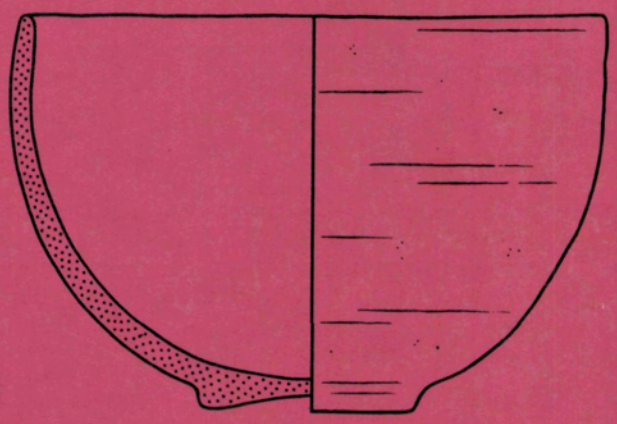
ANALECTA PRAEHISTORICA LEIDENSIA



1981

XIV

ANALECTA PRAEHISTORICA LEIDENSIA

XIV

ERRATA ANALECTA PRAEHISTORICA LEIDENSIA XIV

p. 16 fig.9[b]; stratigraphical drawing of the SW-NE section
p. 26 fig.11; add: scale 1:4
p. 38 fig.12; add: scale 1:1
p. 42 fig.13; add: scale 1:2
p. 44 fig.14; add: scale 1:2
p. 57 ; VI.3.The plain of Larisa, to the Northwest of Sesklo
p.114 fig.25; legend as below

---- Isopachen des Plio-Pleistozäns
——— Synsedimentäre Verwerfung

POSTALPINE SEDIMENTE
Quartär
Neogen

SUBPELAGONISCHE SERIE
Oberkretazische Kalke und Flysch, jurasische Schiefer

PELAGONISCHE SERIE
Marmor von Ossa und Mavrovounion
Marmor der Mittelthessalische Kristallinzone
Gneis
Ophiolith

ANALECTA PRAEHISTORICA LEIDENSIA XIV

PUBLICATIONS OF THE INSTITUTE OF PREHISTORY
UNIVERSITY OF LEIDEN

M.H.J.M.N. WIJNEN

THE EARLY NEOLITHIC I SETTLEMENT AT SESKLO: AN EARLY FARMING COMMUNITY IN THESSALY, GREECE

1981

LEIDEN UNIVERSITY PRESS

ISBN 90 6021 499 4 (this volume)
ISBN 90 6021 450 1 (series)

Printed in the Netherlands

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Coming to think of it, it is hardly credible that barely ten years ago the name "Sesklo" did not mean much to me; it was just one of those Neolithic sites in Greece. A chance meeting with D.R.Theocharis, when visiting the site on a holiday trip, changed this entirely. With a long discussion on Greek and European prehistory, Dutch 17th century painting and cigars, all while enjoying one of the wonderful Sesklo cocktails, of which only Theocharis knew the secret, the base of a fruitful cooperation was laid. It would end only too soon with Theocharis untimely death in december 1977. At that moment I was already a good deal on my way with the study in precipitation of the present book. Although Theocharis had enriched my knowledge of Greek prehistory enormously (without him the entire study would have been impossible) he had still left many questions to be answered. Many of the practical ones have been solved with the help of his wife, Mrs. Maria Theocharis-Papadopoulou (Athens) who gave me full access to all excavation notebooks and plans, both of Sesklo and of other Early Neolithic sites excavated by Theocharis.

In the museum of Volos practical and intellectual support was provided by G. Hourmouziades, Mr. and Mrs. E. Kakavoyannis (Rodos), Mr. and Mrs. B. Intsesiloglou, Mrs. Z. Malakassiotis, Mrs. V. Sismanis, Mrs. G. Michou, M. Nikolorakis, by my fellow Sesklo-authors K. Kotsakis (Thessaloniki), Miss A. Christopoulou (Athens), Mrs. F. Risopoulou-Egoumenides (Cyprus), Mrs. A. Moundrea (Athens) and by the draughtsmen S. Hatzis and Mrs. Th. Makris.

For permitting me to study all material from other sites I owe much to K. Gallis (Larisa), John L. Caskey (University of Cincinnati), Mrs. M. Gimbutas (University of California, Los Angeles), Th.W. Jacobsen (Indiana University, Bloomington), John C. Lavezzi (Bowling Green State University, Ohio), the late V. Milojčić (Heidelberg, Institut für Ur- und Frühgeschichte), S. Miller (University of California, Berkeley), the Hon. C.C. Ridley (Stockton, England), J. Sakelarakis (Nat. Museum, Athens), R.J. Rodden (Saffron Walden, England), K.D. Vitelli (Indiana University, Bloomington), Saul S. Weinberg (University of Missouri).

Faunal and botanical remains were identified by Charles A. Schwartz (Los Angeles) and by H.H. Kroll (University of Kiel).

Geological information was provided by Th. Doutsos (Geological Service, Larisa) and by H. Schneider (University of Saarbrücken). For all help in technical analysis of the ceramic material I am indebted to H.J. Franken and A. van As (Institute of Ceramic Technology, Leiden) and C.J. Overweel (Institute of Prehistory, Leiden). I owe to F.E. Tjon Sie Fat (Institute of Anthropology, Leiden) that statistics did not remain a world of complete darkness.

In the preparation of the manuscript I was assisted by J.P. Boogerd (Institute of Prehistory, Leiden), who prepared the drawings and by Glynis Jones and Paul Halstead (both University of Cambridge) who undertook the task of removing the many errors from the English text; in earlier stages they had always been willing to discuss the many problems involved while enjoying some tsipouro me mezedes or a dinner at the "Skala of Milano".

Without all these people (and the many I forgot to mention) and without the always encouraging support of my parents this thesis would never have been finished.

Thank you all from the bottom of my heart!

Fig. 1 Map of Greece with regions, most important cities, islands and islandgroups.

CHAPTER I

INTRODUCTION

When during the early years of this century Chr. Tsountas excavated the first Neolithic settlements in Thessaly and in Greece, he reached the conclusion that three periods could be discerned in this area: A, B and C, respectively Early and Late Neolithic and (Early) Bronze Age. He noted many arguments in favour of a subdivision of period A into two sections, but he also observed some factors which in the end prevented him from making the division and he left the problem to future investigators.

The research was continued by two English scholars, A.J.B. Wace and M.S. Thompson during the 1910's. They did not restrict their activities merely to excavating settlements, but made a more invaluable contribution to our knowledge with an exhaustive typology of the ceramic material. They did not, however, change Tsountas' division and as a result they separated the pottery types into an A group, characteristic of the "Early" Neolithic, a B group from the Late Neolithic and a C group from the Early Bronze Age. Until the end of World War II this model of the Greek Neolithic remained virtually unaltered. The ceramic material of the earlier Neolithic period became known as Sesklo ware and that of the later period as Dimini ware.

At the end of the 1940's the chronology of Aegean prehistory and more especially of the Neolithic and Early Bronze Age was subjected to reconsideration, partly under the influence of recent discoveries in the Near East. For practical reasons this reinvestigation had to be based on already excavated material and stratigraphical drawings and not on new excavations, which made the subject a problematical one. The different investigators failed to reach a concensus of opinion on all but one point: they agreed that the Neolithic period should be divided into three major phases – Early, Middle and Late.

Weinberg (1942, p. 121; 1947, pp. 165-182), discussing the subject with the ceramic material from Corinth as his main evidence, drew a parallel between Thessaly II and the Late Neolithic, between Thessaly I and the Middle Neolithic and between the beginning of Thessaly I (and an earlier phase) and Early Neolithic. Milojčić on the other hand, mainly using the Thessalian material, proposed a division into five periods (1950/51, pp. 1-90). The first was a so called "Vor-Sesklo" (not to be confused with the present Vor-Sesklo) or Early Neolithic, the following two belonged to the Middle Neolithic, the fourth to the Late Neolithic and the fifth – Rachmani – belonged to the Chalcolithic. Schachermeyr (1955) agreed with Weinberg's crude division into Early, Middle and Late. In all these ceramo-typological discussions, absolute dating was also dealt with. On this point opinions were divergent.

It became clear that all these sequences had to be tested by new excavations. In Thessaly they have been carried out mainly by V. Milojčić and D.R. Theocharis from 1956 onwards – starting respectively at Argissa and Sesklo. The stratigraphy of the newly excavated sites proved the main division into Early, Middle and Late Neolithic preceding the Chalcolithic and Early Bronze Age to be correct, although it became evident that there existed many regional variants, especially where the Late Neolithic is concerned. As a result quite a number of sub-phases have been created.

The ceramic material known as Sesklo ware proved to be characteristic of the Middle Neolithic, but a distinct period, characterised largely by monochrome ware and some simple patterned painted ware, preceded it. At some sites an even older phase, apparently not yielding any pottery at all, was discovered. This was called the Pre-Pottery Neolithic, analogous to that of the Near East. The subse-

quent Early Neolithic could be divided into four sub-phases, the first of them being called Frühkeramikum or Early Ceramic.

In 1972 the then director of the Sesklo excavations, Dr. D.R. Theocharis, proposed the preparation of a PhD thesis on the material from the Early Neolithic I period recently discovered at Sesklo. This seemed an interesting venture, especially if the study would include all data available from this period at Sesklo. In that way it might be a useful contribution to what had been published so far on Early Neolithic Greece. Most literature provided only limited information. Moreover, there was no concensus of opinion between the various authors; some seemingly even contradicted each other. The most extensive information on the subject had been given by Theocharis (1967), but even here data were largely concerned with pottery shapes, their possible ancestors and their development. Technical aspects were discussed only superficially and artefactual remains other than vessels were mentioned only briefly. He concluded that at the beginning of the Neolithic a virtually contemporaneous monochrome phase existed throughout Greece, from Macedonia to the Peloponnese. Discussing its origin, Theocharis rejected the until then widely held opinion that pottery had been introduced together with the domesticates from the Near East in favour of the idea that it was a local development rooted in the Preceramic phase. His view clashes with that of Weinberg in the Cambridge Ancient History. The latter recognises the existence of a Preceramic phase, but refuses to accept the theory that the ceramic Neolithic is rooted in this period. He thinks it was imported by a group of migrants from Palestine – basing this on a certain similarity in pottery ware and shapes.

The descriptions of the ceramic material provided by Theocharis, Weinberg and Milojčić show some differences, which is partly due to the fact that they considered the material from their "personal" excavations – i.e. Sesklo, Corinth and Argissa – as most characteristic of the period in the whole of Greece. Other artefactual remains are often mentioned only superficially.

At Sesklo the rarety of remains other than pottery has forced us almost to confine our research to a kind of catalogue-especially since the typology and technology of the other material will be treated more profoundly in a series of monographs, dealing with groups of artefacts and tracing their development over the entire time span of the prehistoric occupation at the site of Sesklo. The abundance of the ceramic material was such that both technology and typology could be studied and they will be treated at at some length.

Detailed studies of the Sesklo material will enable us to explore some problems concerning the Early Neolithic period in Greece. It will be useful to investigate whether the typological sequence we have established for the pottery from Sesklo is recognisable in other areas of Greece too. Conversely, if a degree of regionalism is recognised, it will be possible to relate its first appearance to our chronological framework.

Attention had to be focussed also on the economy of Early Neolithic Greece. It was quite obvious that the origin of the change from a Mesolithic to a Neolithic way of life – the change in subsistence pattern – was, and still is, the greatest problem to anyone dealing with the period. There are no indications that the wild ancestors of emmer, sheep and goat had existed in Greece in the period preceding the Neolithic, yet the subsistence pattern of the Neolithic is largely characterised by the presence of emmer and sheep/goat. These species were almost certainly introduced in some way from the Near East – but whether this was by migrants or through other contacts is a problem which remains to be solved.

An interesting problem was the relation between the early Neolithic inhabitants of Greece and their environment. Would we be able to get some idea of the distribution of sites in relation to the landscape? We realised that this would not be a very easy question to answer, since little is known of the palaeoenvironment of Greece. Ecological studies have only recently been introduced in the field of Greek Prehistory.

In the course of our study we have attempted to find some answer to these questions. We knew in advance that we could do this only to a very limited extent, the data both from Sesklo and from the rest of Greece being far too restricted to allow certainties.

Despite these restrictions which would make it difficult to reach any sensible conclusions, we decided to give this account of our present knowledge of the Early Neolithic in Greece, for too often mistakes are made when material from this period is being used in discussion. We realise, and indeed we hope, that several of the blanks in this account may be filled by future research – and that as a result we may have to change some of our views.

We propose to discuss first the history of research and the artefactual material from Sesklo and then to place the settlement in its wider context, after which we will gradually extend our discussion to the rest of Thessaly and Greece. Lastly we will investigate whether we can say anything on relations with the Near East. On the whole most attention will be focussed on pottery, since that is by far the most reliable material, but other artefacts are mentioned for all the sites. Some attention will be paid to ecological aspects too.

Fig. 2 Map of Thessaly with surrounding mountain ranges and reconstruction of Lake Viviis to its Neolithic dimension (free after Philippson).

CHAPTER II

THE EXCAVATION AT SESKLO

The site of Sesklo is situated at 39°21′30″N and 22°50′50″E in the region of Thessaly, district Magnisia – 9 km to the West of the modern town of Volos and the sea shore.

In order to evaluate the discoveries at Sesklo properly, we will first have to consider the circumstances in which they were found. Therefore we will mention briefly the history of the excavations and afterwards we will discuss more extensively the excavations which have provided us with the material for our study. Within the latter framework we will consider in particular the circumstances in which the Early Neolithic material was found. Although the material to be discussed here originates exclusively from the recent research by D.R. Theocharis (1956-1977), the contribution of the famous excavations by Tsountas must be remembered. The results of the latter investigation have been memorable.

II. 1. *The excavation by Christos Tsountas*

The Akropolis (fig. 3), or Kastraki, was, as far as we know, first mentioned by Sir William M. Leake (1835 IV, p. 399). Staïs rediscovered Kastraki when he was excavating the site of Dimini, in 1901. He ascertained that the Akropolis dated back to the Stone Age and informed Christos Tsountas – at that time Professor at the University of Athens – who went directly to Sesklo to see it with his own eyes. From surface finds (sherds and other artefacts), he judged it extremely important to investigate the mound. He started the excavation – made possible by a grant from the Archaeological Society of Greece – in the same year, 1901, and finished it during the following summer (Tsountas 1908, pp. 69-70). The whole excavation was directed with great skill and an understanding of the site and its problems, which may be considered remarkable – certainly at this early stage of prehistoric settlement excavations. Although using big pickaxes, he was very careful to retrieve even the smallest traces left by the Neolithic people: animal bones, shells and even carbonised seeds were recovered. The latter were identified by Prof. Wittmarck of the University of Berlin as *Triticum dicoccum* and *Panicum miliaceum* (Tsountas 1908, pp. 359-360). The publication on the "Akropolis of Dimini and Sesklo" (Tsountas 1908) still retains much of its initial value.

Tsountas restricted himself to the Akropolis, which had an accumulation of three to six meters of deposit. Three stratigraphical periods could be discerned: Bronze Age, Later and Earlier Neolithic. The Bronze Age deposit was not entirely uncontaminated and it was not clearly separated from the older deposits: much Neolithic material was discovered on the surface or directly below it. Tsountas supposed that the main reason for this contamination was the Middle Bronze Age cist graves which had been cut as deep as 2.40 m.

The Neolithic deposits were not of the same thickness everywhere (Tsountas 1908, p. 73). In the middle and on the northeastern side of the Akropolis, where the deposit was thickest, it could be divided into five strata, of which the upper two belonged to the Later and the lower three to the Earlier Neolithic. Tsountas thought it difficult to make a clear separation between the two, since it seemed to him that the change from the Earlier to the Later was gradual rather than abrupt. However, he was entirely convinced that the earlier period had been of a far greater longevity, since the deposit was much thicker – over three meters (Tsountas 1908, p. 74). He noticed that the fill of the earlier period was far from homogenous. The lowest stratum contained practically no painted sherds at all, whereas they

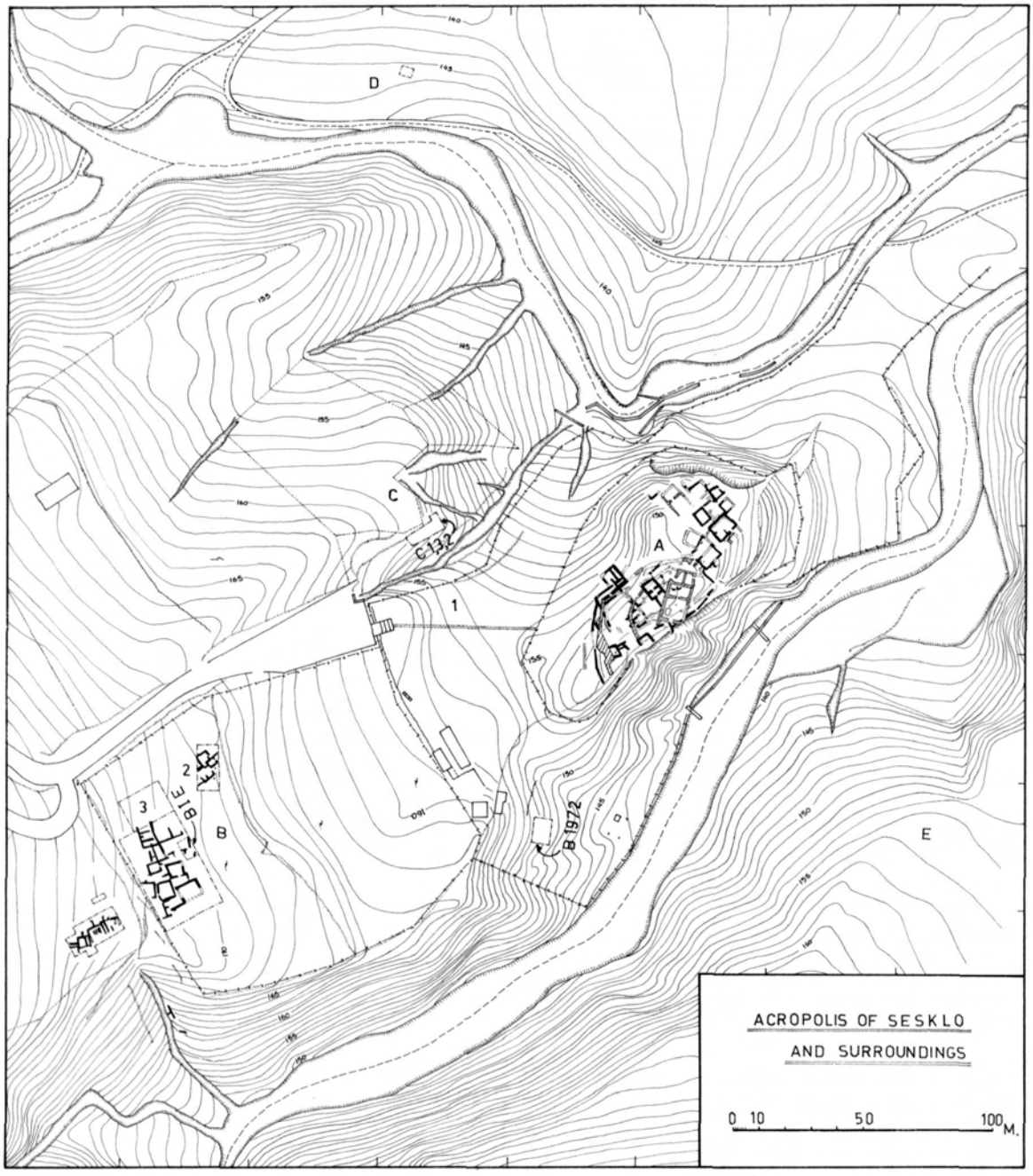


Fig. 3 Sesklo: Area of the neolithic settlement with identification of the different sections and trenches.

