vertical perforations (fig. 11 no 3).

Hole-mouthed jar (spherical restricted vessel) (fig. 11 no 7).

We base our reconstruction of this type on 17 rim fragments. We assume it usually had a spherical shape with a convex or planoconvex base. The rim either shows no changes in wall thickness or it is thickened. Lips are blunt or slightly flattened. The ten rim diameters which could be measured ranged between 11 and 20 cm. The wall thickness measures between 7 and 12 mm. There is no indication of any accessories.

III. 2. 3. *Medium ware*

By far the largest part of the Early Neolithic I pottery – some 5800 of a total of 6100 sherds (95%) was manufactured in this type of ware.
Sample: some 5800 sherds, including 1500 of diagnostic value (1060 rims, 205 bases, 240 lugs).
Temporal distribution: occurs throughout the entire Early Neolithic. Amount increases in strata B and A of Early Neolithic I.
Appearance: handmade undecorated ware of reasonably good quality. Quite well fired. Generally not completely oxidised.
Paste: rather fine, highly micaceous. In some cases slightly porous, due to burning out of some very fine organic matter or the elusion of fine sandy elements.
Non-plastic inclusions: in addition to the natural inclusions, sandy material served as temper. The latter consists of schists, which may be as large as 4 mm., quartz and, more rarely, feldspar and epidote, which do not exceed 1 mm. in size, the average size being 0.4 mm. In some cases crushed potsherds had been added.
Colour: surfaces are in most cases dark uncertain or light uncertain (table 16). About one sixth is dark non-oxidised. Light non-oxidised, light fired and completely oxidised surface colours are rare. Two thirds have a core of the same colour as the surface or even of a higher chroma. One third has a non-oxidised core (table 27a).
Surface finish: by far the majority is well smoothed (table 23). Nearly one third has burnishing traces, some on both sides, some on the exterior or – rarely – on the interior surface only. A high lustre is very rare.
Accessories: vertically and horizontally pierced lugs; 3 plain oblong lugs.

Open bowl with flaring wall (ovaloid unrestricted vessel) (fig. 11 no 8-9).

With a total of 80 rim fragments, a fairly uncommon shape. Several reconstructible vessels have been recovered, both at Sesklo and at other Early Neolithic I sites in Thessaly. All are shallow open bowls with a moderately flaring vessel wall. They have a low ring base.

Rims not showing any change in wall thickness are the most common. Among the other rim types, the number of thinned rims is slightly larger than the number of thickened ones (table 25). Out-curved rims are extremely rare. The lip is generally blunt. All other varieties are scarce (table 26).

The rim diameters range from 7-28 cm, the most common group being between 13 and 24 cm. Basal diameters of the reconstructed examples range between 4 and 9 mm. They are low, straight and more or less blunt. Wall thickness varies from 3 to 12 mm.

None of the reconstructed bowls nor any of the rim fragments showed scars of lugs or other accessories.

Convex-walled open bowl (spherical unrestricted vessel) (fig. 11 no 10, 12 and 16).

With 343 rim fragments, a more common shape. A few reconstructed vessels exist from Sesklo, as well as from other Early Neolithic I sites. They consist of shallow and deep hemispherical bowls, supported by a ring base and of a deep hemispherical bowl with a convex base. The latter has four vertically pierced lugs around the belly, just above the point where the diameter starts to diminish (fig. 11 no 16).

By far the majority of the rims does not show any change in wall thickness (table 25). Thinned rims are far more common than thickened ones; out-turned rims are very rare (fig. 11 no 10). The lip is generally blunt, although flattened and tapered va-

riants occur. The rolled over lip is very rare (table 26).

The rim diameters range between 7 and 28 cm., the most common group being within the range of 15-24 cm. The diameter of the bases ranges between 5 and 9 cm. The wall thickness varies from 3 to 12 mm.

Horizontally or vertically pierced lugs are the only accessories. They are either placed directly above the point where the diameter starts to diminish or a few cm. below the lip.

Slightly closed globular jar (ovaloid restricted vessel) (fig. 11 no 14).

With 459 rim fragments, the most common shape. There are a few reconstructed vessels from Sesklo and another Early Neolithic I site. They are deep jars with a slightly inclined vessel wall. All have a low ring base and four vertically pierced lugs around the maximum diameter of the belly.

By far the majority of the rim fragments do not show any changes in wall thickness. The number of thinned rims is slightly larger than that of thickened ones (table 25). Out-curved rims are scarce. The lip is in most cases blunt, though both flattened and tapered varieties occur, the thickened rim relatively often having a flattened lip. The rolled over lip is still very rare (table 26). The ring bases are always rather low, straight and blunt.

Rim diameters range between 8 and 28 cm., the most common group being between 15 and 24 cm. in size. Wall thickness varies from 3 to 15 mm – a medium thickness being the most common (table 21).

Accessories consist of pierced lugs. They are either placed around the largest diameter of the belly or a few cm. below the lip. They are in most cases vertically pierced.

Hole-mouthed jar (spherical restricted vessel) (fig. 11 no 9).

This vessel shape is represented by 192 rim fragments. There are no reconstructed examples. The presumed shape is spherical. They are supported either by a plano-convex base or by a ring base.

In by far the majority of cases, the rim does not show any changes in wall thickness (table 25). The numbers of thickened and thinned are almost equal, the number of out turned rims is slightly smaller. The lip is generally blunt though flattened and tapered varieties are found too (table 26). Stratum B has yielded some very scarce (3) examples of the rolled over lip.

The rim diameters between 8 an 24 cm., the most common group being between 14 and 20 cm. in size. The wall thickness varies between 3 and 10 mm. (table 21). A medium thickness is the most common.

We have not discovered any scars of accessories on the rim fragments, although this does not completely preclude their existence.

III. 3. *Correlation*

III. 3. 1. *Introduction*

Study of the technology and typology of Early Neolithic I pottery has raised several questions concerning their possible relationship to time (stratum) and to specific vessel shapes. To examine these and other possible interrelationships, we decided to make use of a punched card system, as being the most practical. Each card represents a single diagnostic sherd. Data regarding vessel shape (including rim, lip and base form, diameter of rim and base, type of accessories) and ware (including colour of the surface, oxidation of the core, size of the non-plastic inclusions, surface finish and wall thickness) were recorded, together with the provenience.

Although we are not entirely convinced that a differentiation between stratum A and B is justifiable (cf. the discussion in chapter II. 2. 1.), we have decided to consider them as different strata. Moreover we have classified the pottery excavated in trench B during the 1976 season, which undoubtedly belonged to the last part of Early Neolithic I, as stratum A material.

All numbers and percentages mentioned in this

section relate to diagnostic fragments only. In general there will be no great divergence from the percentages of plain body sherds.

III. 3. 2. *Relationship to building phase*

Coarse ware/medium ware

It is very clear that the amount of coarse ware decreases from stratum C to stratum A (53-42-21 fragments or 45.7%-36.2%-18.1%), whereas the amount of medium ware increases strongly (381-505-580 fragments or 26%-34.4%-39.6%) An explanation for this phenomenon is to be found in the greater ability of the potter.

Colour (tables 1-2)

From the very beginning of our study of the ceramic material we had been struck by the fact that it seemed possible to separate different strata on the basis of the general colour of the sherds. Investigating this, we have discovered that the number of sherds with a light uncertain buffish or reddish surface increases from stratum C to stratum A (tables 1 and 2e), far exceeding the expected number in the latter stratum (table 2e). The amount of dark uncertain buffish or reddish increases from stratum C to stratum B, then decreases from B to A (tables 1 and 2e). Dark non-oxidised shades decrease steadily from C to A. Fully oxidised colours (39 only) do not show a consistent development. The number exceeds the expected value in C, drops in B and increases in A.

When these colour changes were investigated for the different vessel shapes separately, we discovered that they corresponded generally to this scheme (table 2a-d). Only the group of hole-mouthed jars is slightly aberrant in so far as the number of light uncertain coloured fragments decreases from C to B, to increase again in stratum A (table 2a).

In section C, the increase of light uncertain surface colours is especially marked from stratum B to stratum A. There are two possible explanations:

a. Different soil conditions and weathering may have influenced the colour.
b. The potters manufacturing the vessels recovered in section C made more widespread use of the "light red firing" raw clay source.