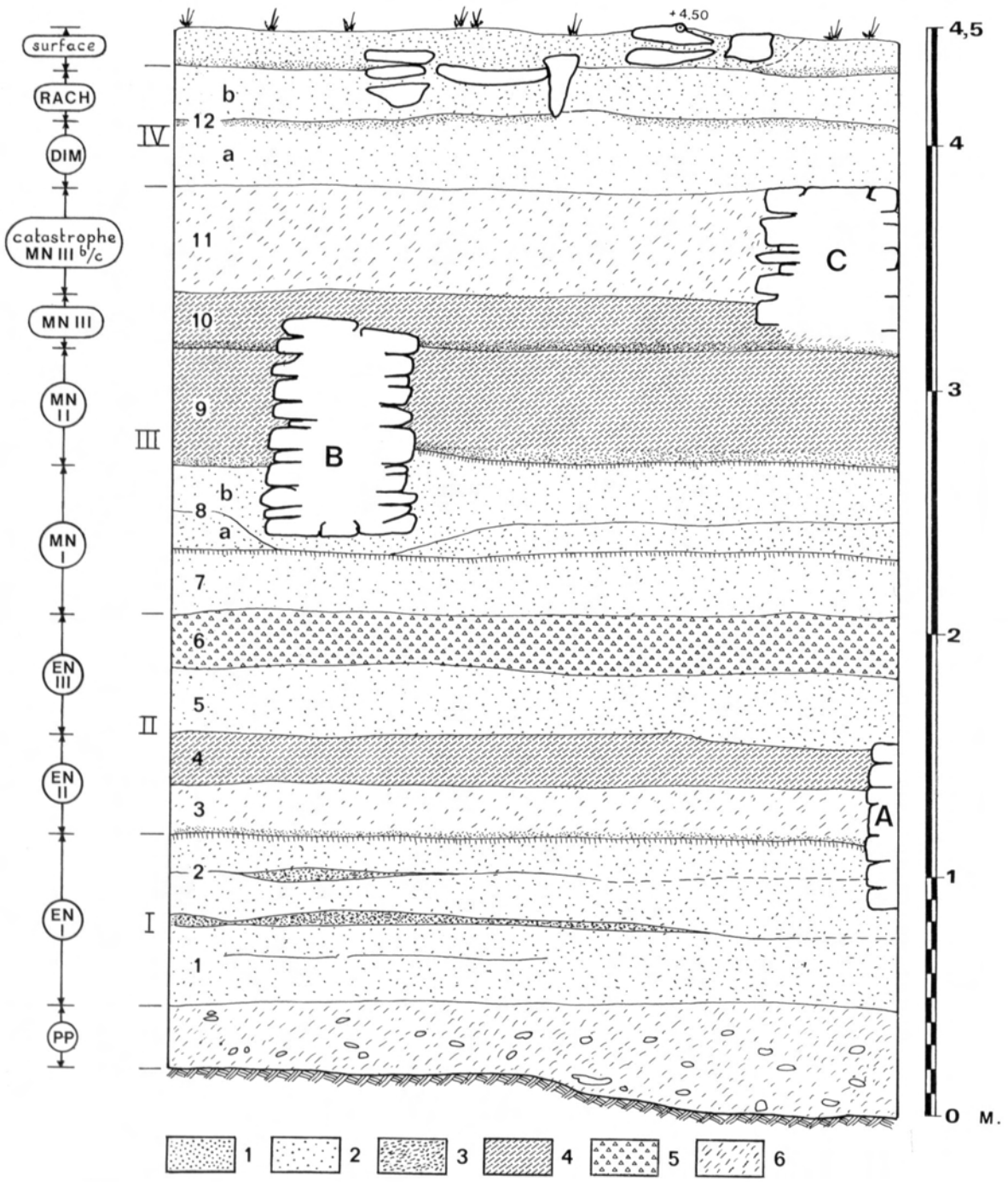


Fig. 4 Sesklo: Stratigraphical section of the 1957 trial trench.
1: clay. 2: burnt clay. 3: ashy. 4: very ashy with chacoal. 5: sterile. 6: ashy carbonaceous.

were rather abundant in the higher strata. Another difference was that stone walls seemed to be virtually absent in the lower strata. Since the fill consisted mainly of ashes and many burned and carbonised particles, he concluded that the walls had probably been built from clay and wood (Tsountas 1908, p. 80).

Although the differences within the strata of the Earlier Neolithic period made him realise that it could probably be divided into two or more phases, he thought it wiser to keep the broad division of Earlier and Later Neolithic for the time being. In the preface to the ''Akropolis of Dimini and Sesklo'' he said the following: ''Possibly another period will be added to them, the earliest of all, which I have not separated off from the first, because I thought, generally speaking, that I should be content with a broader division.'' He stresses this in his description of the pottery (Tsountas 1908, p. 159): ''As we said already above, the pottery of the lowest level of the Akropolis is a simple shaped monochrome ware, whereas in the higher strata we find rather abundant painted pottery. From this it is possible to conclude that the Earlier Neolithic period can be divided into two phases.'' One of the reasons why he did not proceed with this subdivision was that the simple monochrome ware continued to exist in the higher strata. Moreover, he found just a few painted sherds in the lower stratum as well. Drawings and pictures indicate that this was Early Painted ware.

He saw to it that the remains of stone walls were conserved, so that the Akropolis of Sesklo would remain a monument of Neolithic Greece.

Then, part of the northeastern edge of the Akropolis broke away during the tremendous earthquake of 1955 – thus revealing a natural stratigraphic section. Fortunately, D.R. Theocharis, a fervent admirer of Christos Tsountas and his work and at the time one of the few prehistorians in Greece interested in the Neolithic period, had been appointed as epilemetis and later as ephoros of the district of Magnisia, to which Sesklo belongs. He decided that it was necessary to conduct an excavation on the northeast side of the Akropolis, if only for stratigraphic purposes. In this way the excavation at Sesklo was reopened after 53 years. It was to go on for at least another 21 years!

II. 2. *The excavation at Sesklo by D.R. Theocharis*

This period started with the excavation of a stratigraphic trench of ca 2.50 x 2.50 m on the northeastern side of the Akropolis, during the winter of 1956 (Theocharis 1957, pp. 151-159). The section (fig. 4) showed that, below the houses of Tsountas' Earlier Neolithic, a deposit of at least 2.30 m thickness remained to be explored before the sterile soil was reached. The lowest stratum did not contain any pottery, only small stone (mainly flint and obsidian) and bone implements. It seemed possible that it belonged to a phase similar to the ''Pre Pottery Period'' which had been discovered by V. Milojčić at Argissa a few months earlier (Milojčić 1955). The stratum overlying it contained many monochrome sherds, mostly in darker colours and of very simple shapes. They belonged, apparently, to the first ceramic phase. Once this stratigraphic sequence was established, it was decided to reopen the excavation on the Akropolis.

During the summer seasons of 1962-1968, the goal of these excavations was to discover new information not only concerning the Earlier period, but also the Middle and Late Neolithic and to get a better and more up to date knowledge of the Neolithic and the Chalcolithic sequences (Theocharis 1962a, p. 24). At the start it was thought of primary importance to get as much information as possible on the earliest phases and then on the extent of the Akropolis. Despite the sometimes very difficult circumstances of excavation – it was not thought wise to destroy the foundations of buildings belonging to a later period in order to get more information on the earlier periods – the main goal has been achieved. As a result we have a fairly good idea of the Pre-Pottery phase and the artefacts belonging to that period. The same can be said of the Early Neolithic period.

The stratigraphy of the 1956/1957 trench has been confirmed more than once on the northeast side of the Akropolis. Theocharis concluded that the stratigraphic sequence had to be the following (fig. 5):

RACHMANI	(Chalcolithic)	
DIMINI	(Late Neolithic)	
Sesklo period destruction horizon (Middle Neolithic)		
	Middle Neolithic III	
CLASSIC SESKLO	Middle Neolithic II	
	Middle Neolithic I	
Early Neolithic destruction horizon (Early Neolithic III)		
PROTO SESKLO/	BUNTPOLIERTE	(Early Neolithic III)
	EARLY PAINTED	(Early Neolithic II)
FRÜHKERAMIKUM		(Early Neolithic I)
PREPOTTERY		

Upon re-examination, the old ''deep section'' of Tsountas yielded finds characteristic of the Pre-Pottery phase near the sterile soil (Theocharis 1966, p. 5).

The architectural remains of the earliest strata are scanty. However, soil features led Theocharis to conclude that the houses of Pre-Pottery people consisted of a kind of pit-dwelling, which had been cut into virgin soil (Theocharis 1973a, p. 35). Their shape seemed to be more or less elliptical, as far as could be discerned. The total number of these dwellings discovered on the Akropolis amounts to five. In two cases the dwellings seemed to be surrounded by deep ditches (figs. 6 + 7). In the pits several holes were discovered; these could be postholes, although it is strictly not possible to say what purpose they served.

The Pre-Pottery level yielded a rather large quantity of bone implements (ca. 35), flint and obsidian blades and flakes (ca. 90) – the obsidian ones being the more numerous. The other finds, less abundant, included fragments of stone implements and a few fragments of ceramic figurines. The animal bones, of which 98% belonged to domesticated species (sheep/goat, cattle and pig), and the carbonised seeds, identified as *Pisum sativum, Triticum dicoccum, Hordeum vulgare* and *Quercus sp.*, showed that the subsistence pattern was agricultural. (Theocharis 1963, p. 43).

Of the subsequent Early Neolithic I-III, the architectural remains are rather scarce and house-plans are non-existent. The rather abundant remains of burnt clay with wood and reed impressions might be an indication of house-building, although it has also been suggested that these could be remains of a kind of oven or hearth. Only the evidence of the last phase of the Early Neolithic (EN III) indicates without any doubt the presence of houses built of mud-brick and pisé: since at least part of the settlement was destroyed by fire at the end of the period, there is a level consisting almost entirely of burnt wall and roofing debris, making it possible to understand the exact construction of walls and roofs. The nature of the foundations remain guesswork still. Theocharis supposed that the earliest houses were built with pisé walls, resting on a foundation of a single row of stones, but modern evidence shows that this would be disturbed beyond recognition when a house collapses.

The floors were made of clay, which in some cases was probably mixed with small pebbles. They are difficult to distinguish, making a clear separation between the strata impossible. Only the separation between Early Neolithic III and the Middle Neolithic is clear in those parts of the site where EN III is sealed by a level of burnt roofing and wall debris. The stratigraphic division into phases was made on the basis of changes in soil colour: layers of buff building debris – consisting of disintegrated pisé and/or mudbrick – alternate with grey ash-layers.

In the level directly overlying the Pre-Pottery stratum, pottery was still very scarce. The few fragments which have been recovered seem to be a kind of ''prototypical'', heavy, coarse ware, which had been fired badly and – according to the excavator – in a few cases not fired at all (Theocharis 1965a, p. 8). In the next level the quality changed rapidly – although occasional ''bad'' fragments occur: most of the pottery was well made, albeit still monochrome and of simple shape.

The next phase (EN II) saw the introduction of the first painted decoration – the same simple patterns Tsountas had mentioned already as being present in the lowest level of his monochrome phases. The quality of the pottery is good, although the vessel-shapes are still simple.

The third phase (EN III) has pottery of remarkably good quality, though still with a limited repertoire of shapes. Strangely enough, painted pottery seems to disappear again. The excavator noti-

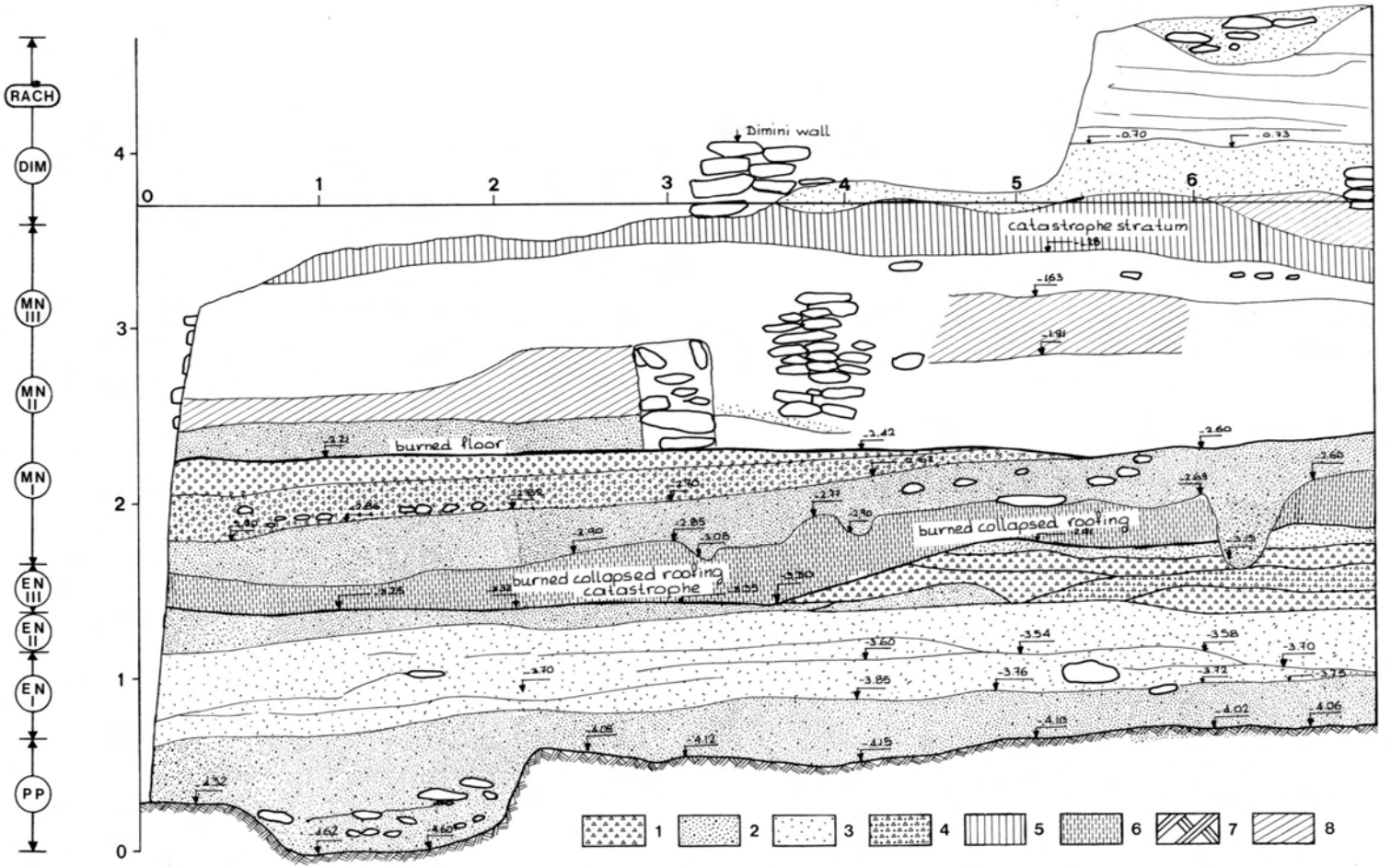


Fig. 5 Sesklo Akropolis: Stratigraphical drawing of the NE-SW section of trench 2 excavated in 1963.
1: clay. 2: ashy carbonaceous. 3: ashy. 4: clay mixed with charcoal. 5: catastrophe (by fire). 6: catastrophe-burnt collapsed roofing. 7: sterile. 8: building debris.

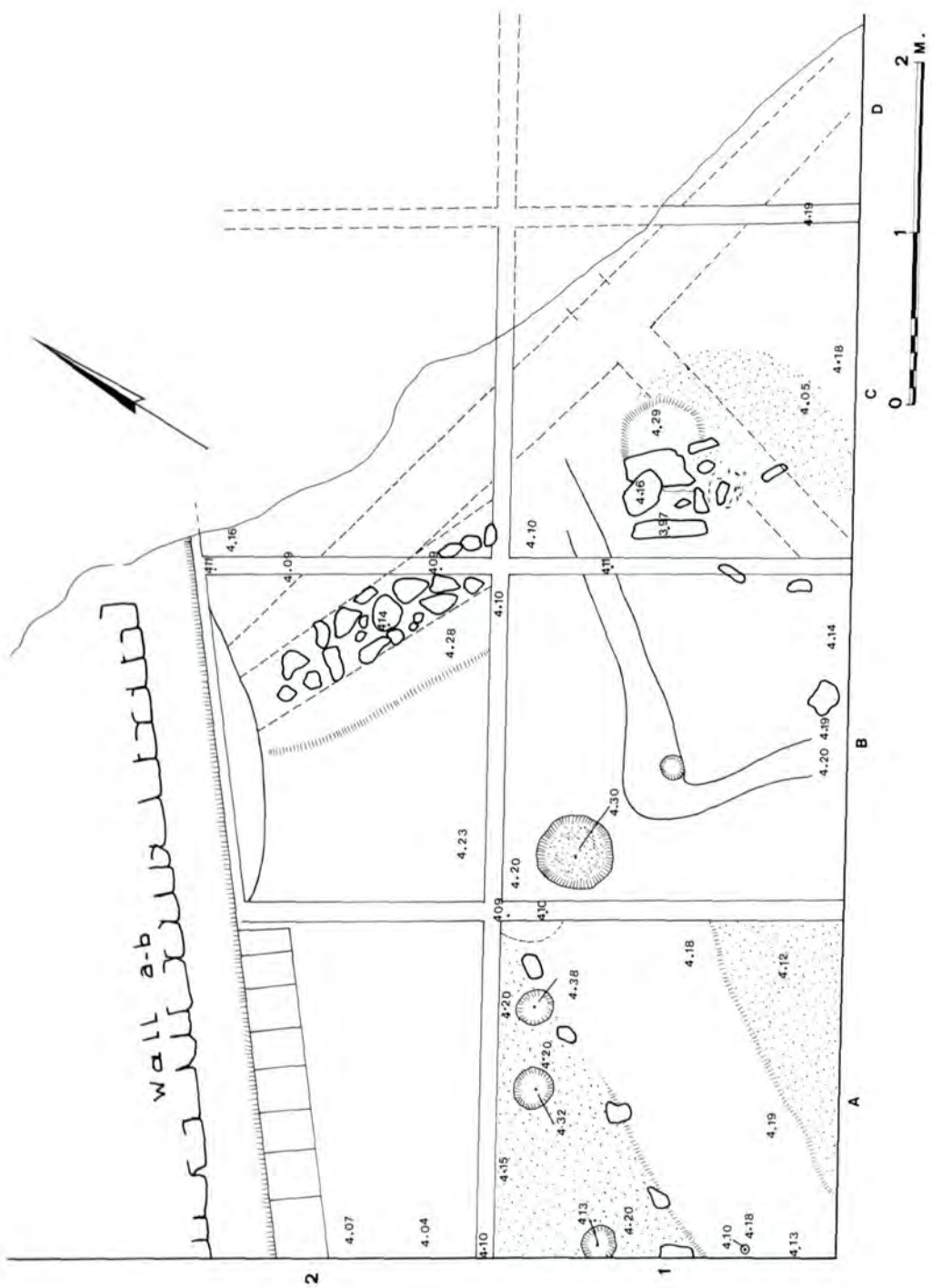


Fig. 6 Sesklo Akropolis: Trench 2 – Plan of the Pre-Pottery stratum.

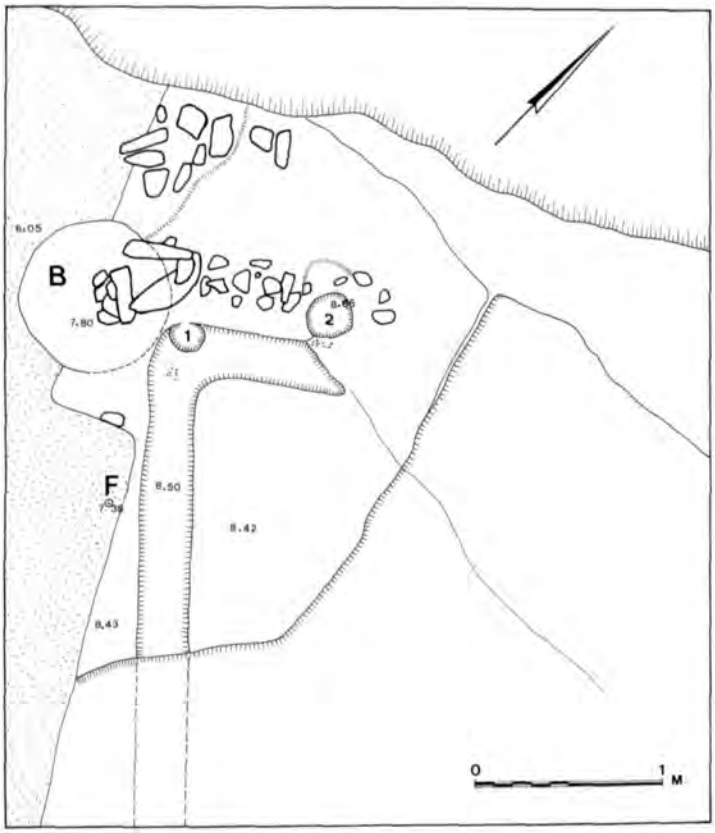


Fig. 7 Sesklo Akropolis: Plan of Pre-Pottery dwelling in pit Thita, excavated in 1962.

ced a certain decline towards the end of the period.

The other artefacts of the Early Neolithic period are marked not so much by a great difference in quality between the three phases as by an ever increasing diversity.

These were, in short, the results of the 1962-1968 Akropolis excavations as far as the Early Neolithic is concerned. But the site of Sesklo was to offer still more data. Remembering that Tsountas had mentioned the presence of sherds in the neighbouring fields, Theocharis undertook some survey walks in the area around the Akropolis. He discovered traces of architectural remains some 150 m West of the Akropolis. On this spot there were cist-graves of the Middle Bronze Age too. Trial trenches, during the years 1968-1970, confirmed that the remains belonged to the Middle Neolithic period. Based on these results, another series of excavations was carried out outside the Akropolis, between 1971 and 1977 (Theocharis 1971a, 1972, 1973a and 1976). They served to delineate the extent of the settlement and also to identify the periods during which it had stretched beyond the Akropolis. To this end, the area around the Akropolis was divided into four sections: B, C, D and E (fig. 3).