Changes in firing conditions or fuelling technique are certainly the main reason for the steady decrease in dark non-oxidised shades.

Core (tables 3-5).

Another fact which drew special attention was the presence of blackish cores in fragments with a more or less oxidised surface colour. The number of sherds from slightly closed globular jars with a non-oxidised core increases quite markedly in stratum A, whereas the number with an oxidised core decreases (tables 4 and 5e). The quantity of non-oxidised cores increases in the group of convex-walled open bowls too (table 4). To our knowledge, the relative proportion of non-oxidised cores decreases again during the subsequent Early Neolithic II.

The correct explanation for this increase in vessels with non-oxidised cores is probably a change in fuelling method or a slightly different technique of firing.

Thickness of vessel wall (tables 6-8).

A slight increase in the number of vessels with a wall thickness of less than 5 mm. can be noted in strata B and A (tables 6 and 8). It is most clearly marked in the open bowls with flaring wall. This type has more thin-walled than medium thick-walled vessels (table 7). The other unrestricted shape of vessel, the convex-walled open bowl, has almost equal amounts of both in strata B and A. The ratio between thin- and medium thick-walled vessels remains roughly constant during Early Neolithic II and III.

The differences between C and B/A could be understood as a result of the potters' technical skill.

Vessel shape (tables 9-10).

Also of interest was the question whether, with the passage of time, any shift would occur in vessel shape. As we have already seen, the slightly closed globular jar is, generally speaking, the most common vessel form in Early Neolithic I (table 10). Investigation has shown that in stratum A unrestricted shapes become more important. The numbers of both hole-mouthed jars and slightly closed globular jars increase from stratum B to stratum A. The number of convex-walled, open bowls decreases slightly from C to B and increases greatly from B to A, where it equals the number of slightly closed globular jars (table 10).The number of open bowls with flaring wall remains more or less stable throughout the whole period.

It is hard to say what could have been the reason for the increasing popularity of the convex-walled open bowl. A change in demand by the customers seems to be the best explanation.

Surface finish (table 11).

Our supposition that there would not be any relationship between surface finish and stratum proved to be entirely correct on investigation. One might have expected that burnished ware, being the main feature of Early Neolithic III monochrome ware, would already show an increase in quantity during the last phase of Early Neolithic I. Perhaps our observations are incorrect. This might be due to the fact that in stratum A the surface of the pottery had been subjected to stronger weathering, which has quite a damaging effect on the burnish.

Rim shape (tables 12-13)

On investigation there proved to be no relationship between rim shape and stratum, with one exception. A tendency to make the rim of the hole-mouthed jar up-turned could be observed in stratum A (tables 12; 13a). During Early Neolithic II/III, nearly all hole-mouthed jars have an up-turned rim. Therefore we may conclude that this certainly is a trend through time. The best explanation seems again to be the greater technical skill of the potter.

Base form (tables 14-15)

It was almost certain that there would be a relationship between base form and stratum. Although it might be expected that in stratum C the slightly more complicated ring base would be less common than the plano-convex base, this proved to be wrong – except for the crude coarse ware of the lowest levels. Right from the beginning, the majority of all bases are ring bases and low ring bases. The percentage increases with time at the expense of plano-convex bases. The frequency of flat-footed bases increases too – albeit on a far more modest scale.

The reason for this increasing importance of the ring base lies in all probability in its greater stability.

Conclusions

Our general conclusion has to be that the following changes occur with the passage of time:

1. There is a shift from restricted to unrestricted vessel forms.
2. There is slight tendency to manufacture more thin walled vessels.
3. Dark non-oxidised colours become less common, whereas light uncertain reddish and buffish shades are found more often. The number of dark uncertain buffish or reddish vessels decreases.
4. The frequency of non-oxidised cores increases.
5. Towards the end of the period the slightly up-turned rim becomes more widely used with restricted vessel forms, especially the hole-mouthed jars.
6. There is a marked increase in the use of ringbases, whereas the plano-convex base becomes less common.