In B, a (by Greek standards) large trench was opened up, measuring 40 x 25 m. Later another 16 x 16 m trench and a few small trial trenches were added to the main trench. A deep section in the main trench revealed that all phases prior to Middle Neo-

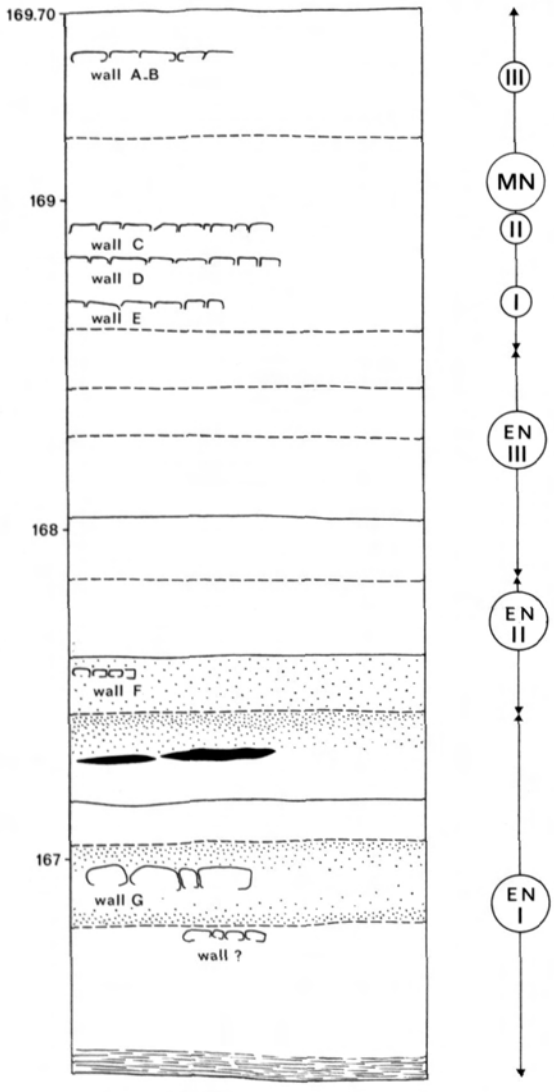


Fig. 8 Sesklo: Stratigraphical section of trench B(I)E, with projection of walls.

lithic III were present, except for the Pre-Pottery (fig. 8). This does not make it absolutely certain that Pre-Pottery did not exist in section B, only that it has not been discovered in this particular part of the area.

The Early Neolithic I (Frühkeramikum) debris contained, at different levels, fragments of two stone structures. First, a slightly rounded construction, built of heavy stone slabs, was discovered and 0.20 m deeper a straight wall, made of smaller stones, disappearing unfortunately below the rounded wall. Once again one of the major excavation problems was the inability to destroy any superseding Neolithic structures in order to get a more complete view of the earliest phases.

The overlying strata also contained stone structures. Two of them, a nice straight wall and a strange round construction probably belong to Early Neolithic II; the five remaining walls all belong to the Middle Neolithic.

In the second large trench, material belonging to Early Neolithic I was discovered directly underlying the Middle Neolithic III deposit, with a thin layer of transitional Early Neolithic I-II in between.

In section A, outside the Akropolis, a trial trech was opened in 1972 (B1972). Almost the entire deposit, except for the upper levels in the extreme western corner, belonged to the monochrome Early Neolithic III phase – a deposit of over 2 m thickness (Theocharis 1972, p. 9). Architectural remains were few; they consisted of the traces of a pisé wall, 0.30-0.40 wide, stretching over a length of 4 m; moreover the deposit contained a lot of ''burnt house rubble''. The whole area yielded a tremendous amount of material – pottery, figurines, bone implements and lithics – in an infinite variety.

A trial trench in section D revealed the presence of Middle Neolithic III pottery, both monochrome and painted, in rather large quantities (Theocharis 1972, p. 11).

A survey of section E indicated human occupation during Middle Neolithic III and the Early Bronze Age. Trial excavation showed the architectural remains to belong to Early Bronze I (Theocharis 1977, pers. comm.).

In section C three trial trenches were opened for the specific purpose of getting more data on Early Neolithic I. Since the larger part of our material originates from these trenches we will discuss the excavation of this area in more detail.

II. 2. 1. *Section C, excavation and stratigrapy*

Section C is situated West of the Akropolis, across the dry stream-bed. Most of it is situated in a kind of depression, surrounded by something resembling an embankment at the side of the stream. It is possible that the depression is artificial, but we think that this is more likely to be true of the embankment. Since the field is rather barren and very subject to erosion, it could have been made to prevent the field from washing down the slope completely.

In 1972 Prof. Theocharis discovered layers containing Early Neolithic pottery near the top of the slope. Since this is situated at about the same height as the Early Neolithic I stratum on the Akropolis, it seemed quite possible to him that the Early Neolithic settlement had stretched beyond the Akropolis. Therefore he decided to make a trial excavation at this spot. He started to excavate two trial trenches, 1 and 2, each 5.50 m long, with an intervening space between the two of 4.50 m. The width at its narrowest point was 2.50 m, but since the southeast side of the trenches followed the natural line of the slope, it expanded to nearly 4.00 m. Great care was taken to remain outside the embankment, which actually became the basic southwest-northeast section. Later the intervening space was excavated too, as trench 3. This was partly because Theocharis hoped to

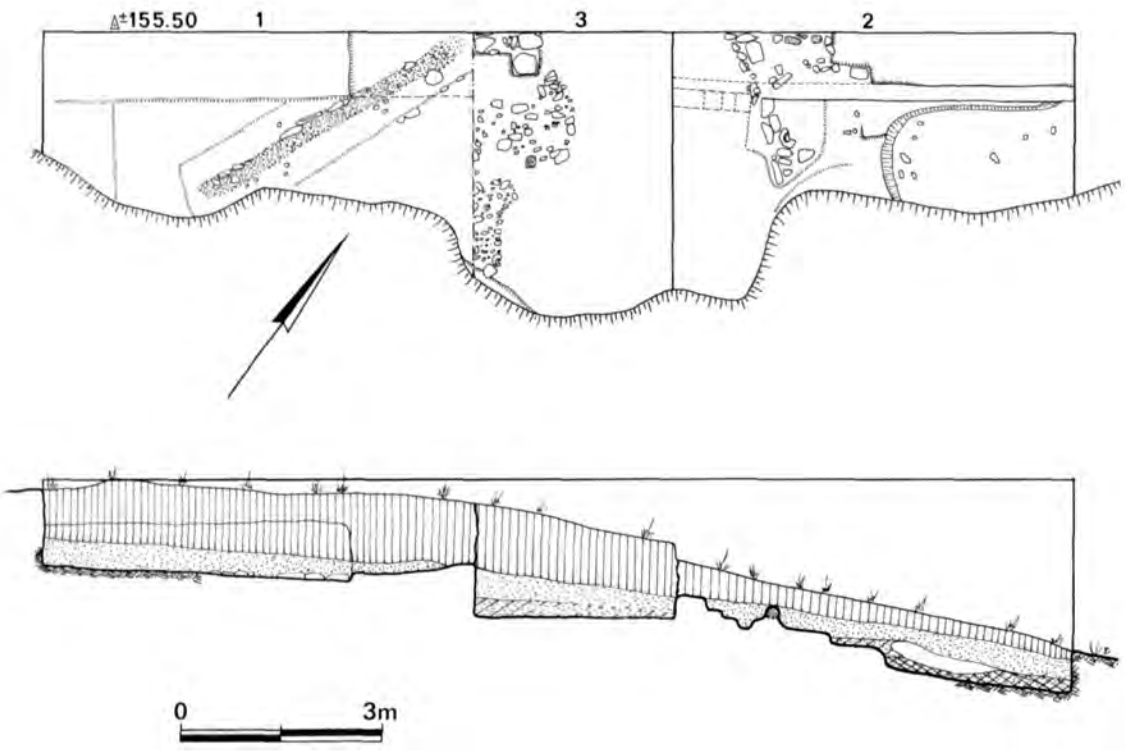


Fig. 9 Sesklo section C, trenches 1, 2 and 3 as excavated in 1972.
a. plan of the lowest levels. b. stratigraphical drawing of the NW-SE section.

solve some architectural problems in this way. In trench 1 an area of 1.00 x 3.50 m was left unexcavated, after the removal of the surface soil, in order to serve as a ''control area''. In 1976 this was excavated to get a continuous stratigraphic section and to check the stratigraphic observations. In 1977 trench 2 was enlarged with an extension of 2.00 m to the Northwest; it still remained outside the embankment, since this turns inward at this point. The extension was, at a distance of 0.30 m from its northwest section, heavily disturbed by the recent intrusion of a streambed; this disturbance was for a length of ca four meters. The stream had apparently dried up and the bed had been covered with loose earth from a nearby surface, which contained a little pottery from the Early Neolithic and later periods.

The ''horizontal level'' excavation technique was adopted. After removal of the surface soil (with heavy pickaxes) horizontal levels of 0.10, and in crucial areas of 0.05 m, were taken off with a small hand-pick and trowel. The depths were measured from a secondary datum point △, 4.90 m below the central datum point HG (160.40 m ASL) on the Akropolis. When at a later stage it became impossible to use point △ any more, a new datum point was established in trench 1, 1.50 m below △.

Although in general the spoil was not sieved, extra care was taken when a very ashy level was reached and also when finally a stratum apparently without pottery came to light. The soil from these areas was sieved with a fine mesh. In this way some extremely small obsidian and flint flakes were retrieved. However, tribute has to be paid to the workmen, who managed to discover many a microscopically small fragment without the use of a sieve.

Stratigraphy (fig. 9)

It was possible to discern four strata, A, B, C and D. Of these the upper three all belong to Early Neolithic I, the lowest to the Pre-Pottery phase.

The virgin soil consisted of very hard, yellow clay, situated at a depth of 1.25-3.25 below △. It slopes rather sharply downwards from the Southwest in trench 1 to the Northeast in trench 2 and quite gently from the Southwest to the Southeast. The inclination in a Southwest – Northeast direction is a little less steep than the present slope of the surface, but the Southwest-Southeast inclination is far more gentle. This indicates that the slope has been eroded at a later date. Theocharis' supposition that the stream was made artificially during the Middle Neolithic or even later may be proven true.

Stratum D – Pre-Pottery phase.
The earliest evidence of human habitation is a deposit of very ashy debris, 0.30-0.45 m thick, and only present in trench 2. It did not yield a single sherd, though it contained other finds, indicating human habitation. The occupation area consisted of an oval cutting into the sterile soil (fig. 10), at least 3.00 x 4.00 m large, although the exact extent is not known, since the pit is cut by the trench wall on the northeast side and by the slope on the southeast side. Directly next to it was an amorphous mass of sterile yellow clay, resting directly on the sterile soil and having the same colour but not entirely the same structure, and so ''worked'' in some way. It would seem reasonable to call this kind of dwelling a pithouse.

The finds of this stratum consisted of bone implements, flint and obsidian bladelets, a few grinding stones, bones, shells and some ''house rubble''. Analysis of the bone material indicated it to be almost completely of domesticated species (Schwartz, Appendix II).

Stratum C – Early Neolithic I, building phase 1.
This stratum, consisting of a yellowish grey, rather soft soil, lay partly directly over the sterile soil and partly over the Pre-Pottery deposit. It included levels 11-17 of trench 1 and 3 and levels 3-7 of trench 2. The thickness of the deposit varied between 0.30-0.70 m.

Architectural remains are rather scarce. Some clumsily laid rows of heavy stones, including saddle-shaped querns, have been discovered; although not neatly constructed, they may belong to foundation walls. The numerous remains of burnt clay, mixed with straw – occasionally even with seeds – often had reed impressions, which could be of rather thick stalks. In a few cases they had impressions of

branches or twigs. The number of buildings in the three trenches is uncertain.

Large areas of the lowest level were littered with small stones, including hand-stones. They represent either floors or cobbled yards. At the edge of the trench 1-3 "floor", a rounded fireplace was discovered. In several Middle Neolithic houseblocks a fireplace was situated in the courtyard outside the houses. If this was already the case in Early Neolithic I, this cobbled area would represent a kind of courtyard.

This was the first stratum to contain pottery, apparently already in a fully fledged form. In the lowest levels there were a few sherds, of a very coarse and crude type which were badly fired, mixed with the better pottery. Apart from pottery, the assemblage of finds includes bone and stone implements, flint and obsidian, bone material, figurines and earstuds. Unfortunately almost no carbonised seeds were recovered – the one exception being *Vitis silvestris* (J. Renfrew, 1973, pers. comm. to D.R. Theocharis).

Against the southwest-northeast baulk of the extension of trench 2 a skeleton was discovered, lying in a crouched position. It probably belongs to an adult. Since it lay on the sterile soil and since there are no outlines of a pit visible, we have reason to believe that it belongs to building phase 1 and indeed that it is the first Early Neolithic I burial discovered in Thessaly. There are no grave goods accompanying it.

Stratum B – Early Neolithic I, building phase 2

This deposit of very grey, soft soil overlies stratum C in all three trenches. The two strata are very difficult to distinguish from one another, since there is no real change in soil colour nor a clear line dividing them. The deposit has a thickness of 0.20-0.50 m, including levels 3-10 in the northwest part of trench 1 and 8-10 in the northeast part, levels 7-10 in the northwest part of trench 3 and 9-11 in the northeast part and level 2 of trench 2.

The architectural remains of this period are slightly better preserved than those of stratum C, though it remains impossible to discern a house-plan. There are foundations of two walls, consisting of a single row of large stones which probably carried a pisé construction. Pisé is very difficult to detect, but thorough scraping revealed traces in the soil along the foundation. At one end of the wall, in trench 3, a so called pivot-stone was discovered (fig. 9).

Since it was impossible to discover any floors, we suppose them to have been made of plain earth. In general the soil of the lowest two levels of this stratum is quite ashy, containing a lot of charcoal specks. Moreover, they are relatively rich in finds. An area West of wall A in trench 1 contained, in levels 8 and 9, a large quantity of stones, often covered with some charcoal and with carbonised chaff underneath. A rather large quantity of bones and pottery and quite a lot of obsidian and flint were mixed in. This could indicate that the area was used for cooking or meat preparation. One of the blades, discovered in close association with a bone, showed butchering traces when submitted to micro-wear analysis[1].

Although the deposit of his building phase is not thicker than that of building phase 1, the total quantity of artefacts is larger, including ceramics, bone and stone implements, figurines and earstuds.

Stratum A – Early Neolithic 1

Stratum A consists of a deposit of yellow-grey, rather hard soil. Overlying stratum B directly in all three trenches, it has a thickness which ranges between 0.20 and 0.80 m. Only loose topsoil separates it from the surface (thickness 0.10-0.20 m).

No traces of any architectural remains have been discovered in this stratum. It contained only Early Neolithic I material, mostly pottery. In fact we had the strong impression that this stratum may consist of wash from the slope above. Should this be the case, we would expect the finds to consist largely of material of the latest phase of Early Neolithic I. If, on the other hand, it is not wash, but building debris, consisting of disintegrated pisé from the building of stratum B, they would belong to building phase 2 – or the later part of Early Neolithic I.

In addition to a fairly large quantity of sherds, the material from this stratum contained flint, obsidian, bone implements, bone, figurines and an earstud. The quantity is rather small in comparison to strata B and C.

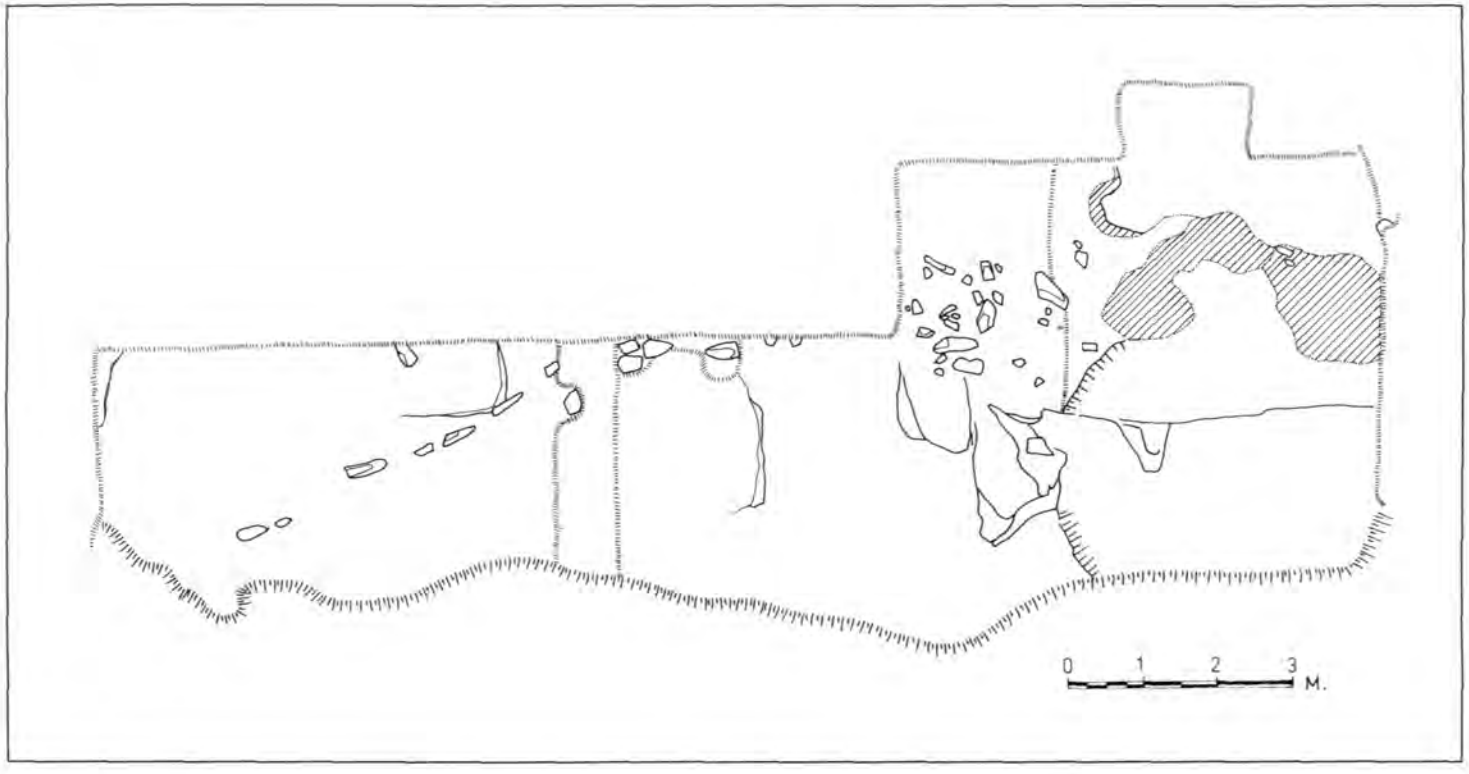


Fig. 10 Sesklo section C, trench 1, 2 and 3: Plan of the lowest levels after excavation and enlarging of trench 2 in 1977.

II. 2. 2. *Final remarks*

The excavations of 1971-1977 seem to confirm Prof. Theocharis' hypothesis that the settlement belonging to the Neolithic period (not only, as he thought at the beginning of the project, to the Middle Neolithic, but also to the Early Neolithic) is very extensive, covering an area of more than 10 hectares, though at the outset it may have been somewhat smaller. Anyway, the settlement is considerably larger than Tsountas' original estimate of 0.4 hectares. Naturally we do not know whether the entire area was built-up. It seems quite possible that, in between clusters of houses, there were fields or workshops.

Prof. Theocharis thought it possible that at the outset the whole area formed one village, without the Akropolis "towering above the humbler dwellings" (Theocharis 1972, p. 11). He thought that only towards the end of the Middle Neolithic period did part of the Eastern ridge become separated from the rest of the area by the construction of retaining walls and the digging of a ditch. In this way the actual Akropolis would have been created.

NOTE

[1] Miss Alexandra Christopoulou has analysed this blade.

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.

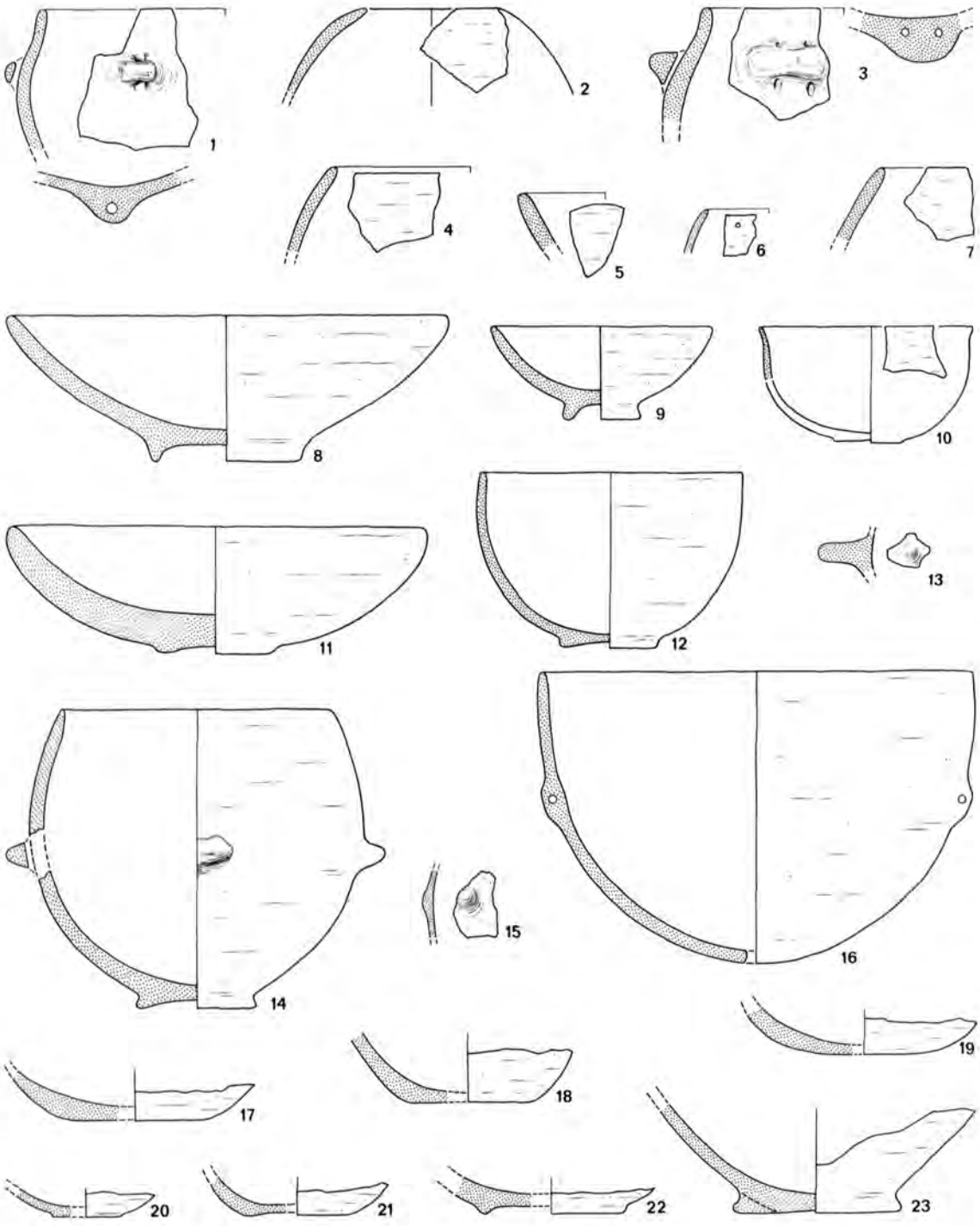


Fig. 11 Early Neolithic I pottery.