Points 2 and 5 are a result of the growing technical skill of the potter. 4 is probably a result of a different fueling or a slight change in firing technique. 1 and 6 are the results of the changing demands of the customers. Point 3 is largely due to the use of a different raw clay source.

III. 3. 3. *Relationship to vessel form*

In principle the same variables have been investigated in relationship to specific vessel form. The relationship of base to vessel form could unfortunately not be investigated since data relevant to this subject are insufficient. Summarising the results of these investigations (tables 16-26), we note that it is generally impossible to determine vessel form from a simple bodysherd. Nonetheless, each vessel form has some characteristics which are more typical of that specific shape than of the others:

I. *Hole-mouthed jar.*
   Surface colour dark, non-oxidised (table 17)
   Vessel wall of medium thickness (table 22)
   Burnished exterior surface with smooth interior surface (table 24)
   Up-turned or thickened rim with flattened lip (table 26)

II. *Slightly closed globular jar*
   Surface colour of lower values (table 17)
   Lip of out-curved rim is tapered (table 26)

III. *Convex-walled open bowl*
   Non-oxidised core (table 19) } also
   Burnished interior and exterior surface (table 24) } "characteristic" of IV
   Rim with thinned wall (table 25)
   Lip of plain and thinned rim types tapered (table 26)

IV. *Open bowl with flaring wall*
   Non-oxidised core (table 19) } also
   Burnished interior and exterior surface (table 24) } "characteristic" of III
   Surface colour of higher values (table 17)
   Thin vessel wall (table 22)
   Plain rim – blunt lip (table 26)

III. 3. 4. *Colour – oxidising core*

The data given in table 27 make it clear that in general there is a relationship between surface colour and degree of oxidation of the core. Only the fact, that the number of sherds with a light uncertain coloured surface and a non-oxidised core exceeds the expected value, is surprising. This phenomenon is probably due to firing conditions.

III. 4. *Subdivision*

The problem which sooner or later had to rise is whether we would be able to relate changes of the pottery definitely to stratum. This is quite impossible for the following facts:

a. The different strata cannot clearly be discerned from each other.
b. The pottery itself shows a strong continuity; sudden changes do not occur.

The identity of the so called Early Neolithic Ia pottery (the very coarse clumsily made ware) is very uncertain: except for the pottery exhumated from the lowest level of trench 2A in section B (excavated during the 1976 season), it has never been discovered in an unmixed level. Theocharis himself has never been very conclusive as to whether the pottery he had discovered in a stratum directly overlying the non-pottery bearing stratum had been exhumated from an unmixed level or not. We assume it could be possible that this type of ceramic vessels is not as much representing the first stage of pottery manufacture itself as well as being part of a local first stage: they might represent the result of a not entirely succesful attempt to make a ceramic vessel. However, although not being the only representative of first pottery, it is still true that the very coarse wares occur in the lowest levels of Early Neolothic I only. One could say that they are characteristic for the beginning of the period.

We can also separate the end of the period. In between we have the middle, which does not have the specific characteristics of either beginning or end. Boundaries can, however, not be discerned, hence it is better not to speak of phases.

The characteristics for beginning, middle and end of the period will probably prove to be valid for the pottery of other Early Neolithic I sites in Thessaly, provided that there is a fairly large number of pottery material, containing enough diagnostic sherds.

As far as Early Neolithic I sites elsewhere in Greece are concerned, we think that the characteristics for the beginning of the period still may be valid,

but that towards the end a certain regionalism will prevent comparison. Hence it will not be easy either to discern the middle. This will be investigated in Chapters VI and VII.

III. 5. *Outline of Early Neolithic II and III pottery from Sesklo*

We think this is the appropriate place to give a short introduction to Early Neolithic II and III pottery, since we have already mentioned the succesive phases of the period several times and since we are bound to come across the so called Early Painted and Proto-Sesklo pottery in the next chapters.

Early Neolithic I develops gradually into the subsequent Early Neolithic II; there certainly is no sharp break between these two periods – neither in ceramic material nor in stratigraphy. Since during this period a new element, painted decoration, was introduced, we prefer to call it Early Neolithic II rather than Early Neolithic Ix. Although the period is characterised by the presence of painted ware, one has to realise that this is extremely rare and that monochrome ware is predominant by far. This is apparently the case at all Thessalian sites.

Description of Early Neolithic II pottery

Appearance:

Handmade ware, mainly monochrome. Good quality. Manufactured by a combination of coiling and modelling technique. Vessel walls mostly of medium thickness, but quite a few thin-walled vessels.

Paste:

Micaceous clay, high in iron oxides. Non-plastics include quartz, schists, micrite and sometimes fine pottery grit. The grains are generally around 1 mm in size, not exceeding 3 mm; coarser granules, always smaller than 8 mm, are rare. White ware (extremely rare): Micaceous clay, not containing any iron oxides. Non-plastics include possibly schists and quartz, fine grained, not exceeding 2 mm.

Firing conditions:

Open fire, firing conditions not entirely controlled. Hardness 3 on Mohs' scale; white ware 4-5.

Colour:

Light uncertain buffish/reddish most common. Quantity fully oxidised increases during period to 40%. Dark red fired far more common than light or dark buff fired; dark non-oxidised rare.

Core: some 25% non-oxidised with (slightly) oxidised surface colour.

Surface finish:

Generally burnished exterior surface, interior when possible. Quality from streaky, fugitive to glossy, hard. Introduction of red slip; at first fugitive, later better quality. May be burnished.

Accessories/Decoration:

Number of pierced lugs decreases.

Painted decoration: red on white slip or buff surface; white or light red on red surface. Designs: line patterns, broad bands and solid triangles; former placed on exterior surface, horizontal or vertical, latter often pendant from lip. Often band along lip or in hollow of ring-base.

Vessel shapes:

Open bowl with flaring wall: frequency increases.

Convex-walled open bowl most common

Slightly closed globular jar shapes

Hole-mouthed jar: some 15-20%, often with upturned rim or pseudo-collar.

Rim: Plain unchanged most common; amount of upturned and thinned rims increases. Ledge-rim introduced.

Lip: Blunt in most cases; increasing amount of inside tapered and (slightly) rolled over types. Ledge symmetrically tapered.

Base: Ring-base most common; higher and often flaring outwards. Flat-footed type increases.

Early Neolithic II developed gradually into Early Neolithic III. One might even consider it as one and the same period. This is what often happens when speaking of Proto-Sesklo. There is, however, much

confusion of terminology. Originally the Proto-Sesklo phase was meant to start with the introduction of early painted pottery – making it necessary to subdivide it into an Early Painted and a Monochrome phase. This inevitably led to a difference between Early Painted and Proto Sesklo. Added to this is the fact, that the highly glossy and ''buntpolierte'' ware, assumed to be typical of Proto-Sesklo is almost absent during Early Painted, whereas it is one of the characteristics of a completely monochrome period at Sesklo and in the northern region of Thessaly. To avoid all this confusion we have decided to use the subdivision into Early Neolithic II and III. During the latter period, painted decoration disappeared entirely at Sesklo, not to reappear until the end of the period. Instead we see the introduction of plastic decoration. The disappearance of painted ware is apparently a local phenomenon restricted to settlements situated in and directly around the plain of Larisa; at sites in or around the pain of Karditsa it does not vanish, but coexists with plastic decoration. The theory that painted decoration was used only in very restricted parts of the settlement, and has in this way been recovered at some sites and not at others is hardly credible – especially since some of the ''others'' have been excavated on a comparatively large scale.

Description of Early Neolithic III pottery

Ware:

Fine ware some 10%
Medium fine ware some 45%
Medium ware some 54%
White ware some 1%

Appearance:

Fine ware: Handmade monochrome ware of very high quality Well fired; ringing resonance. Thin-walled.

Medium fine and medium ware: Handmade monochrome. High to good quality. Well fired. Most of medium wall thickness. Some 10% thin-walled.

White ware: Handmade monochrome, porcelain-like. Very high quality. Sometimes ringing resonance, silky. Well fired. Medium wall thickness. Some thin walled.

All manufactured by a combination of coi-

Paste:

Fine ware: Well levigated micaceous clay, rich in iron oxides. Non-plastics include fine mica flakes, around 0.1 mm in size.