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.

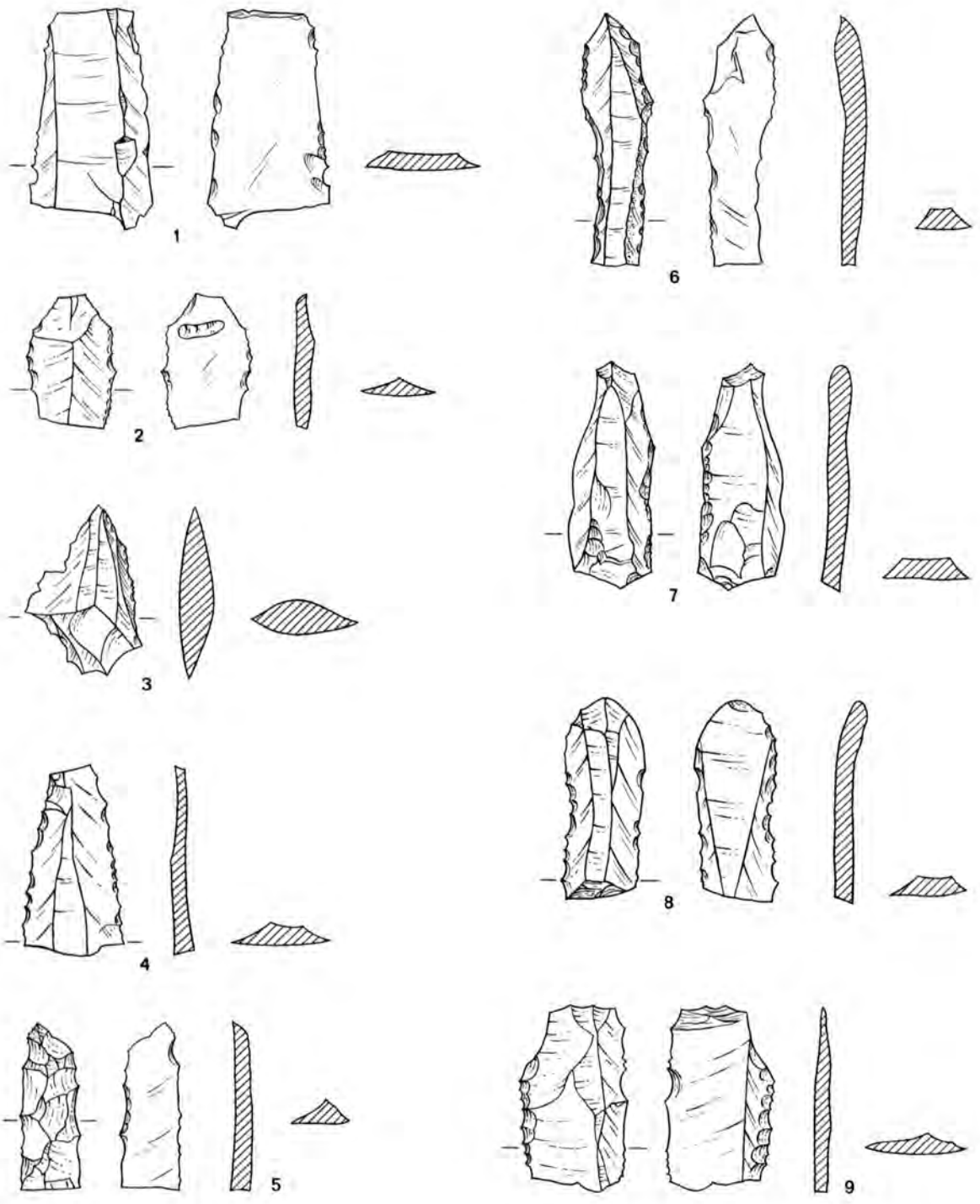


Fig. 12 Chipped stone implements.

CHAPTER IV

FINDS OTHER THAN POTTERY

In this chapter we will discuss the remaining finds from the Early Neolithic I strata at Sesklo. Although the total number of artefacts, other than sherds, is rather small, making it impossible to establish a typology or to use them for comparative purposes, we want to include them for completeness sake. Hence we will give a kind of catalogue, arranged according to the type of objects. These will include the material from stratum D. As mentioned in chapter II, this does not contain any pottery, but the faunal remains indicate that the mode of subsistence was agricultural. This brings into focus the problem of the existence or non-existence of a Pre-Pottery Neolithic. It is one of the subjects to be discussed at the end of this chapter. This will be followed by a few short notes on the chronology of the Early Neolithic.

IV. 1. *CHIPPED STONE*

We will restrict our observations to the chipped stone material from section C, for the sole reason that this is the best sample[1]. In total it consists of 184 fragments of obsidian or flint. Nearly half of the fragments (86) consists of generally extremely small debitage chips. Most of the latter have been recovered from stratum D; therefore one could conclude that this is an archaic artefact. The greatest care should, however, be exercised because many chips from higher strata will have been lost since the soil was not sieved. This would be the case especially with stratum A which has an extremely hard soil, in which microlithic fragments might easily be overlooked.

The rest consists entirely of blades. Of these not a single one has been deliberately retouched. Only a faint nibbling of the edges could be an indication of use. In the few cases where silica gloss can be seen on one of the edges do we know for certain that the blades have been used. The fact that the vast majority of the blades consists of fragments indicates that they were used until they were completely worn and needed renewal. This may be due to the fact that the raw material for manufacture was not available close to the settlement.

Among the material excavated there were many quartz flakes. Generally they are not thought to have served as implements, since the material is far too brittle to allow prolonged and heavy use. For this reason they were not recovered with particular care during the excavation. Quartz is, however, readily available at Sesklo, whereas both obsidian and flint have to be imported. Therefore we think it may certainly have been used, e.g. in cutting cereals and wild plants and also for other purposes not requiring an implement of particularly great strength[2].

The complete absence of cores and core fragments, be they of flint or obsidian, is remarkable. A few possible rejuvenation flakes have been recovered and one or two small fragments which would resemble a core but for the fact that the scars are far too narrow for this to be convincing. Although there are numerous extremely small chips and several rather irregular debitage lumps, we assume that the implements were manufactured at an entirely different site, e.g. at a kind of distribution centre or even at source. Despite the fact that chips are essentially connected with tool manufacture, the products of such activity are not known.

IV. 1.1. *Obsidian* (fig. 12 no 1-3; 6)

Around 73% of the chipped stone artefacts have been made of obsidian – 133 pieces. The material has been analysed by Prof. Colin Renfrew (Renfrew, Cann and Dixon 1965, p. 225). He discovered

that the provenience had to be the island of Melos, situated some 320 km. southeast of Sesklo in the Aegean sea.

Among the fragments were two complete blades and 58 blade fragments. The rest (73 fragments) consisted of debitage material, largely small chips of a width less than 5 mm. From stratum D, only 4 blade fragments, but 24 debitage chips were recovered; from stratum C, 24 blade fragments and 23 chips; from stratum B, 23 blade fragments and 21 chips and from stratum A, 8 blade fragments and 5 chips.

Among the blade fragments we could discern three groups:

a. Width around 7 mm. Length varying between 7 and 14 mm, mostly around 10 mm. One complete blade, 7 mm wide, 10.6 mm long.
b. Width between 9 and 13 mm. Length varying between 12 and 27 mm, most often 20 mm. One complete blade 10 mm wide, 38.8 mm long.
c. Width over 15 mm. Length 16 - 17 mm.

Some blade fragments show a bulb of applied force, indicating that they have been knapped using a percussion or pressure technique. Judging from the simplicity of shape it was the former.

IV. 1.2. *Chert implements* (fig. 12 no 4-5; 7-9)

The total chipped chert consists of 51 fragments. The colours range from whitish to dark red-brown, the latter being the most common. The material is of granular fine quality and shows generally a rather dull lustre. It is not locally found. It has not yet been subjected to analysis in order to trace its origin. However, the chert artefacts at all Early Neolithic sites in the plain of Larisa and its immediate surroundings seem to have been manufactured of the same material. Texture and lustre are of a similar quality and the colour range is in all cases identical. Possibly the material for all these implements originated from chert boulders in the piedmont fans of the lower Pleistocene Pinios terrace (Schneider 1968, p. 38).

The bulbs of percussion indicate that the blades have been knapped from the core using a percussion or pressure technique. In a few cases traces of cortex are visible on the blade.

Among the chert implements were four complete blades, 34 blade fragments, of which five had silica sheen on the edge(s), and 13 debitage chips. From stratum D, 4 blade fragments and 6 debitage chips were recovered; from stratum C, 5 blade fragments and 3 chips; from stratum B, 15 blade fragments and 3 chips and from stratum A, 14 blade fragments and 1 chip.

As with the obsidian the blade fragments could be divided into three groups:

a. Width around 7 mm. Length ranging between 8 and 11 mm. Two complete blades, one 20.5 mm. and one 22 mm. long.
b. Width between 9 and 13 mm. Length ranging between 15 and 20 mm. in one case 32.3 mm. Two complete blades, one 44.1 and one 23.6 mm. long.
c. Width over 15 mm. Length ranging from 23 to 32 mm.

The sickle blades have not been prepared by deliberate retouch (fig. 12 no 7-9). The edges show zones of chipping as a result of use – especially the edge with silica gloss. As to the size, sickle blade fragments are slightly longer than the other fragments: there is one of width 9 mm. and length 15 mm.; three of widths between 9 and 12 mm. and lengths of respectively 22.9, 30.7 and 33.9 mm.; one of width 16 mm. and length 30.4 mm.

Throughout the Early Neolithic period, chipped stone use is restricted to blades; at least this is the case in Thessaly. We suppose that the harvesting of cereals, the cutting of wild plants, the preparing of meat and other food and the processing and preparing of skins were the main tasks chipped stone was used for. They may have served another purpose too: although wooden and bone implements may have been the more important components of the Early Neolithic tool-kit, they had to be manufactured using chipped stone. In view of the bone analysis (Appendix II) it is hardly surprising that hunting tools are virtually absent.

IV. 2. *MISCELLANEOUS STONE ARTEFACTS*

The stone artefacts from section C are not very numerous as is normal in Early Neolithic I as-

semblages in Greece[3]. A main division into (a) 13 polished implements and (b) 32 grinding and pounding tools can be made, to which another (c) 3 doubtful stone artefacts may be added. Microscopic analysis has not been done and generally we do not have very clear indications of use. Stratum B yielded the largest quantity of objects, respectively 8, 19 and 1; from stratum C 5, 12 and 1 respectively were retrieved. The rest are from stratum D, since stratum A was completely devoid of these objects.

Most polished implements are made of "greenstone", which may be serpentine or green jasper, probably of East Thessalian provenience, if not from the direct neighbourhood of Sesklo. Some are made of a local schist. The bolas have been made of white marble of unknown provenience. Coarse grinding slabs are made of porous rock from the volcano at Mikro-Thive. Fine grinding slabs are of local schist. Hand-stones and pestles are of local cobbles, a grey stone or greenstone. The other artefacts are of local cobbles and of porous volcanic rock from Mikro-Thive.

Most of these objects were used throughout the Neolithic, or at least during the Early and Middle Neolithic periods, at all sites in Greece. The exception is the coarse flat celt or hoe, which seems to be restricted to Early Neolithic I. For the bolas and the objects of unknown use we have no indication of temporal or geographical distribution.

IV. 2.1. *Polished stone tools*

a. The heavy rounded "axe" (fig. 13 no 1) Sample: 3
Heavy pounding implement with rather blunt edge. 7 - 10 cm long. Reasonably well polished surface.

b. Flat celt or "hoe" (fig. 13 nos. 2-3) Sample: 3
Flat chopping tool, oval or rectangular in shape. Edge chipped but not very sharp. 6 - 10 cm long.

c. Chisel (fig. 13 no 4) Sample: 2
Narrow, slender cutting implement. Symmetrical section. Sharp straight edge with two working platforms. Highly polished surface. 5 - 7 cm long; 0.7 - 1.5 cm wide.

d. Adze (fig. 13 no 5-7) Sample: 2
Asymmetrical convex chopping implement. Sharp edge. One with a second sharp edge along the longitudinal side, where it had been cut from the parent stone. Highly polished surface. 6 - 8 cm long; 3.5 - 6 cm wide.

e. Small axe (fig. 13 no 6) Sample: 1
Almost rectangular, slightly convex chopping implement. Symmetrical profile. Very shallow working platform. Sharp edge. Highly polished surface. 6 cm. long; 3.5 cm. wide.

f. Bolas (fig. 13 no 8-9) Sample: 2
Almost completely globular projectile. Slightly tapered, perfectly smooth drill hole through centre. Both well polished. Discovered close together, seemingly as a set. 5.75 cm high. Maximum diameter 5.8 - 6.2 cm.

IV. 2. 2. *Grinding and pounding tools*

a. Grinding slab, coarse Sample: 8
Oval slabs of volcanic rock which have been ground until the upper surface showed a concave appearance. One case has an additional depression in the centre of the upper surface. About twice as long as they are wide - length around 35 cm.

b. Grinding slab, fine Sample: 1
Rounded slab of schist. Lower surface rough, convex. Upper surface very smooth, strongly concave appearance. Length 11.8 cm, width 4.1 - 6.3 cm, height 1.2 - 1.7 cm.

c. Hand-stones Sample: 21
Oval or round, disc-shaped (14) and oblong, plano-convex (7) cobbles. The lower surface displays a very smooth, worn appearance and may even show a slight concavity. Smooth side may have polishing lustre. Diameter of round examples 6 - 10 cm. Length of oblong examples 8 - 15 cm.

d. Pestle (fig. 13 no 10) Sample: 3 fragments
Cone with a tapered end which shows signs of use for pounding and grinding. May also have served as hammer-stone. Surface polished smooth, but has no lustre. Length around 7 - 10 cm. Maximum diameter fragments 4.5 cm.

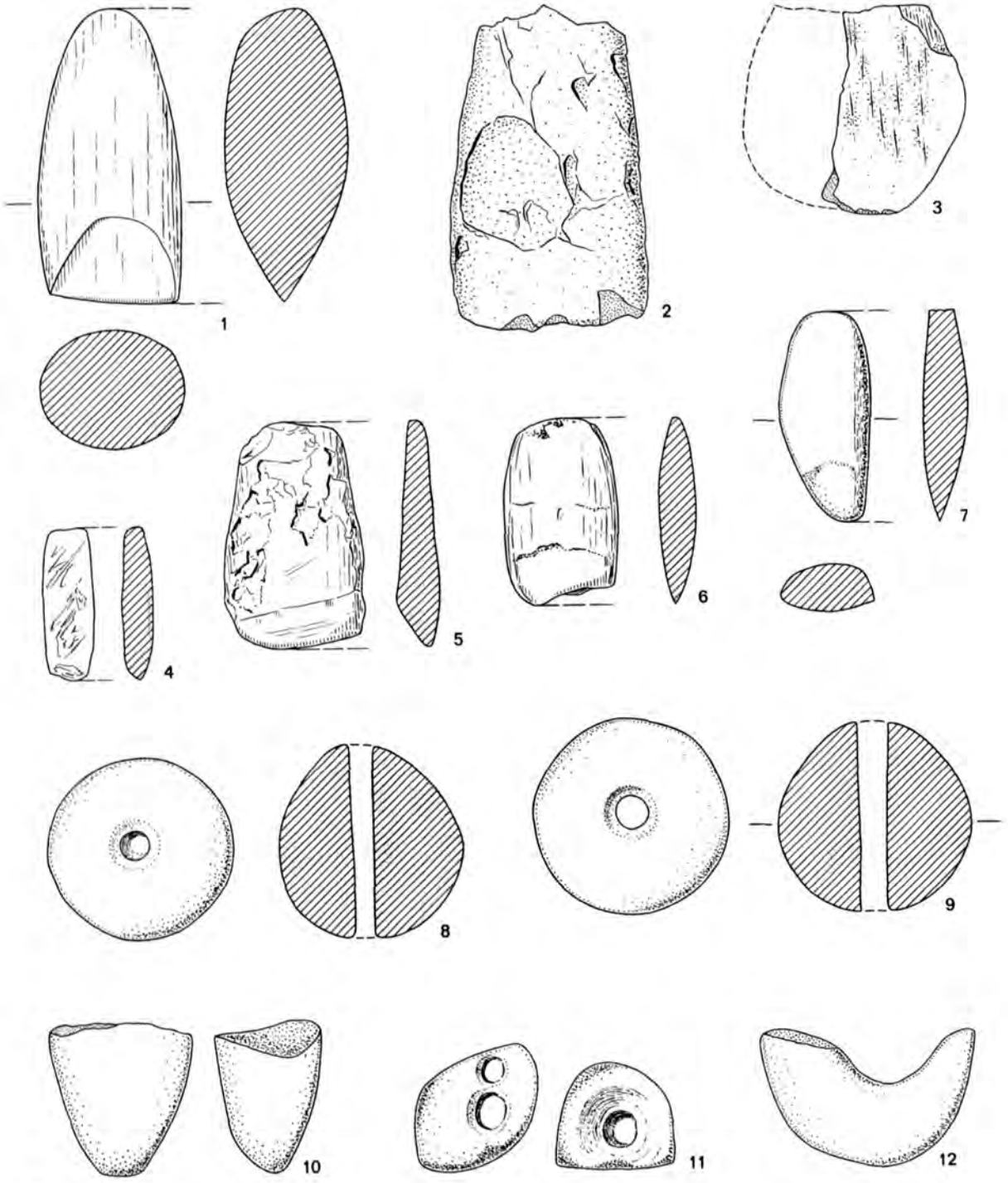


Fig. 13 Ground stone tools.

IV. 2.3. *Other stone artefacts*

a. Pivot-stone Sample: 1
A roughly quadrangular, flat stone disc with a neatly outlined depression in the centre of the upper surface. Size 28 x 28 cm.

b. Perforated stone object of unknown use (fig. 13 no 11) Sample: 1
Cobble with quadrangular flat lower surface. Two hourglass perforations from the convex upper surface to the flat bottom, one small, one large. Flat side very smooth and abraded. Size 4.8 x 3.2 x 3.1 cm.

c. Stone "digging-stick" (fig. 13 no 12) Sample: 1
Horn-shaped fragment of volcanic rock. Lower end flattened and abraded -through pounding? Resembles present Indonesian ulek, a kind of pestle. Diameter 1.1 - 2.9 cm, length 7 cm.

IV. 3. *BONE IMPLEMENTS*

Out of 57 fragmentary or complete specimens of worked bone artefacts, only 24 permitted identification to implement type, revealing the repertory of shapes to be very simple with no characteristic items[4]. It consisted of awls, spatulas, adzes/chisels and implements considered to be pottery burnishers. With the identification of the tool types some problems arose, since awls and burnishers have a similar shape, except for the basal part, which is sharp in the case of the former and rounded in the case of the latter. This makes it impossible to identify a fragment without a base. Microscopic analysis has not been carried out.

From stratum C and B equal amounts of these objects were recovered - 21 in each; from stratum D, 8 fragments and from stratum A, 6 fragments. We discovered that in several levels some sort of concentration could be discerned whereas other levels did not contain any of these objects all – e.g. the bone implements of stratum B were all found in trench 1 level 7/8 and trench 2 level 2/3.

All implements are present at all Greek sites throughout the entire Neolithic sequence, except for the adze/chisel which is found only during the Early Neolithic.

Description

a. Awls (fig. 14 no 3; 5-6) Sample: 6
Long awls made out of the radius (proximal end) or tibia (distal end) of sheep/goat or pig. Between 14 and 16 cm long (fig. 14 no 3). The fine awl is made of the tibia (distal end) of hare. Medium-sized piercing tool. Length between 6 and 7.5 cm. (fig. 14 no 5). The short awl is made of the ulna (proximal end) of sheep/goat. Rather short and broad at the top - a sharp piercing tool. Length between 5 and 6.5 cm. (fig. 14 no 6), rare.

b. Spatulas (fig. 14 no 2) Sample: 6
Made of very thin, long slivers of rib, the larger of cattle, the smaller ones possibly of pig. The ends are rounded, the sides can be rather sharp, but are not necessarily so. Have generally a highly glossy polish. No complete specimen available. From Early Neolithic III levels a complete one some 20 cm. long. Maximum thickness 0.4 cm.; width of the larger examples 1.8 cm. of the smaller ones around 1.3 cm. Purpose unknown. Semenov (1973 p. 178) mentions them as being used to prepare animal skins. Evans (1964 p. 236) says they were used to scrape flour from grinding stones and Smoor (1976 p. 189) thinks they served as spoons.

c. "Adze or chisel" (fig. 14 no 4) Sample: 3
Implement made of the rib of sheep/goat or pig. The entire thickness of the rib has been used. The top end is cut off in a rather haphazard way; the basal end has been finished in a wedge-shape, creating a chisel. Length around 9 cm. Width varies between 0.8 and 0.95 cm. Maximum thickness ca 0.8 cm., minimum 0.15 cm. Purpose unknown.

d. Burnisher (fig. 14 no 1) Sample: 9
Made of the radius or tibia of sheep/goat or pig. Very similar to the long awl, but with a well rounded basal end. Ranging between 14 and 16 cm in length. Exact use unknown. Identified as chisel (Evans 1964 p. 236) or spatula (Hole, Flannery and Neely 1969 p. 216; Smoor 1976 p. 191). Potters think they are ideal implements for burnishing purposes (Vitelli 1977 pers. comm.; Nikolorakis 1979, pers. comm.).

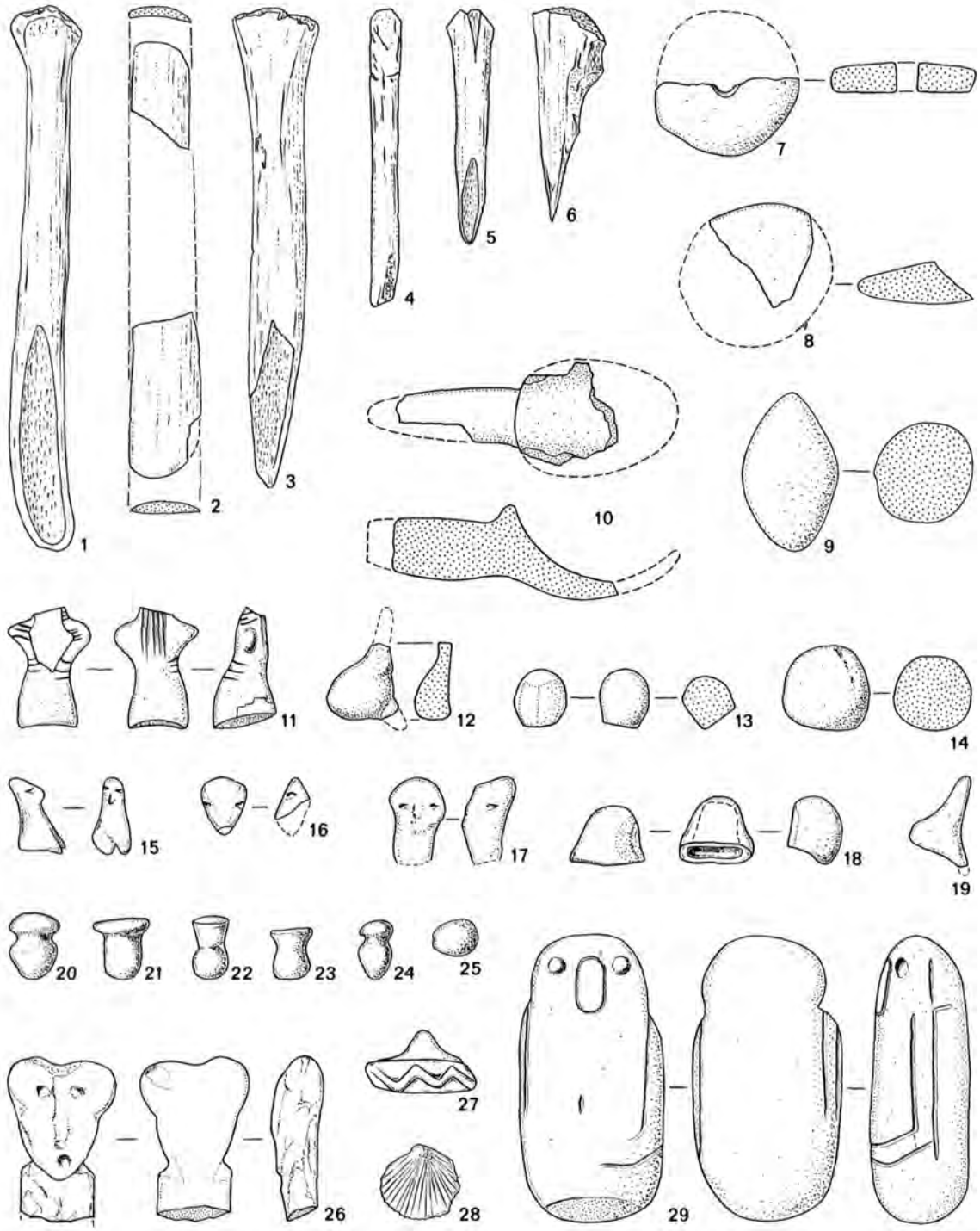


Fig. 14 Bone tools; figurines; ornaments; ceramic objects.

e. Bone haft Sample: 1 (from Akropolis)
A long bone with a deep incision along the whole length of the bone (Theocharis 1967 p. 121, plate XX C). Served to haft obsidian and flint blades or blade fragments for use as a sickle or reaping knife.

IV. 4. *FIGURINES*

Figurines are rather scarce in Early Neolithic I. A division into (a) 17, possible 20, ceramic figurines and (b) 2 stone figurines can be made. We will confine ourselves to a mere description[6] and we will not indulge in any theories on possible functions (Hourmouziades 1973) nor will we divide them into any physiological classes (Gimbutas 1974b).

From stratum C, 8 figurines, were retrieved among which were two stone ones; from stratum B, 7; from stratum D, 1 and from stratum A, 3 figurines (or figurine fragments).

The ceramic figurines have been made of a micaceous, medium or fine paste. The surface colour is dark non-oxidised or dark uncertain buffish/reddish. The core is in most cases non-oxidised. The surface is well smoothed. It is remarkable that the coffee-bean eyes, often considered characteristic of Neolithic Greek figurines are still completely absent. They make their first appearance during Early Neolithic III and come to full development during the Middle Neolithic period.

IV. 4.1. *Ceramic figurines*

a. Small sitting figurine (fig. 14 no 15) Sample: 3
Small highly schematised anthropomorphic figurine of female sex. Conically shaped head and body with protruding nose. Eyes indicated by slits. Legs rendered by two frontal protruding butts. Height ranging between 1.9 and 3.2 cm; width of base between 0.9 and 1.5 cm.

b. Highly schematised sitting figurine[7] (fig. 14 no 12) Sample: 2
Steatopygous buttock with vertical protruding butt indicating trunk and neck, frontal protruding butt indicating legs. Height ranging between 3 and 4 cm.; width between 2 and 3 cm.

c. Standing figurine (fig. 14 no 11) Sample: 5
Schematised anthropomorphic figurine, probably of female sex. Some have a vertical incision in the base, at the front; hence they may have been represented without legs. In all cases the head is broken off. Arms indicated by horizontal, sideways protruding butts. Waist rendered. Bottom generally slightly concave. One figurine has incisions on back and front, indicating hair, clothing and hands. Height ranging between 2.3 and 3.8 cm.; width of arms 2.4 - 2.7 cm. Diameter of waist 0.9 - 1.4 cm.; diameter of bottom 1.8 - 2.1 cm.
This type occurs throughout the entire Early Neolithic and can be found at most Greek mainland sites.

d. "Naturalistic" figurine head (fig. 14 no 17) Sample: 2
Head broken from figurine of unknown type. Triangular or rounded face on a cylindrical-shaped neck. Plastic rendered nose. Eyes indicated by deep slits, mouth by round incision. Front strongly receding. Height around 3 cm; width ranges between 1.5 and 2 cm. Type occurs throughout the entire Early Neolithic at most Greek mainland sites.

e. Figurine head of schematised type (fig. 14 no 16) Sample: 3
In one case face consisting of nose only, with eyes indicated by incisions at the side. Height 1.8 cm. Otherwise cylindrical shape with incisions to indicate hair or headdress at the slightly-rounded top. Face cut away. Belonging to figurine of unknown type. Height 2 cm.

f. Twin figures Sample: 2
Schematic figurines, very similar to type b. They seem to have been cut lengthwise in half before the surface was given its finish, hence they have one completely flat side. The idea of halving figurines continues throughout the Early and Middle Neolithic, although they remain scarce. Height between 3 and 4 cm.; width between 1.5 and 2 cm.

g. Doubtful twin figurines (fig. 14 no 13; 18) Sample: 2
Both knob-shaped. One cut in half with convex,

hollowed-out bottom (fig. 14 no 18)). From the other, two pieces have been cut, creating two flat sides at an angle of 90°. The bottom is flattened (fig. 14 no 13). Size (1): height 1.82 cm., width 1.54 - 2.34 cm., thickness 1.09 - 1.68 cm. Size (2) height 1.79 cm., width 1.39 - 1.66 cm., thickness 1.42 - 1.61 cm. We wonder whether these small geometric objects are figurines at all; possibly they form part of an early recording/ counting system, such as that described by Dr. Schmandt-Besserat (1977b fig. 1; 1978 p. 38 - 48).

IV. 4.2. *Stone figurines*

On the whole stone figurines are a rare item in the Early Neolithic Greek assemblage of a mainland site. During the later Neolithic periods, serpentine and marble would be used more often (Tsountas 1908 p. 287 - 303, plate 37). On Crete stone was a more commonly used material during the Early Neolithic.

a. Schematised complete figurine (fig. 14 no 29)
Carved from a large, marble-like cobble, resembling a loaf-shaped hand-stone. Originally of whitish colour, now turned brown. Surface smooth, not polished. The separation of head and body is marked by rather deep notches. The nose seems to stand out in relief, since the contours are cut away rather deeply. The eyes are rendered by two rather shallow depressions. The arms -the right alongside the body, the left bent so that the forearm rests on the belly – are given shape by two deep parallel incisions. On the belly, a little above the hand/forearm is a small vertical slit, possibly indicating navel or vulva. Legs are not rendered. It is 8.4 cm. high, has a width of 2.9 - 4.4 cm., and a thickness of between 2 and 2.9 cm. Recovered from the lowest pottery bearing level of Early Neolithic I. No parallels in Greece. Shows similarity to a limestone figurine from Mureybit, dated to 7400 BC (Mellaart 1975 p. 47 fig 16).

b. Figurine head (fig. 14 no 26)
Carved in white marble. Triangular-shaped head on a thin neck or body; end broken. On the whole, rather flat. Back slightly concave, giving the impression that the head is slightly tilted backwards. Long and straight. Slightly protruding sculpted nose. Eyes and mouth indicated by round depressions. The ears are rendered by notches. On top of the head, in the centre, a hole has been drilled, giving the face a heart-like shape. The purpose of the hole is unknown. On the neck/shoulder is a small slit, which may be accidental. Height 4.92 cm., width between 1.74 and 3.30 cm.; thickness between 1.12 and 1.38 cm. Recovered from the lowest level of pottery bearing Early Neolithic I. No parallels in Early and Middle Neolithic Greece. Resembles marble figurines found at Late Neolithic Dimini (Tsountas 1908 Plate 37 no 7).

IV. 5. *ORNAMENTS*

Only a few objects recovered from the Early Neolithic I strata at Sesklo could be classified in this category, which can be divided into (a) 22 ear studs and (b) 6 beads to which (c) some 10 possible shell ornaments may be added. Both groups a and b can be made of clay or stone. The latter are of steatite, ''greenstone'', quartz or a fine greyish stone. The clay ones are made of a micaceous fine paste. The surface colour is dark non-oxidised. The surface is often burnished.

The largest number of these objects was recovered from stratum D: 8 ear studs and 4 beads; from stratum C came 8 ear studs and 2 beads; from stratum B, 5 ear studs and from stratum A, 1 ear stud – a surface find at that.

Stone ear studs are found in some form all over Greece during Early Neolithic I and II, including the Pre-Pottery Neolithic. Ceramic ear studs seem to be restricted to Sesklo. Beads are present at all Greek sites during the entire Neolithic.

Description

a. Ear studs (fig. 14 nos 20-24)
A very enigmatic group of objects. Both use and

provenience are hotly debated subjects, which have not yet been resolved. Nor has the name which they should have been decided up on. For the moment ear stud, ear plug, nose plug and several others are in use (a.o. Theocharis, 1974 p. 60).

Two groups can be discerned, both among stone and ceramic ear studs. One has a rounded upper segment and is almost mushroom-shaped (fig. 14 no 20; 24). The other group has a flat, often disc-like upper segment and a bulbous lower part; may become almost nail-shaped (fig. 14 no 21; 23). The steatite ones are slightly different (fig. 14 no 22), consisting of a round ball on which a cylinder has been mounted, crowned by a flat disc. Height varying between 1.2 and 2.9 cm.; width between 1.0 and 2.0 cm.

b. Beads
Probably worn in strings or as ornaments on clothing. Stone beads are small flat discs with a cylindrical hole in the centre. The diameter varies between 0.4 and 0.6 cm., the thickness between 0.15 and 0.2 cm. They are usually made of steatite. Ceramic beads (fig. 14 no 25) are oval with a cylindrical drilled hole through the short axis. Diameter of the long axis varies between 1.4 and 1.6 cm., of the short axis between 1.1 and 1.4 cm.

c. Shell ornaments
There are a few cardium shells with a hole near the apex (fig. 14 no 28). They may have been worn in strings (Rodden 1962 p. 285) or as single amulets.
From stratum C comes a *Spondylus* shell with an hourglass perforation, possibly worn as a kind of amulet.
From stratum B there is a possible ring, made of a *Cardium* valve. Unfortunately the object is in a rather fragmentary state.

IV. 6. *MISCELLANEOUS CERAMIC OBJECTS*

From the Early Neolithic I strata, 17 ceramic objects have been recovered, divided into (a) 6 spindle whorls, (b) 2 ceramic discs, (c) 7 sling bullets, (d) 1 spoon and (e) 1 ceramic ball – to which a seal may possibly be added. The latter was discovered in the highest level of stratum A; the excavator considered it to be intrusive (Theocharis 1967 p. 118). Two of the objects were discovered in stratum C, nine in stratum B and seven in stratum A.
All these types of object, except the seal, can be found at all sites in Greece during the Early Neolithic and many also during the Middle Neolithic and later. Seals generally make their appearance at the end of the Early Neolithic.

Description

a. Spindle whorl (fig. 14 no 7)
Disc made of a monochrome body sherd, generally with ground edges. Has a central hourglass-shaped perforation. Diameter ranges between 2.5 and 5 cm., thickness between 0.4 and 0.8 cm.; diameter of perforation between 0.5 and 0.85 cm.

b. Ceramic disc (fig. 14 no 8).
Slightly dome-shaped disc made of a monochrome body sherd. Edges are ground. One shows a scar, made in an attempt to drill a hole in the disc. Diameter ranges between 5 and 6 cm. Thickness between 0.5 and 1.1 cm.

c. Sling bullet (fig. 14 no 9)
Egg-shaped, biconical object made of a micaceous medium paste with chaff temper. Light uncertain buffish all through. Smooth surface. Poorly baked, especially in the lower levels. Height ranges between 2.5 and 5 cm. Width between 1.8 and 3 cm.

d. Spoon (Fig. 14 no 10)
Deep spoon made of a micaceous medium paste. Light uncertain buffish surface, non-oxidised core. Smooth surface. Length around 10 cm. Spoon 3.5 cm. wide. Wall thickness 0.35 - 0.60 cm. Diameter of handle 1.5 cm.

e. Ceramic ball (fig. 14 no 14)
Clay ball, slightly oval in section. One side flattened. Made of a micaceous medium paste. Light uncertain buffish colour. Height 2.4 cm.; thickness 1.8 - 2.3 cm., diameter of base 2.3 - 2.4 cm. Purpose unknown. May have been used in a counting/recording system (cf. IV. 4. g).

f. Seal (fig. 14 no 27)
Oval stamp seal with a short handle. Stamp is a simple zig-zag pattern. Made of a micaceous fine paste. Dark non-oxidised surface colour.

IV. 7. *THE PROBLEM OF PRE-POTTERY NEOLITHIC*

The stage to which stratum D belongs has been called the Aceramic or Pre-Pottery Neolithic, analogous to the non-pottery bearing Neolithic in the Near East. The term Aceramic is quite unsuitable, since the stratum yielded some ill-fired clay objects. The Pre-Pottery Neolithic has not been generally accepted, the reason being that at some sites in Thessaly it contained a very small quantity of pottery. To anyone who has not actually excavated a similar stratum its existence will remain doubtful, the doubt being augmented by the unfortunate circumstance that at virtually all sites non-pottery bearing levels have been excavated almost only in trial trenches or over relatively small areas. The only exceptions are Kythnos and Knossos.
It has been suggested that the "aceramic" could be functionally aceramic, i.e. that although the area was contemporary with other areas containing pottery, it featured activities not involving the use of pottery (Vitelli 1979, pers. comm.). This suggestion is not supported by the fact that at all sites dates for the Pre-Pottery stratum apparently precede those of the first pottery bearing Neolithic stratum (table 28).

The only way to solve this problem will be to excavate large areas at sites where the presence of Early Neolithic I, and possibly of a non-pottery bearing phase too, is suspected.

The economy is certainly of Neolithic type: the bone sample consists of domesticated animals only (Appendix II). Therefore it has to be included whether it is a separate stratum or whether it is contemporary with the earliest pottery bearing stratum.

IV. 8. *SOME NOTES ON THE CHRONOLOGY OF THE EARLY NEOLITHIC*

In the previous section we mentioned dates. Although still rather weakly founded, the chronology of Greek prehistory is slowly assuming a more definite shape. This is particularly due to recent excavations at Achilleion and at Franchthi Cave, which have yielded good sequences. From Sesklo only a few good radiocarbon dates are available; some thermoluminiscence samples have been taken, the results of which are not yet published[8].

The dates for the non-pottery bearing stage of the Greek Neolithic (the earliest being 8130 ± 100 BP, the latest 7755 ± 97 BP) seem to be more or less contemporary with those of several Near Eastern sites. For the pottery bearing Early Neolithic I we have as the earliest date 7740 ± 140 and as the latest 7320 ± 50 BP.

In table 28 we have included a list of radiocarbon dates, as far as possible arranged by period. It starts with the Upper Mesolithic and ends with the last phase of the Early Neolithic. For comparative purposes we also give dates for the Pre-Pottery Neolithic of Cyprus and for several sites in Anatolia, but these will be discussed in Chapter VIII.

Regarding the Greek dates, unless otherwise stated they are taken from samples consisting of charcoal from occupation layers, often found in concentrations and more or less mixed with ashy soil. On the one hand it is beyond doubt that samples taken from burnt wooden posts, carbonised grain or bone collagen are more certainly associated with the material they are supposed to date than are the other samples. On the other hand one should not forget that building material for a house especially might be older than the associated archaeological context (Waterbolk 1971, p. 13). We think that for these reasons most dates may reasonably well be compared with one another, although dates provided by charcoal from heavy wooden posts may prove to be too early. Dates provided by carbonised grain should be more accurate than other dates.

From the table it is clear that it is impossible to mark a clear chronological separation between the three phases of the Early Neolithic. They follow each other without a clear break. Generally we can say that the Neolithic sequence in Greece starts at the end of the seventh millennium BC (uncalibrated date), possibly at a stage when the use of ceramic vessels was unknown. The Early Neolithic as a whole lasted through almost the entire sixth millennium BC.

NOTES

1. A study of micro-wear analysis of the stone artefacts fom the Akropolis section of Sesklo has been the subject of an unpublished PhD thesis by Miss Alexandra Christopoulou at the London Institute of Archaeology. She also analysed a few blade fragments from section C, found in close conjunction with butchered bones. They showed a pattern, indicating that these blades had been used for butchering purposes.
2. Until fairly recently, quartz flakes were used in threshing sledges.
3. All polished stone artefacts are being studied and will be published by A. Moundrea. They comprise all the material from the Early and Middle Neolithic.
4. The bone implements from Sesklo are being studied and will be published by Mrs. A. Moundrea.
5. The bone has been analysed by C.A. Schwartz.
6. All figurine material from Sesklo is being studied and will be published by Mrs. F. Egoumenides-Risopoulou.
7. Theocharis assumed that this type had its antecedents in Pre-Neolithic periods. He compared them, as well as the closely related twin figurines of IV. 4. f, to some Palaeolithic figurines and rock carvings, from the Ukraine and Bavaria and from the Dordogne, France, respectively.
8. The samples were taken by Y. Liritzis and H. McKerrell of the University of Edinburgh.

CHAPTER V

RECONSTRUCTION OF THE SETTLEMENT

One of the goals of this thesis is to arrive at a better understanding of the Early Neolithic I at Sesklo. In the previous chapter we discussed the artefacts recovered from the strata which are believed to correspond to this period, together with the contexts of their discovery.

The following point requiring our attention is the environment, man-made and natural, of the Early Neolithic Sesklo people, i.e. we want to know what kind of dwellings they lived in, how large the settlement was and in what sort of setting it was located. In short we will give a reconstruction of the settlement as far as the data permit us, which is to a limited extent only.

V. 1. *Dwellings and settlement*

Having made an inventory of the artefacts left by the Early Neolithic I inhabitant of Sesklo, we will now have a look at his dwelling. It probably consisted of a one-roomed quadrangular structure. There are no complete house plans, but the few soil traces give us the impression that they measured some 3.50 x 4.50 m. During the Pre-Pottery Neolithic it was cut into the soil, the walls being built in a wattle and daub construction. During the later part of Early Neolithic I, the foundation consisted of a low wall built of a single row of large stones, often including grinding slabs. The house walls were still made in wattle and daub. Floors were made of clay, sometimes reinforced by small pebbles. The roof was probably constructed of branches, twigs, mud and reeds. Hearths were located in a kind of courtyard.