Medium fine ware: Well levigated micaceous clay, rich in iron oxides. Non-plastics may include very fine schists, quartz and fine pottery grit, generally not exceeding 0.6 mm.

Medium ware: Well levigated micacous clay, rich in iron oxides. Non-plastics include schists, quartz and fine pottery grit, generally 1 – 1.5 mm in size, sometimes larger, not exceeding 3 mm.

White ware: Well levigated micaceous clay, not containing iron oxides. Non-plastics include fine mica flakes, around 0.1 mm in size.

Firing conditions:

Open fire, firing atmosphere not entirely controlled. Hardness of fine ware $\geqslant 5$; medium ware and medium fine ware around 3, few $\geqslant 4$; white ware $\geqslant 5$ on Mohs' scale.

Colour:

Fine ware: Most dark red fired, some light buff fired and some mottled red/black: Buntpolierte ware.

Medium fine ware: Most dark red fired, fewer buff fired; red slip often over light and dark uncertain reddish/buffish; ca 10% non-slipped light and dark uncertain reddish/buffish; ca 5% dark non-oxidised; ca. 0.5% red/black mottled – ''Buntpoliert''.

Medium ware: Most red fired, fewer buff; red slip may be over light uncertain buffish; few not completely oxidised; very few dark non-oxidised.

Core: Some 20% of the cores of all these wares has not been oxidised.

White ware: White to cream (7,5 – 10YR 2/–4/./8) surface and core.

Surface finish:

Fine ware: Burnished exterior, interior when possible, otherwise smooth.

Medium fine and medium ware: Mostly red slipped, quality flakey to good; exterior surface often burnished, interior if possible, otherwise smoothed. Interior rim may be burnished.

White ware: mostly interior and exterior burnished; few burnished exterior and smooth interior.

Accessories/Decoration:

Fine ware: Applied knobs and pellets; towards end, painted decoration, red on white slipped or buff surface, linear motifs and solid triangles on exterior surface, neatly executed.

Medium fine and medium ware: Few pierced lugs; applied knobs, pellets in rows, raised bands.

White ware: no decoration.

Vessel shape:

Fine ware, medium fine and medium ware:

1. Plate-like vessel, always supported by ring-base. Has a thinned rim and blunt or inside tapered lip.
2. Open bowl with flaring wall, shallow or deep – shallow more common. Supported by ring-base or flat base. Thinned or unchanged rim with blunt or inside tapered lip.
3. Convex-walled open bowl, shallow or deep, the latter being the most usual. May have ledge rim. Often has thinned or unchanged rim with blunt, inside tapered or rolled lip. Few upturned rims. Supported by flat base or ring-base.
4. Slightly closed globular jar. Often has up/out-turned rim. Otherwise unchanged or thinned rim with blunt or inside tapered lip. Often supported by ring-base. May also have flat base. In some cases ledge rim.
5. Hole-mouthed jar. Most with up/out-turned rim. Lip blunt or flattened. Thinned rim with rolled lip. Often supported by ring-base.
6. Collared jar. Hole-mouthed jar with a low or high neck; joint shows sharp carination in vessel-wall. Lip often inside tapered. Supported by ring-base.

Types 3 and 4 are the most common, although shape 5 is quite common, too.

White ware: Most a shallow convex-walled bowl with flat base, or low straight ringbase. Some slightly closed globular jars with an upturned rim and a low ring-base.

At the very end of the period or during the transition from Early to Middle Neolithic, the quality of the monochrome ware seems te have declined slightly, but this was not a longlasting decline, for the transition to Middle Neolithic is a gradual one, with the monochrome A1 ware (a very fine, thin-walled red ware) developing directly out of the fine ware of Early Neolithic III.

Since this is a summary of Early Neolithic II and III pottery from Sesklo we have not included the phase of the impresso-decorated ware, the so called Pre-Sesklo, this being a local development in the Northeastern part of Thessaly. It would best be classified as part of Early Neolithic III, since some, possibly imported, impresso ware fragments have been discovered in an otherwise typical Early Neolithic III context.