Regarding the size of the settlement, vestiges of Pre-Pottery dwellings have been discovered both on the Akropolis and in section C. We assume that the Pre-Pottery settlement covered a small area, having a diameter of some 100 meters. Debris of the first pottery bearing phase has been recovered on the Akropolis, in section C and in section B. The extent seems to have been larger therefore, with a diameter of around 200 m. We do not know whether the entire surface was built up or whether an open space was left between the dwellings for other purposes. We are completely ignorant of the density of the population since we do not know how many people lived in one dwelling; moreover we do not have any data on the number of houses inhabited at any one time.

V. 1. 1. *Location and physical environment*

The site is situated in an area of gently sloping hills; only in the Southeast do they rise fairly steeply. There is no flat ground in the immediate vicinity. The Akropolis is bordered by two streams, which unite a little further downstream. The settlement is built on slightly sloping terrain - its elevation is between 155 and 170 m ASL. The land to the West and North undulates gently downwards towards the plain and the sea respectively. It is true that erosion has changed the landscape since prehistoric times, but it seems certain that there was no level ground during that period either.

The geology of the surroundings of Sesklo is being studied at present. It proves to be rather complicated. A short general account of the geology of Eastern Thessaly by Th. Doutsos is included in this thesis as Appendix III. For details on the areas bordering the region of Sesklo the reader is referred to Schneider (1968), Voliotis (1973) and Frost (1978). Sesklo itself is situated in a zone of neogen; the area is bordered by a zone formed by marbles of the Crystalline socle (the Chalcodonio hills) and the Holocene deposits in the plain of Larisa.

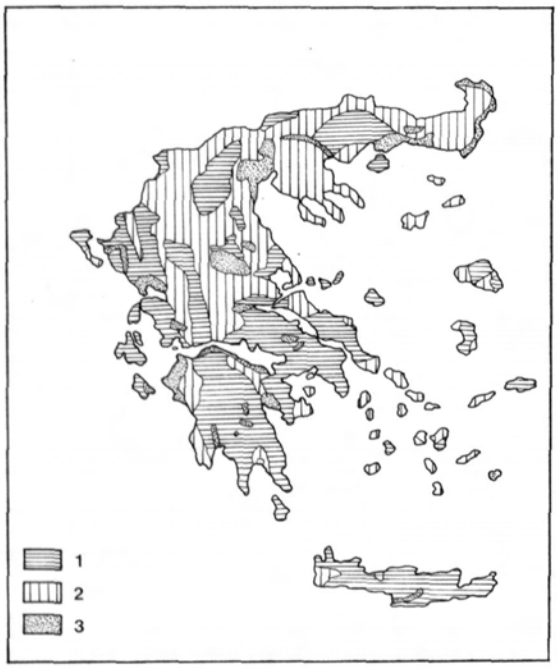


Fig. 15 Distribution of soil parent materials in Greece (after Anastassiades).
1. Regions with limestone predominant parent material. 2. Regions with non-limestone predominant parent material. 3. Regions with alluvial predominant parent material.

Although no pedological research has been carried out it is noticeable that the region has at present different soils - a heavy red clay, resembling the terra rossa; silty yellow clay, composed of weathered schist and a reddish - grey silty clay, containing a large quantity of mica flakes. Whatever the exact soil types may be, it is certain that they are fertile and can support the growth of plants, provided there is a good water supply.

At present most of the water supply in the area is provided by springs. There is one immediately next to the Akropolis and there is one in each of the streams, very close to the site. This makes the streams more or less perennial. Otherwise they are rain-fed - as a result of which the flow can be fairly great during periods of heavy rainfall and when the snow in the hills is melting. In summer the flow is extremely small (restricted to the water provided by the springs). In years when the amount of precipitation is extremely low they dry out.

V. 1. 2. *Climate*

At present the area of the Sesklo settlement has a maritime Mediterranean climate. The average yearly precipitation amounts to 514 mm and the average temperature is 16.9°C. (Walther and Lieth 1964). Summers are dry and hot with an average August temperature of 26.6°C and a precipitation of around 10 mm. Winters are fairly cold and wet: the average temperature of the coldest month is 7.0°C, the precipitation in the wettest month is around 100 mm. In the hills winter often brings snow and frost. The prevailing winds are easterly in summer and westerly in winter.

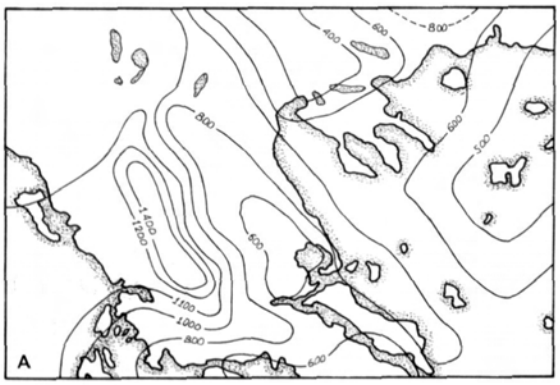
During Early Neolithic I the climate was different. The last part of the 7th millennium/beginning of the 6th millennium BC falls within the Boreal Atlantic transition. Yearly precipitation increased during this period until the climate was slightly more moist than it is at present.

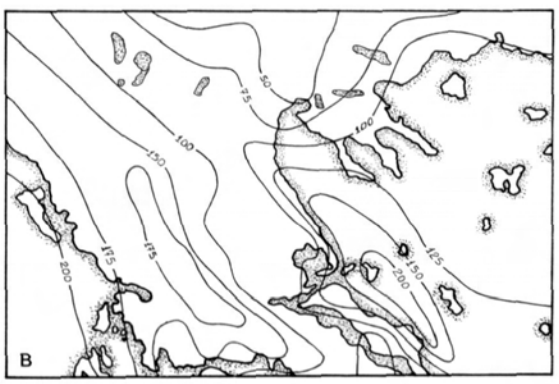
About temperature we are less certain. Bottema (1974, p. 158-159) argues that there are indications of a fall, but that this seems highly improbable since temperatures in West and Central Europe as well as in the Near East and North Africa become higher. He suggests that the temperature remained unchanged and was about the same as at present.

V. 1. 3. *Vegetation*

The present vegetation of the Sesklo area probably bears little relation to that of Early Neolithic. It has a largely maquis vegetation, except for the areas where heavy erosion has created badlands. In addition the fields have been enriched during the last ten years by the planting of numerous almond orchards. So few indications can be found.

Neither has it been possible to retrieve pollen cores in the immediate area. Therefore we have to rely on diagrams from Lake Viviis, which is nearby, (Bottema in press) from Lake Xinias in South Thes-





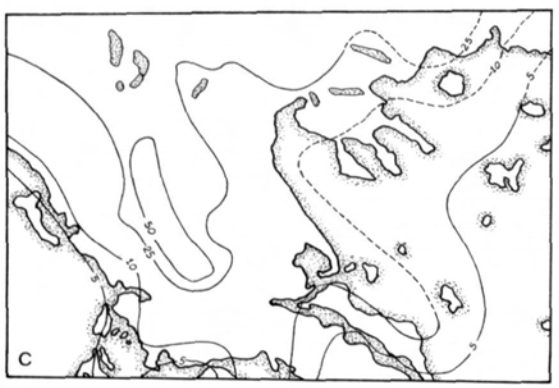


Fig. 16 Distribution of precipitation in Northern and Central Greece.
a. average annual precipitation in mm.
b. average rainfall in December.
c. average rainfall in July.

saly (Bottema 1978), from Lake Kopais in Boeotia (Greig and Turner 1974) and from different sites in Macedonia and Epirus (Bottema 1974). The latter diagrams point to dense forests of (deciduous) oak. The Lake Kopais diagram (Greig and Turner 1974 p. 190) indicates, for the beginning of our period, an oak forest with a considerable amount of scrub vegetation with juniper and pistachio - an open forest with shrub clearings. The diagram for Lake Viviis (Bottema in press) unfortunately gives no clear information on the Early Neolithic. That of Lake Xinias (Bottema 1978 p. 19; Bottema, in press) shows high values for *Quercus cerris*, together with relatively significant values for *Pistacia*, *Juniperus* and *Poterium*. We think that the diagrams for both the Boeotian Lake Kopais and the Thessalian Lake Xinias reflect the vegetation of the lowland and hilly areas of East Thessaly, Sesklo included, better than those from Macedonia and Thrace.

From Sesklo there are some scanty data from seed identification and wood analysis. Among the carbonised seeds there were acorns and pistachio. The wood charcoal was of oak.

It must be stressed that a slight change in climate - e.g. a few consecutive years of low precipitation - will have caused changes in the vegetation, since the equilibrium is very delicate in this area.

V. 1. 4. *Fauna*

We are able to reconstruct the faunal community of the Sesklo region during the Early Neolithic to a limited extent only. The skeletal remains are restricted to those left over after food consumption and to those used as implements. In the former case the bones were often completely gnawed and could not provide much information. Moreover, not all wild animals were eaten. As it is, the faunal remains include mostly larger mammals, a few rodents and a few of the smaller carnivores, but no large carnivores or small rodents, let alone insects (Schwartz, Appendix II). The bones of small animals may have been overlooked in excavation. Regarding the larger carnivores, we do not know the reason for the absence of these bones. The material comprises: red deer, roe deer, badger, hare, wild boar, wild cat,

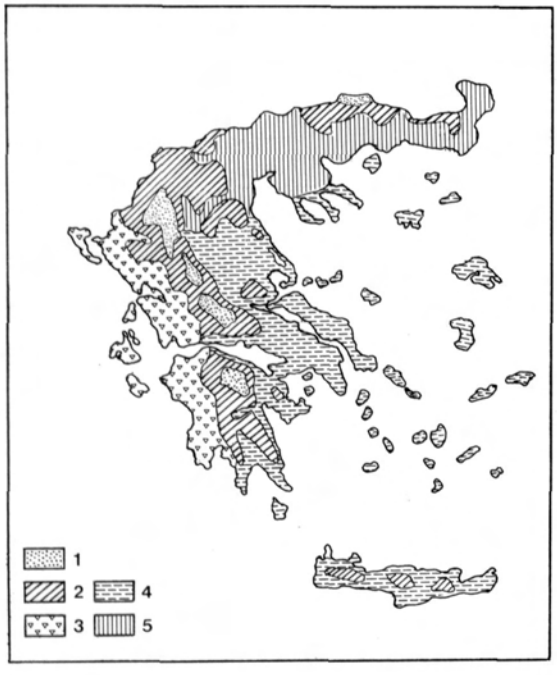


Fig. 17 Generalised vegetation zones for Greece (after Anasassiades).
1. Alpine, subalpine and beach belts. 2. Chestnut belt. 3. Ionan belt. 4. Aegean belt. 5. Northern belt.

lynx, fox, birds (unidentified species), turtle, crab and a few fish vertebrae. The shell sample included quite a lot of terrestrial snails, several *Cardium* and a few *Spondylus* shells.

Concerning the biotope of several of these species Clason (1978 p. 104) remarks: ''Red deer can live in woods as well as in open plains. The roe deer lives at the edge of a wood, young woods with much undergrowth or in the open plain if there is enough shrub cover. Wild cat and badger can be found in mixed deciduous woods, but also need clearings in the vegetation. The fox can live in a variety of biotopes, but likes dry terrain.'' Hare is well known for its preference for open spaces with some woodland for shelter. Wild swine are generally found in open forest. From the limited information we may conclude that in the immediate vicinity of Sesklo such biotopes existed: both wooded areas and open spaces could be found.

Crayfish and crabs were probably found in the streams. Turtle may have been caught in Lake Vivi-is. The fishbones have not been identified - they may be either freshwater or marine.

V. 2. *Subsistence patterns*

Due to the fact that only an extremely small quantity of seeds were recovered from the Early Neolithic I strata at Sesklo, we can only say that from the beginning of the Neolithic onwards seeds of domesticated crops were used. These include emmer, einkorn, barley, peas, lentils and other pulses (J. Renfrew 1966; Kroll 1979 pers. comm.). Moreover nuts, herbs and wild grasses were gathered, including pistachio and acorns.

The sample of animal bones shows that from the first Neolithic period onwards meat was largely supplied by domesticated livestock (Appendix II). Caprovines are the most important (60%), followed by pig (ca 19%) and cattle (ca 14%). Dog is represented by three bones only. Due to the rather small sample it has been difficult to ascertain the age distribution, but we understand there was a special preference for butchering juvenile animals. The herds were mainly kept for the production of meat. Milk, wool and possibly traction may have been secondary purposes. The bone sample is too small and fragmentary to determine the number of individuals. It is however most likely that the herds were small – just large enough to provide a sufficient meat supply. In view of the rather more wooded aspects of the country we think that the herds were grazed partly in the immediate vicinity of the settlement, e.g. on stubble and partly in nearby clearings. Halstead (1980) has suggested that dung may have been a secondary product.

The wild mammals were of little importance in the diet, although they may still have played a role in times of shortage - e.g. during periods of severe drought. Most of the bones of wild animals were of hare (30 or 4.2% of the sample), an animal which could easily be trapped. Second comes red deer (14 or 1.9%) and third roe deer (7 or 1%). It is theoretically possible that large wild animals were skinned and de-boned at places away from the settlement,

but the tool-kit does not provide any evidence for this.

Only a few fish bones of undetermined species have been recovered; this may be partly due to the excavation technique. Although we do not suppose that fishing was of great significance in subsistence it may have been more important than is suggested by the remains. Small fish may have been prepared in a way which leaves no bones. Larger fish may have been prepared by deboning and smoking, salting or drying before they were brought into the settlement. The bones could also have been gnawed away completely by dogs or scavengers. The quantity of shells of *Cardium* and other marine molluscs suggests either contacts with people in the coastal area or some coastal activities by the inhabitants of Sesklo themselves, possibly including sea-fishing.

Water for drinking purposes was taken from the nearby springs, some hundred meters away. The flock was probably watered in the streams. Water used for mixing clay and other purposes may either have been taken from the springs or from the streams.

V. 3. *Raw materials*

We can divide the raw materials into two categories: (1) those used for building and (2) those used for the manufacture of utensils and other objects.

The necessary building materials were apparently all found in the vicinity. Large stones, used to lay the foundations, and smaller pebbles, used to strengthen the floor and the courtyard, were readily available in the area: well rounded stones were taken from the stream beds. In addition abraded or broken grinding slabs and hand-stones were used. Tree trunks, branches and twigs, used in wattle construction for walls and roofing may be rather scarce in the region now, but we have to remember that Greece was more wooded during the Early Neolithic. We think therefore that the necessary branches and twigs could easily have been obtained in the immediate vicinity. Reeds, also used as wattle and certainly in roofing, are at present available near the springs in the stream; possibly they also grew at these spots during the Early Neolithic. Otherwise they were certainly present on the slightly marshy banks of Lake Viviis and at the riverine outlets on the seashore - both at some 1,5 hours walking distance. As far as daub is concerned, the Sesklo area is even now well known for clay of high plasticity. To make the daub, clay was mixed with chopped plant remains, stems and chaff- the whole looking much like chopped straw. Unfortunately the plentiful remains have not been investigated.

The raw materials used to manufacture utensils and other objects are partly local, partly imported from other places. All have been discussed in the previous two chapters. We have seen that the clay used to manufacture pottery and the schists, riverine boulders and cobbles used to make hand-stones and other utensils were all of local provenience. The chert probably came from the Larisa region, whereas the obsidian is most certainly from the island of Melos. The volcanic rock used to manufacture grinding slabs, has been identified as coming from the volcano of Mikro Thive. The origins of both the greenstone and the marbles is not entirely certain, but we think that the former came from the hills in the region of Pharsala, which have good serpentine and green jasper sources. The marbles may be East Thessalian. Neither steatite nor turquoise can yet be traced.

If we look at the distances of these places from Sesklo we see the following. (1) The volcano of Mikro Thive is at a distance of some 10 km as the crow flies. Taking into account the fact the road goes through hilly land we suppose it was at two and half hours walking distance; so the rock could be carried to the settlement within a day. (2) The Larisa region is at a distance of 50 km over the plain, which may involve easier walking - but it would still be some ten hours walking distance. (3) The Pharsala region is at a distance of some 35 km and again involves crossing the hills. It should be around nine hours walking distance. (4) Melos is an island some 230 km away. This involves either a long voyage or a long trip over land and then direct crossing by sea. This certainly shows that the inhabitants of Sesklo had contacts with other people - whether they went themselves to the other regions to look for the necessary raw material or whether they met with inhabitants from other regions and exchanged goods - e.g.

skins, salt or food for other requirements. This brings us directly to the point to be discussed in the next chapter: what kind of neighbours did they have and did these neighbours live in similar or different circumstances.

CHAPTER VI

EARLY NEOLITHIC SITES IN THESSALY

In the last chapter we have seen that the mode of subsistence of the people of Sesklo was agricultural, involving domestic crops as well as livestock. The presence of objects and implements manufactured from raw materials which can only be found at places which are more than a day's journey from the site, points to contacts with other regions. In this chapter we will investigate whether there were settlements similar to Sesklo and, if so, how far away they were. We will see that they do indeed exist, but only in certain geographic regions and not everywhere in the surrounding countryside. This compels us to give a geographical description of Thessaly. Furthermore we propose to investigate the similarities and differences between the settlements. Overall, we will see that Sesklo is part of a more general pattern.

VI. 1. *Geography (fig. 2)*

In order to achieve the above aim we will first give some information on the geography of Thessaly. It is largely based on the excellent account of A. Philippson (1950/59 Vol. I, pt. 1).

Thessaly consists of a large 'lowland area' which is almost completely surrounded by mountains and sea. Two large basins – the plains of Karditsa and Larisa- and three smaller basins – the plains of Xerias, Volos and Almyros - together form the lowland area of Thessaly. The plains are separated from each other by low ridges of hills.

– In the West, Thessaly is separated from Epiros and Aetolia by the steep and barren Pindos. It can be crossed only by the difficult Zygos pass;

– in the Southwest and South, it is separated from the Spercheios basin, Boeotia and Locris by Tymphristos and Othrys. The Western part of the latter is quite low and may fairly easily be crossed;

– in the Northeast and East, are Ossa, Mavrovouni, the Volos plateau, Mount Pilion and the Magnisia peninsula, ending in Trikkeri. The peninsula encloses the Pagasitic Gulf, also known as the Bay of Volos, which is in fact the continuation of the Volos basin. In between Trikkeri and the mainland is the narrow strait of Trikkeri, leading from the Pagasitic Gulf into the Aegean;

– in the North, Thessaly is separated from Macedonia by Kato-Olympos, Olympos and the Chasia mountains. The only roads leading into Macedonia go by the Vale of Tembe, separating Ossa and Kato Olympos, and by the valley of the river Xerias, in between Olympos and the Chasia mountains.

It will be clear that Thessaly is a well enclosed region. Easy access overland is only to be found in the North, through the vale of Tembe and the valley of the river Xerias, and in the South, across the western part of Othrys and along the coast. By sea, the best route is from places situated on the Pagasitic Gulf.

During the Plio-Quaternary, the basins of Karditsa, Larisa and Volos were submerged (Aubouin 1959, p. 276). In the two former, lakes were formed whereas the latter was submerged in the sea. Most of the lakes became land again after a more recent uplifting of the land and lowering of the sea-level. The larger part of the Volos basin remained submerged and is known as the Pagasitic Gulf. The only fragment surviving of the Quaternary Lake of Larisa was Lake Viviis. The extent of the Lake during the Neolithic period is unknown, but Schneider (1968 p. 45) supposes that at some time during the Postglacial the watertable was some 20 m higher – therefore it must have been larger in extent. In fact Grundmann (1937 p. 56) had concluded this already, arguing that the distribution of Neolithic settlements indicated the former shore line (fig. 2).

Looking at Thessaly from Sesklo, we see that to

the North and North-east the land first goes down to the small pass connecting the plains of Volos and Larisa and then rises steeply to the foothills of Mavrovouni and Pilion. To the East it descends towards the small plain of Volos. To the Southeast and South it ascends first rather steeply to the Chalcodonio foothills and then descends into coastal plain of Almyros. Towards the Westsouthwest it ascends into the Chalcodonio for a distance of some twenty km and then finally gives way to the plain of Karditsa. To the West it descends into the plain of Larisa.

To the North and Northeast, areas are suitable for hunting, but not especially for permanent human occupation. Here no settlement traces are discovered yet. The same applies to the area directly Southwest of Sesklo. The areas most suitable for settlement in the vicinity would be the plains of Volos, of Almyros and of Larisa. In the first, no traces of Early Neolithic settlements have been recovered, although the possibility that they are either buried by later settlements or covered by recent alluvium cannot be excluded.

VI. 2. *The plain of Almyros*

The plain of Almyros offers favourable conditions for an Early Neolithic economy. One would expect that it had been inhabited during Early Neolithic I, but proof of this is still lacking.

The only Early Neolithic settlement investigated in this plain is *Pyrasos*. (fig. 18 no 27). The site is situated on the coast, in modern Nea Anchialos, at a distance of 9 km from Sesklo. It lies in a flat alluvial plain, which may have been slightly damp during winter, since several small streams debouch into the sea along this shore. The soil in the region is at present very fertile and well suited to different agricultural purposes. During the Early Neolithic, climate and vegetation will not have differed much from what we described in general terms for the region of Sesklo.

The mound itself is composed largely of building debris, which is over 9 m thick. Trial excavation revealed that it had been occupied from Early Neolithic to Classical times (Theocharis 1959, pp. 31-69). The lowest level of the Early Neolithic stratum included some twelve sherds with early painted motifs. It can best be compared to Early Neolithic II from Sesklo. Older phases have not as yet been discovered.

The architectural remains discovered in the lowest level consisted of some postholes and a hearth, but otherwise provided no information. The finds other than pottery do not differ from those discovered at Sesklo.

The faunal remains were quite interesting for they included not only bones of domesticated animals, but also many vertebrae of large fish, shells and remains of crustaceans – indicating that marine activities played some role in the subsistence pattern. As yet this is the only Early Neolithic site in Thessaly situated directly on the shore.

As for raw materials available in the vicinity, these included clay, wood and probably reed and stone. The extinct volcano of Mikro Thive, which supplies the volcanic rock used to manufacture grinding slabs, it at a distance of four km from Pyrasos, across an area of flat land.

VI. 3. *The plain of Larisa*

The plain of Larisa, to the Northeast of Sesklo, is an area which is very suitable for farming. It is an alluvial plain and it consists largely of flat land. Towards the surrounding foothills it is slightly undulating. It is partly covered by Holocene deposits. There are not many rivers crossing it – the only large ones being the Pinios and its tributary, the Xerias. Otherwise the plain is watered by rain-fed streams coming from the Chalcodonio. The Pinios used to be connected to Lake Viviis by the Asmaki stream. Streambeds are all rather shallow (Anastassiades 1949) and melting snow and heavy rains have often caused floods.

The climate of the plain is slightly different from the east coast and Sesklo. Summers are hotter and winters colder. The yearly average is 16.1°C, with an August average of 27.3°C and an average for the coldest month of 5.4°C. In summer rainfall is extremely low, whereas the temperature may rise to maxima of over 40°C. The climate was probably slightly different during the Early Neolithic, but is

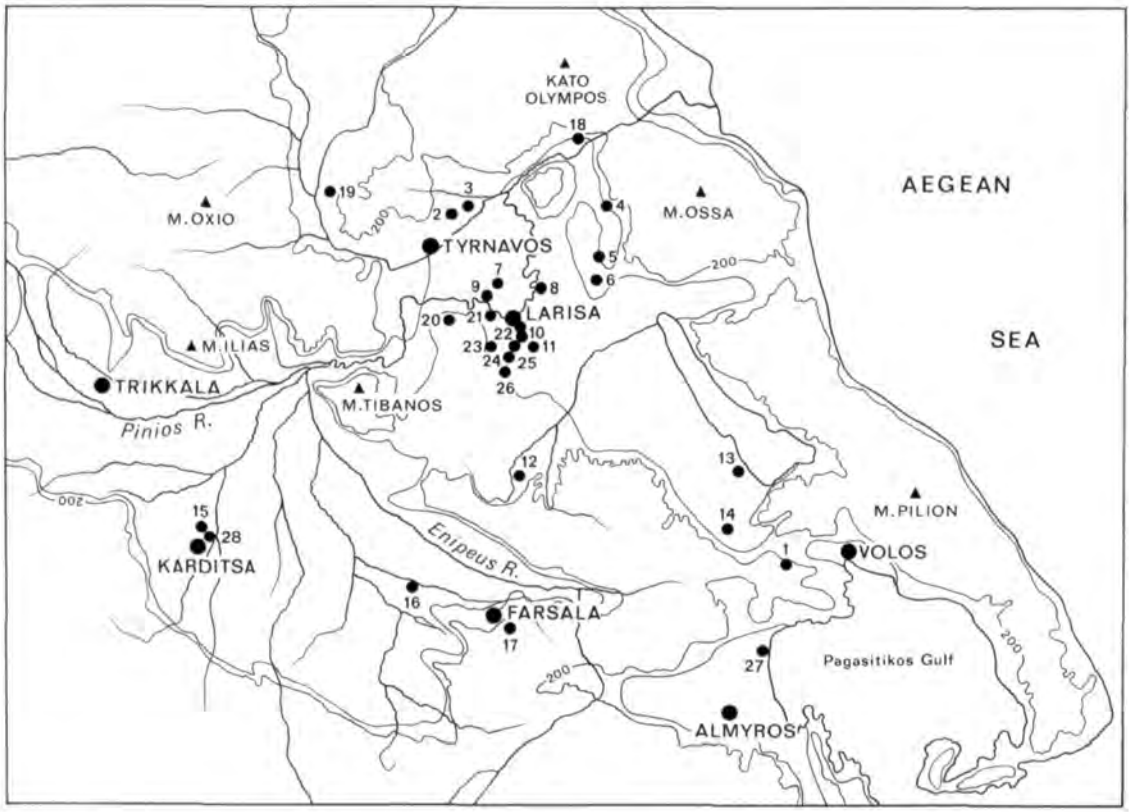


Fig. 18 Map of Thessaly – distribution of the Early Neolithic I settlements.
1 Sesklo. 2 Agia Anna. 3 Magoula Agios Athanasios. 4 Bournarbasi. 5 Nessonis I. 6 Gendiki. 7 Otzaki. 8 Soufli-Magoula. 9 Argissa. 10 Magoula Motel. 11 Magoula SE of Motel. 12 Koutouki Magoula. 13 Karamourlar. 14 Gioulberi. 15 Koskina Magoula. 16 Magoula Demerli. 17 Achilleion. 18 Magoula Tepe Gonni 1. 19 Magoula Domenikon. 20 Magoula Mantras. 21 Magoula K.E.P.M. 22 Magoula Averof. 23 Magoula Vrastira. 24 Magoula Pigadoula. 25 Magoula "Boukoum". 26 Magoula Beï. 27 Pyrasos. 28 Prodromos.

likely to have been in the same relationship to that of Sesklo as it is at present.

As to the vegetation, we refer to the general remarks on the vegetation of Early Neolithic Sesklo made in chapter V. We think they will largely be valid for the Larisa plain, too.

Survey has indicated that the plain was well settled during the Neolithic (French, forthcoming), but unfortunately most mounds have been investigated only rather haphazardly. As a result we possess but limited information on occupation during the Early Neolithic. Going from Sesklo northwestwards through the plain, we will discuss the Early Neolithic sites one by one.

VI. 3. 1. *Magoula Gioulberi (fig. 18 no 14)*

A mound some 8 km northwest of Sesklo, some 2 km from the banks of Early Neolithic Lake Viviis. The site is the nearest to Sesklo of all those discussed here. It has not been excavated, but Early Neolithic pottery has been discovered during survey work (Theocharis 1965b, p. 319). The surveyor did not

state whether the pottery belonged to Early Neolithic I, II or III.

VI. 3. 2. *Karamourlar (fig. 18 no 13)*

Karamourlar is situated on slightly rising ground, apparently not a magoula, at a distance of 12 km northwest of Sesklo. (Theocharis 1973 p. 349). If we accept Grundmann's estimate of the extent of Lake Viviis, this site should have been well inside the lake – and in that case one might think of a small islet. Another possibility is that the extent of Lake Viviis fluctuated, in accordance with the humidity of a given period. Unfortunately the site itself can provide us with little information. Upon excavation it became clear that the entire area had been disturbed by previous agricultural activities. Although the finds were extremely rich and despite the fact that they included many interesting objects, they were of little practical value, since the stratigraphy was completely disturbed. The pottery finds included material which closely resembles the pottery from the lowest pottery-bearing levels at Sesklo – therefore it would be reasonable to suppose that the site was already occupied during Early Neolithic I.

After these two, there is a remarkably long distance over which the presence of Early Neolithic mounds has not yet been attested. There are a good many magoulas in this area, but the pottery discovered in survey has not been subject to close analysis.

In the region of Larisa proper, at a distance of some 45-55 km northwest of Sesklo, is a cluster of magoulas which may have been occupied during Early Neolithic I. Many of them (fig. 18 no. 20-26) have been discovered very recently in a survey by Dr. C.J. Gallis and exact data on situation and size are unknown to the author. She has however identified some of the ceramic material as belonging to Early Neolithic I. These settlements are apparently all situated South of the River Pinios at a distance of up to 12 km from the bank of the river. The distance between the mounds is some 4-6 km.

We have a little more data on numbers 10 and 11 of the map. No 10 is *Magoula Motel,* also known as Magoula Vrasterò or Karagats. It is to be found 3 km south of Larisa, directly behind the Larisa motel. It lies on the borderline between an Upper Tertiary terrace and the valley of the River Pinios. Grundmann surveyed it (1932 pp. 102-123) and discovered a rich collection of Early and Middle Neolithic ceramic material, including some Early Neolithic I fragments.

No 11 is situated some 2 km Southeast of Magoula Motel. It is a very low mound, which was probably occupied for only a short period. Survey revealed that the pottery had Early Neolithic I and II characteristics.

VI. 3. 3. *Argissa (fig. 18 no 19)*

The site of Argrissa is some 4.5 km west of Larisa. It is commonly known as Gremnòs or Gremura Magoula. The mound was visited by W. Leake (1835 p. 534) during the last century. It was cited by Tsountas (1908 p. 6 no 30) as being the ancient city of Argoura and Homeric Argissa. It may have been the Akropolis of the city of Argoura, which flowered from the Early Geometric to the Early Roman period. During the years 1956-1958 it has been excavated by a German team, directed by V. Milojčić. (1960 pp. 1-56). At a depth of 6-7 m below the old ground surface, fossilised bones and stone implements indicated the presence of Middle Palaeolithic occupation at the site. The occupation of the mound lasted from the Pre-Pottery Neolithic to the Early Roman period.

The site is situated on the southern edge of an extensive Upper Quaternary terrace. South of it stretches the wide valley of the River Pinios. The soil in the immediate vicinity consists of riverine clay, deposited by flooding of the river.

On the vegetation of Neolithic Argissa we have just a little additional information in the form of carbonised remains of hawthorn (Hopf 1962 p. 110). The fauna included aurochs, which according to Clason (1978 p. 104) can be found in an open forest with undergrowth, but according to Bökönyi (1973 p. 167) likes big plains with areas of forest.

Of the earliest settlement we have few architec-

tural remains. As at Sesklo the Pre-Pottery stratum contained pits which had been dug into the sterile soil. All have a northeast/southwest orientation. The fact that one pit cuts through three others led the excavator to conclude that they belong to two different phases at least. The pits were related to some postholes of unknown purpose. The excavator (Milojčić 1962 p. 24) surmised that at least one of the pits served for grain storage. In the lowest level of the pottery bearing Neolithic, traces of a rectangular building have been discovered. This had a North-South orientation and measured some 4 x 5 m. The walls had been constructed with posts. Remains of a simple hearth have been found in the northwest corner. In short they are of a conception which seems slightly different from the dwellings at Sesklo.

There are few indications of the size of the settlement, although the Early Neolithic stratum seems to stretch over some 80 m at least in the profile of the mound.

The ceramics of the lowest pottery bearing stratum show the following characteristics:

1. The vessel forms are simple. Restricted shapes are more common than unrestricted ones.
2. The rim generally shows no changes in thickness, though both thinned and thickened rim shapes occur. Lips are generally blunt; both inside tapered and flattened lips occur rarely.
3. Both (plano-)convex and ring-bases are present, apparently in equal proportions.
4. Vessel surfaces are in most cases only well smoothed. Burnishing is very rare.
5. The only decoration consists of pierced lugs and small oval lugs.
6. The wall is mostly between 6 and 9 mm thick – a medium thickness.
7. Coarse tempered ware is extremely rare.

These characteristics, which correspond to those of the middle of Early Neolithic I at Sesklo, are valid for the entire stratum. No shifts towards more elaborate vessel forms and a better surface finish are to be noted. On the other hand there is no clear development from the Pre-Pottery phase towards this Early Neolithic pottery – it appears suddenly. There are indeed a few sherds, resembling the very coarse ware of Sesklo, but they are entirely mixed with the common medium gritty pottery. The apparent lack of any notable development during the period may be due to the fact that the stratigraphy is rather difficult. Because of the many disturbances, we have chosen for our sample only material from secure Early Neolithic sections. It seems quite possible that pottery, corresponding to that of the end of Early Neolithic I at Sesklo, is included with material of the next planum.

The finds other than pottery resemble the Sesklo assemblage and we will not discuss them here.

The subsistence pattern is largely the same as at Sesklo. Carbonised seeds included einkorn and emmer wheat, six-row barley, millet and lentils (Hopf 1962 p. 102). The bone sample consists for the largest part – some 80% – of caprovines; most are undetermined but those which could be attributed to either sheep or goat belong for the main part to sheep. Among the minimum number of individuals were 25 sheep and one goat. The remaining bones, some 10% are of pig, some 6% of cattle (including possibly the earliest domesticated cows) and a few fragments are of dog, red deer, roe deer, hare, fox and birds, one of them possibly grey goose (Boessneck 1962). Several shells of freshwater molluscs have been found, too. The bone sample indicates that wild animals were of little importance in the diet.

Building materials were clearly all found locally: they consisted of wood and reed for frame and wattle and of clay mixed with chopped plant remains for daub.

Raw materials to manufacture utensils and objects were partly found locally and partly imported. The latter was certainly the case with obsidian, coming from Melos. Despite the fact that chert was present in the immediate vicinity – only a little way upstream – obsidian was the more commonly used material. We have little information on the provenience of other raw materials. The sandstone slabs which were used as grinding stones may have been found in the vicinity.

VI. 3. 4. *Otzaki Magoula (fig. 18 no 7)*

The site of Otzaki Magoula lies some 5 km North-

east of Argissa. It had already been mentioned by Tsountas (1908 p. 7) and by Grundmann (1932 pp. 102-123). In 1953 a trial trench was dug by the German Archaeological Institute under the direction of V. Milojčić (1954 pp. 1-28). As a result, a large scale excavation was carried out, revealing settlement debris from Early Neolithic II to the end of the Late Neolithic period. Pottery fragments discovered in survey indicated that the mound had already been occupied during Early Neolithic I.

The site lies on the extensive Upper Quaternary terrace. It rises to a height of 5 metres above an area of flat land. The soil in the vicinity consists of a silty clay, which is at present quite fertile.

About the vegetation we have no direct information. The faunal sample included aurochs (Boessneck 1962 p. 40).

The architectural remains of the Early Neolithic II settlement were of mudbrick dwellings. They did not have a stone foundation or a framework made of wooden posts; the walls rested directly on the ground surface. The excavator found indications that the houses had flat roofs, constructed in wattle and daub (Milojčić 1971 p. 17). A similar construction may also have been used during Early Neolithic I.

Since the finds which belong to Early Neolithic I are surface finds only, we will not discuss them here.

As far as the subsistence pattern is concerned we have to rely on the information given by the bone material from the Early Neolithic II and III strata. The sample, which is very small, shows the common pattern. Caprovines are most important, followed by cattle and pig. Contrary to the data from Argissa, goat seems to have been almost as common as sheep. Wild mammals are of little importance.

The provenience of building materials was again local. Raw materials used to manufacture utensils and other objects, other than ceramics, probably came largely from the same areas as those exploited at Argissa.

VI. 3. 5. *Soufli Magoula (fig. 18 no 8)*

Some 10 km Eastsoutheast of Otzaki, on the opposite bank of the River Pinios lies the site of Soufli Magoula. Tsountas had already mentioned that it yielded much pottery from the earlier Neolithic (1908 p. 6). In 1958 Theocharis made a trial excavation with two trenches (Theocharis 1958, p. 78-86). In this way he wanted to clarify the stratigraphy of the Neolithic occupation. He discovered a fairly thick stratum bearing no pottery at all, which lay over bedrock (fig. 19). Overlying this were strata from the earliest pottery bearing Neolithic to the Bronze Age. In 1974 the present ephoros of the Larisa region, C. Gallis, had to do a rescue excavation on an area of large blackish patches on the eastern flank of the mound (Gallis 1975 pp. 241-258). Those turned out to be cremation burials, eleven in all. Four of them were completely untouched and undisturbed. To judge by the pottery they belonged to Early Neolithic III. If so, they represent the oldest cemetery yet found in Greece.

The magoula, a low artificial mound consisting

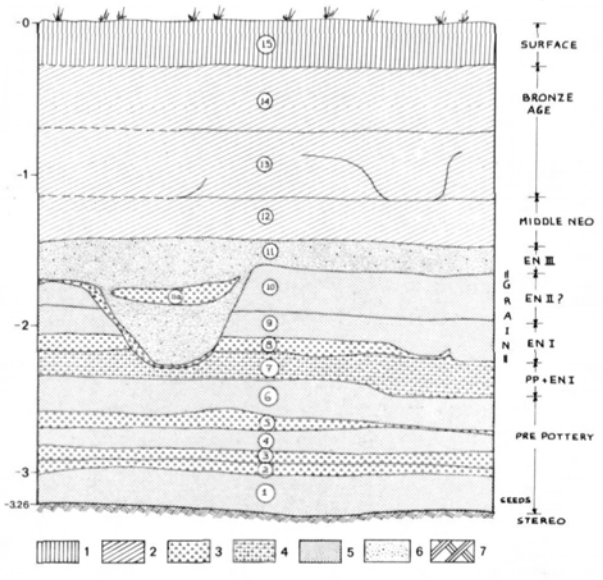


Fig. 19 Stratigraphical section of Soufli-Magoula, excavated in 1958.
1: surface humus. 2: building debris. 3: clay. 4: clay mixed with charcoal. 5: ashy. 6: ashy with charcoal. 7: sterile.

largely of building debris, is at present situated directly on the bank of the River Pinios; it is highly probable that during the Neolithic it used to be at a greater distance from the river. The soil in the vicinity consists of a fertile riverine clay, deposited by flooding. At present the area is largely used for the cultivation of sugarbeet.

The vegetation was probably much the same as that described in general terms for Sesklo. We have one small additional piece of information in the form of a carbonised wild olive stone, which was discovered in the lowest non pottery bearing level.

No clear architectural features have been discovered, although the excavator speaks of beaten clay floors separating the different building phases of the Pre-Pottery Neolithic stratum.

The total of some 250 sherds from the lowest pottery bearing stratum (levels 7-10) is rather small, especially since they include about 95 tiny body fragments. This is probably due to the fact that a large part of the Early Neolithic I stratum had been disturbed by an Early Neolithic III pit. The sherds show the following characteristics:

1. The vessel forms are very simple. In the lowest level, restricted shapes are more common than unrestricted ones, but there seems to be a shift towards a preference for unrestricted forms in the higher levels.
2. The thickness of the rim usually remains unchanged. In the higher levels hole-mouthed jars and convex-walled open bowls may have an up-turned rim. Lips are often blunt. A tapered and a rolled form are represented by one example each.
3. As base-forms, both plano-convex and ring-bases are represented.
4. Thickness of wall varies generally between 5 and 10 mm. Heavier wares occur only rarely.
5. Surfaces are in most cases only smoothed. Burnishing is rare.
6. Coarse ware occurs in small amounts. Medium fine ware is rare.
7. Colours are never fully oxidised. They belong generally to the group of middle chromas. The percentage of colours of higher values increases from 0% in level 7 to 26% in level 10.
8. The percentage of non-oxidised cores apparently increases in the highest level (10), especially with sherds having a surface colour of one of the higher values.

On the whole these characteristics indicate ceramics which are comparable with the pottery from Early Neolithic I Sesklo. According to our observations, some of the developments which occur at Sesklo may be noted at Soufli, too.

The finds other than pottery resemble the material from Sesklo. Due to the limited size of the excavation, they are very few in number and will not be discussed here.

The subsistence pattern was probably much the same as at Sesklo. Carbonised seeds include einkorn, emmer, two-row hulled barley, pea and lentil (J. Renfrew, 1966. p. 21 ff.). The bone sample has not been analysed.

Raw materials used to manufacture implements were partly local like the clay used for pottery manufacture, partly from a few km upstream, like the chert, and partly from a long distance away like the Melian obsidian.

VI. 3. 6. *Gendiki (fig. 18 no 6)*

Some 10 km East of Soufli is the site of Gendiki, also known as Chasambali. In 1962 a trial excavation, consisting of one small trench, was carried out by D.R. Theocharis, on behalf of the Greek archaeological service. As a result we possess a stratigraphy (fig. 20), giving us some idea of the periods present at this mound, but not of their extent or importance. Directly above the sterile soil is a stratum which did not contain any pottery. Overlying it is a stratum of yellow river sand. The following strata cover the whole of the Early Neolithic, Late Neolithic and Early Bronze Age (Theocharis 1962b pp. 73-76).

The magoula is situated on the border between the plain of Larisa and the Chasambaliotiki hills, which form the foot of mount Ossa. It lies on the Southwest side of the once marshy area of former Lake Nessonis. The magoula consists of building debris over a small natural rise. The soil in the vicinity consists of fertile clay.

In the lowest strata were no architectural remains, but the Early Neolithic II stratum contained parts of

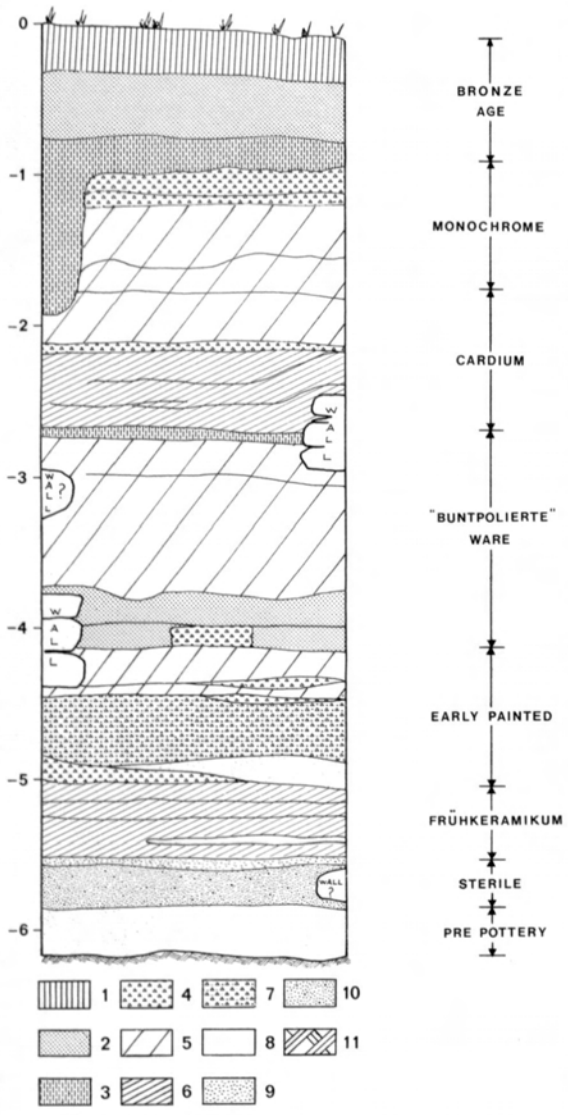


Fig. 20 Stratigraphical section of Gendiki.
1: surface humus. 2: ashy. 3: burnt building debris. 4: clay. 5: ashy building debris. 6: building debris. 7: dark soil with clay. 8: ashy with charcoal. 9: sand. 10: sand with ashes. 11: sterile.

a stone foundation wall and a beaten clay floor covered with ashes.