From the preceding it will be clear that it is difficult to make a subdivision into periods, which is valid for the whole Thessalian region, let alone for the whole of Greece or even the Greek mainland. We suppose however that a division into plain Early Neolithic I, II and III will at least cause less confusion than names like Argissa phase, Achilleion phase, Pre-, Proto- and Vor-Sesklo, which are all regionally restricted in their validity.

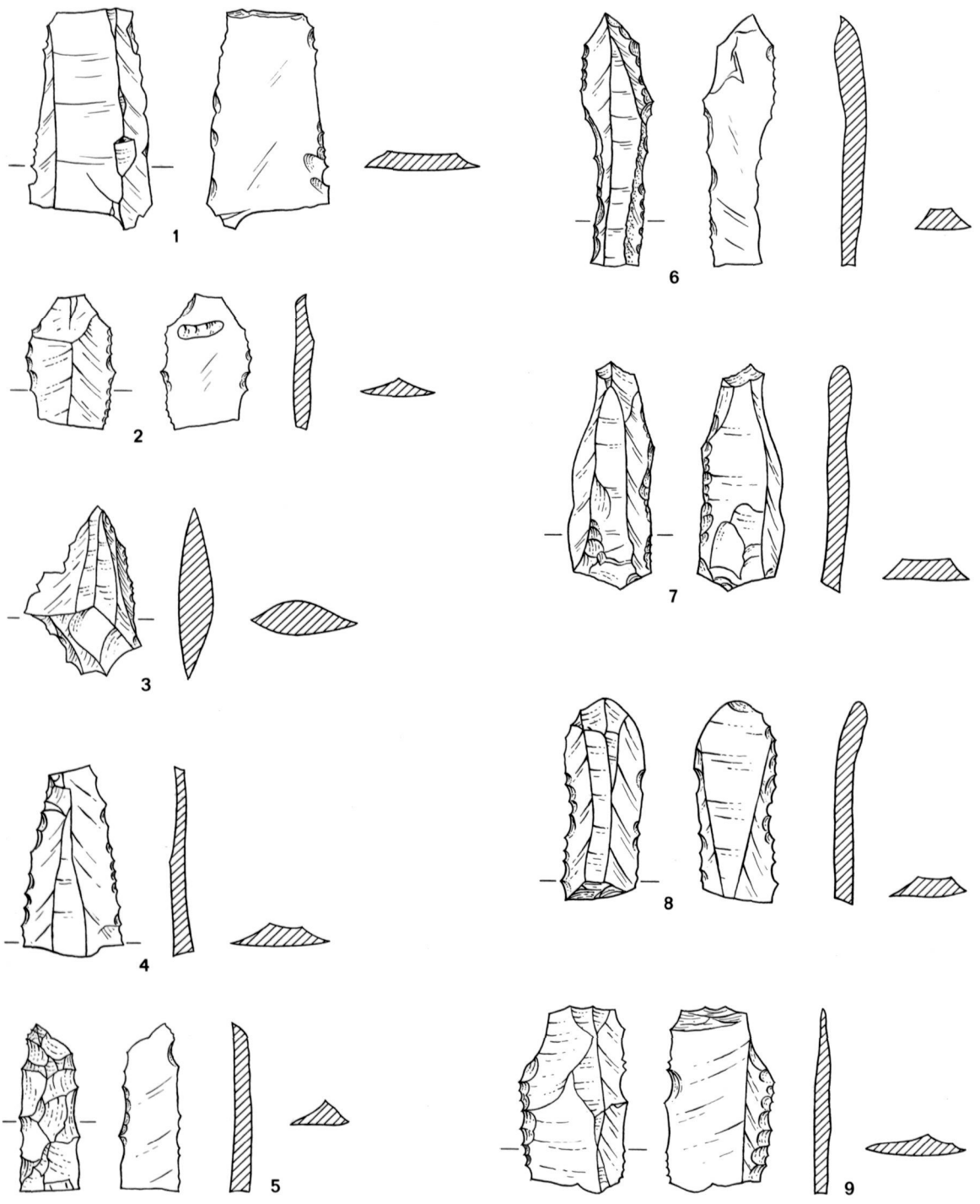

Fig. 12 Chipped stone implements.