The sample of 150 sherds from the lowest pottery bearing stratum which we have investigated showed the following characteristics:

1. Vessel forms are very simple. Restricted shapes appear to be more common than unrestricted ones.
2. Rims do not generally show any changes in thickness. Hole–mouthed jars have in several cases a slightly up-turned rim. Lips are generally blunt.
3. Both plano-convex and ring-bases occur. It cannot be stated which is the more common type.
4. Vessel surfaces are generally well smoothed only. Burnishing appears to be rare.
5. Walls are generally between 6 and 9 mm thick. Both thin and heavy wares are rare.
6. Pierced lugs are the only decoration.
7. Coarse tempered ware occurs, but is rare.
8. Colours often belong to the group of middle chromas. The core is often completely oxidised.

These characteristics show that the ceramic ware of this stratum may be compared with the Early Neolithic I ware from Sesklo. There were no vessel fragments in our sample which seemed to belong to the final part of the period, apart from the hole-mouthed jars with upturned lips. There was not a single fragment of the very coarse clumsy ware; this could be accidental, but might also have been caused by the fact that Early Neolithic I began slightly later at Gendiki than at other sites.

The finds other than pottery included, apart from chert, obsidian and bone implements and a stone earstud, as well as fragments of two shallow, open stone bowls. These had been made in a light coloured greenstone, possibly serpentine.

Concerning the subsistence pattern we possess only a little data, but they indicate that from the Pre-Pottery Neolithic stratum onwards, agriculture played an important role. A sample of carbonised seeds from the deepest stratum consisted for the largest part of emmer, but also included einkorn, two-row hulled barley, lentils, vetch and peas (J. Renfrew 1966).

The building materials, consisting of stones used in the foundations, mud mixed with chopped plant remains for daub, twigs, branches and reed for wattle, could be found in the vinicity. Raw materials used to manufacture implements could partly have been obtained in the direct vicinity or at short distance, like the greenstone. Chert came from an area

within a day's reach, but the obsidian was once again from Melos.

VI. 3. 7. *Nessonis (fig. 18 no 5)*

Some 5 km North of Gendiki are the four mounds of Nessonis. The mounds are situated in the plain of Keserlì, on the northeast side of the former Lake Nessonis; they lie on an Upper Quaternary terrace. The surrounding area consists largely of flat land. To the East are low foothills, largely composed of schists. The soil in the vicinity consists of fertile clay, on which at present sugarbeet and cotton are cultivated.

In 1975 a trial excavation, consisting of two small

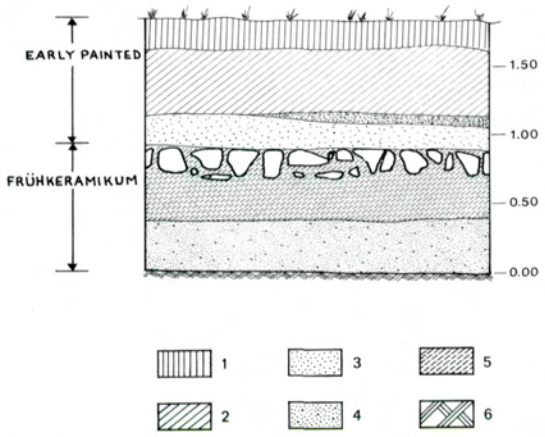


Fig. 21 Stratigraphical section of Nessonis I.
1: surface humus. 2: building debris. 3: ashy. 4: ashy with charcoal. 5: clay. 6: sterile.

trenches, was carried out at Nessonis I and II by D.R. Theocharis. It served merely to establish the stratigraphy of the mounds. In the trench at Nessonis I, the sterile soil was reached at a depth of 1.90 m. The finds indicated that the mound had been occupied during Early Neolithic I and II. The two strata were separated from each other by a kind of stone floor (fig. 21) (Theocharis 1958, p. 78-86).

Except for the stone floor no architectural remains have been discovered.

The sample of some 200 sherds from the deepest stratum showed the following characteristics:

1. Vessel forms are very simple. Restricted shapes appear to be more common than unrestricted ones.
2. Rims do not in general show changes in thickness. Hole-mouthed jars may have a slightly up-turned rim. Lips are mostly blunt, although varieties like inward tapered and flattened lip occur.
3. Both plano-convex and ring-bases are to be found.
4. The thickness of the wall ranges mostly between 6 and 9 mm. Both thin and heavy walled ware are rare.
5. The surface is in most cases smoothed only. Burnishing seems to be quite rare.
6. Pierced lugs are the only decoration.
7. Coarse tempered ware is rare.
8. The colours belong generally to the group of middle chromas: uncertain buffish or reddish.

These characteristics indicate that the pottery from stratum I of Nessonis I compares well to the pottery from Early Neolithic I Sesklo. We have not been able to discover the small changes characteristic of the end of Early Neolithic I and the transition to Early Neolithic II, but the sample was rather small.

The finds other than pottery included a few fragments of bone awls, a little chert and obsidian and some heavy stone implements.

We do not dispose of any data which could shed light on the subsistence pattern except for the bone awls, which were made of the bones of domesticated sheep/goat.

The raw materials were local in origin, but the chert and obsidian were certainly brought from further afield.

Some 7 km Northeast of Nessonis is the site of *Bournarbasi*. (fig. 18 no 4). It is situated near the northern entrance of the plain of Keserlì, and therefore in an area of flat land. To the east rise the foothills of Mount Ossa, to the West flows the Kalamitsa, a tributary of the River Pinios. The site has only been surveyed, which revealed that the mound had an apparently continuous occupation

from the Early Neolithic to the Mycenaean period (Theocharis 1964 p. 262; Milojčić et alii 1976). The exact nature of this occupation is as yet unknown.

Some 25 km West of Bournarbasi, having crossed both the Pinios and Xerias, and 20 km North of Argissa we come to the site of *Agios Athanasios*. (fig. 18 no 3). At present it lies on the right bank of the River Mati, a tributary of the Xerias, on the Upper Quaternary terrace which borders the North and West side of the valley of the Pinios. In survey a large amount of pottery from the Early and Middle Neolithic was discovered (Theocharis 1964, p. 262). It included Early Neolithic I material.

Some 4 km Southwest of Agios Athanasios is *Agia Anna*. (fig. 18 no 2). The mound was surveyed by D.R. Theocharis in 1960 (Theocharis 1960, p. 186). A trial excavation was carried out in 1968 by G. Hourmouziades (Hourmouziades 1969b p. 169 ff). Due to bad weather he did not succeed in reaching virgin soil. The part which could be excavated revealed the presence of all Neolithic periods except for Early Neolithic I and II. Early Neolithic III had no architectural remains except for a stone wall. As far as pottery is concerned, this very thick stratum contained monochrome ware as well as black topped ware, cardium-incised ware and a few painted sherds.

In the northeastern corner of the plain of Larisa, near the Vale of Tembe is the site of *Tepe Gonni I* (fig. 18 no 18) – only recently surveyed by C.J. Gallis. We do not dispose of any geographical data on this site. The pottery seemed to include Early Neolithic I ware.

In the valley of the River Xerias, at the very westernmost foot of Kato Olympos, lies *Magoula Domenikon* (fig. 18 no 19) another site which has only recently been surveyed by C.J. Gallis. Here the pottery also included Early Neolithic I material.

Having considered all the Early Neolithic settlements hitherto investigated in the plain of Larisa, we must conclude that the circumstances of life were largely the same as at Sesklo. There appear to be some differences in the way dwellings were built, which are largely due to the fact that construction methods are dependent on the locally available raw material. Stone foundations were only laid when large stones were available in plenty; otherwise either a framework of wooden posts was used or there were no foundation walls at all.

VI. 4. *The plain of Karditsa*

Moving from Sesklo eastward, over the Chalcodonio range, one comes to the plain of Karditsa. As is the case with the plain of Larisa this is an alluvial plain, consisting largely of flat land. It is quite probable that the Northern part of it is even covered by alluvium of late historical date (Vita Finzi 1969). This part of Thessaly is well watered by powerful rivers from the surrounding mountains, the steep Pindos range in the West and the Kassidiari in the South. They traverse the plain to unite in the mighty Pinios, which then flows Eastward to the plain of Larisa. Considerable flooding probably occurred in prehistory, as was the case in recent times too. On the one hand this improved soil texture and structure, but on the other hand destroyed crops and, in some cases, settlements.

The climate is different from the climate in the eastern plain. Temperatures do not show large differences – here too winters are cold and summers very hot – but the annual amount of rain is far larger (738 mm at Trikkala) and falls largely in the wintermonths (November - second half of February), with a second small peak in April. Being the result of topography, we may presume this difference in climate to have existed during the Neolithic period as well.

Concerning prehistoric vegetation we have no data, but we assume that, despite the different climatic circumstances, it will not overall have been greatly different from the general picture we have sketched for the vegetation at Sesklo.

On the whole our knowledge of possible Early Neolithic settlements in this area is a very scanty one. This may partly be due to the fact that settlements in the Northern part of this plain have been covered by recent alluvium and partly because it has been surveyed on a limited scale only.

VI. 4. 1. *Achilleion (fig. 18 no 17)*

Having crossed the Chalcodonio range we move a little South from the plain into the foothills of Kassidiari and at a distance of 40 km from Sesklo we come to the site of Achilleion. In 1961 a trial excavation with two small trenches was carried out by D.R. Theocharis (1962 pp. 71-73). In 1973/74 this was followed up by a larger scale excavation by the University of California, Los Angeles, in a joint venture with the Greek Archaeological service. The Director was M. Gimbutas, joined in 1973 by D.R. Theocharis and in 1974 by C.J. Gallis (Gimbutas 1974a). The trial excavation revealed a stratigraphy from the Pre-Pottery Neolithic till the end of the Middle Neolithic. In this large scale excavation the Pre-Pottery was missing.

The site is situated in an area of gently undulating hills; there is no flat land in the vicinity. The rock formation is largely composed of radiolarites and schists, but in the immediate vicinity serpentine comes to the surface, too. The soil consists of a red clay, which at present supports large wheat fields.

The only data we possess on the Neolithic vegetation consist of carbonised acorns. The faunal remains include red deer, roe deer, fallow deer, aurochs, wild swine, fox, hare, wild cat, badger and birds of unidentified species. This seems to indicate that the biotopes of all these animal species could be found in the vicinity of the settlement. We may therefore assume that there were woods as well as open spaces near the settlement.

The architectonical remains of the Early Neolithic settlement are very scanty. They consist largely of ghost impressions of matting, of parts of stone foundation walls, of pisé debris, of carbonised fragments of wooden stakes and of some pits bordered with stones, probably fire pits or cooking pits.

The pottery of the lowest levels showed the following characteristics:

1. Vessel forms are simple: restricted shapes are more common than unrestricted ones.
2. Rims do not generally change in thickness. Percentages of thickened and thinned rims are equal. Lips are most often blunt.
3. Vessels generally have a low ring-base – straight or slightly out-flaring. Plano-convex bases occur too.
4. Vessel surfaces are rarely burnished.
5. Pierced lugs are the most common decoration, but small lugs occur.

In the higher levels of the first stratum (Gimbutas 1974a, fig. 2) the following changes occur:

1. There is a slight temporary shift from restricted to unrestricted vessels. In the highest level the number of restricted shapes increases again.
2. The up- or out-turned rim becomes more common. Both ledge-rim and rolled lip are introduced.
3. The ring-base flares outwards both higher and wider, whereas the planoconvex base gradually disappears.
4. Vessel surfaces, and especially the exterior one, are in almost all cases burnished, albeit rather streakily.
5. Painted decoration is introduced, even though solid triangles are the only motif. Knobs replace pierced lugs more and more as applied decoration. In the highest level, rows of pellets are introduced.
6. Walls become thinner.
7. The amount of incompletely oxidised cores increases.

Compared with Sesklo we see that the pottery of the lowest levels has all Early Neolithic I characteristics. In the higher levels we note a gradual change to Early Neolithic II – not different from the development at Sesklo. This suggests the conclusion that the pottery which usually is said to represent the Achilleion phase of the Frühkeramikum belongs in fact to transitional Early Neolithic I/II. Among the pottery from the lowest level is some of the very crude, clumsily made ware, again mixed with monochrome medium gritty pottery.

During the succeeding Early Neolithic III a difference in development may be noted. Whereas painted decoration has disappeared on the pottery from Sesklo, it continues to exist and even to gain in importance at Achilleion.

The finds other than pottery do not on the whole show a marked difference from those at Sesklo. They include obsidian, chert and bone implements, ground stone tools, a great number of figurines and also two fragments of plate-like greenstone vessels.

The subsistence pattern was clearly agricultural.

The sample of carbonised seeds which has been analysed (Renfrew 1966 pp. 21 ff.), included emmer wheat and oats. The bone sample consisted for much the largest part of domesticated animals – the highest percentage being of sheep/goat, followed by pig and cattle. There were also a few dog bones.

Building materials were probably all local. Of the other raw materials, obsidian was certainly imported; chert was partly imported – probably from the Pinios area near Larisa – but some of it is said to be local jasper (Elsker, pers.comm.). Greenstone could be a local product. The volcanic stone used to manufacture the grinding slabs probably came from the volcano of Mikro Thive.

Some 12 km Northwest of Achilleion is the site of *Magoula Demerli*. (fig. 18 no 16). It is situated in the plain, surrounded by an area of flat land. Survey indicated that this mound was occupied throughout the whole Early Neolithic period (Theocharis 1961 p. 179).

VI. 4. 2. *Prodromos (fig. 18 no 28)*

Some 25 km Westnorthwest of Magoula Demerli is the village of Prodromos. Between 1970 and 1972, rescue excavations were carried out by G. Hourmouziades at three magoulas, Prodromos 1 and 2 at a distance of some 1.5 km North of the village, and Prodromos 3 inside the village. The former two are both low mounds which were occupied during the Early Neolithic until the transition to the Middle Neolithic. Prodromos 3 is a tall mound on a natural rise. Here Late Neolithic, Bronze Age and historical levels overlie a thick Early Neolithic deposit. (Hourmouziades 1971, 1972).

The sites lie near the southern edge of a large area of recent floodland and marsh in the northern part of the plain.

Concerning the vegetation we have some sparse data in the form of carbonised acorns and stones of Cornelian cherry (Halstead and Jones 1980). The faunal remains included red deer, roe deer, perhaps wild swine and aurochs, fragments of tortoise shell, one vertebrum of a small fish, shells of a freshwater bivalve and one bird bone. We may assume that biotopes suitable to these animal species could be found in the vicinity of the settlement, which means that there were woods, something like a pond or a lake, and possibly open spaces.

The architectural remains of the Early Neolithic included a wooden roof which had been preserved by waterlogging.

The pottery from the lowest levels mostly has a well oxidised surface colour. It is often red slipped and has a burnished surface. In several cases it has painted decoration. On the whole it compares well with the Early Neolithic II material from Sesklo. Ceramic vessels or fragments of pottery which could be related to Early Neolithic I are not represented among the material.

The finds other than pottery are largely the same as at other sites in Thessaly.

The subsistence pattern at all three sites was agricultural - as evidenced by carbonised seeds, grinding stones, flint sickle blades and a large collection of animal bones. The samples of carbonised plant remains included both emmer and einkorn wheat, barley, peas, lentils and *Lathyrus sativus*. The bone sample consists for the largest part of sheep/goat (some 62%). As was the case at Argissa the bones which could be attributed to sheep predominate heavily over those belonging to goat. The next group – and possibly the biggest supplier of meat – is cattle (some 23%) followed by pig (some 13%). Only a few dog bones have been discovered.

Building materials were all local. Of the materials used to manufacture implements we know but little. The flint probably had the same provenience as at other sites, some 25 to 30 km downstream on the Pinios. Greenstone possibly came from the Kassidiari – 30 km to the East across the plain. The obsidian was Melian.

It is quite remarkable that Prodromos 1 and 2 are so close together, while Prodromos 3 is quite nearby too. It has been suggested that low rises like these mounds would be advantageous for agriculture if flooding was a problem. In that case it would have been practised in the dry area on top of the mound, between the dwellings, and a settlement might have been divided between two or more low mounds in close proximity (Hourmouziades pers. comm; Halstead and Jones 1980 p. 95).

Some 5 km. Northwest of Prodromos is the site of *Koskina Magoula. (fig. 18 no 15).* As is the case with Prodromos, it lies near the southern edge of a large area of recent floodland and marsh. It is a mound built over a low rise and largely composed of building debris. During 1967 an irrigation canal was dug into the eastern side of the mound. The pottery and other material recovered from this trench revealed the presence of the entire Early Neolithic period, including Early Neolithic I, and the Middle and Late Neolithic and Early Bronze Age. (Hourmouziades 1969a pp. 93-95; 1969b p. 169). The finds other than pottery included disc spindlewhorls – made out of early painted sherds – and a ceramic ear-stud.

In the western part of the low foothills of the Chalcodonio, between the plains of Larisa and Karditsa, lies *Koutouki Magoula* (fig. 18 no 12). It is situated on the border of an Upper Tertiary plateau and an alluvial valley. Survey has revealed that the mound was occupied during the Early Neolithic period. (Theocharis 1967, p. 98).

In this chapter we have investigated the position of Sesklo in a larger geographic context – Thessaly. Our knowledge, at present, of the distribution pattern of Early Neolithic settlements is somewhat haphazard. It seems too early to reach any conclusion on their original distribution and on which areas were most favoured for settlement. However, we have noticed that the settlements are all built on the boundary between two different topographic zones. Within this framework we may discern three groups:
1. settlements on the boundary between plain and low foothills – e.g. Sesklo and Achilleion;
2. settlements on the boundary of a river valley and a plateau – e.g. Argissa, Soufli, Prodromos;
3. settlements on the shore of a lake or of the sea – e.g. Magoula Karamoular, Pyrasos.

This quite certainly has much to do with the presence of alternative foodresources. The accessability of raw materials may have played a role too.

Taking into consideration all the scarce data collected, we have to conclude that at all the sites investigated in Thessaly the subsistence pattern was largely the same. It was in all cases agricultural. At most of the sites where it was possible to attribute the bones of sheep/goat to one of these two species, sheep predominated over goat. This is at first sight contrary to expectations: in a wooded environment, goat should predominate over sheep. An interesting theory has been put forward by Halstead (1981, p. 324), who suggests that the main grazing resource in use was a combination of stubble in summer and autumn and fallow fields in winter and spring. We have too little data on plant remains to say anything about local differences in, for example, the ratio of cereals and pulses grown.

At all sites pottery shares the same characteristics for Early Neolithic I and initial Early Neolithic II. Afterwards local changes gradually occur; these tend to be concentrated regionally, e.g. incised decoration in the region of Larisa.

At all sites local materials were used for building purposes. As a result there are differences in architecture, although the basic house plan seems to have been the same at nearly all sites. In areas where no suitable stone was available, people either built posthouses or they erected their dwellings in mudbrick directly over the clay floor. Concerning construction of the roof we possess little information, but it seems possible that this may have been flat or gabled, depending on local conditions.

Comparing all the data on the raw materials in use, it seems that obsidian, chert, volcanic stone and greenstone, at least, had the same provenience at all sites. This suggests that there was some exchange in Early Neolithic Thessaly; at least it is fairly certain that there was mutual contact between settlements.

CHAPTER VII

EARLY NEOLITHIC SITES IN GREECE BEYOND THE THESSALIAN REGION

In the last chapter we have seen that at other sites in Thessaly people were living in much the same conditions as at Sesklo. We were able to discern three different types of settlement location. All three were situated on the boundary between two different topographic zones, but one group of settlements was situated in low foothills near the plain, the second group was situated on the boundary between a river valley and terrace and the third group of settlements was either on the shore of a lake or on the coast. There are some minor differences between the groups which are largely due to slightly different local conditions. During the period a certain regionalism developed, which can be noted especially in the most obvious material, the pottery.

So far our discussion has been restricted to Early Neolithic settlements in Thessaly, which are geographically and climatically quite closely related to Sesklo and which are situated in an area which is suitable for early agriculturalists. In this chapter we will investigate whether in other areas, which are geographically and climatically different, a similar development may still be noted. We have to keep in mind that in several areas which at first sight seem very suitable no traces of Neolithic settlements have been recovered, for the simple reason that those plains are covered by recent alluvium. This is the case with the plain of Arta in Epiros, the plain of the River Alphios and its tributaries in the Northwest Peleponnese, the Kopaïs basin and the valley of the River Spercheios in Boeotia and possibly with the river valleys of Eastern Macedonia and Thrace (Vita-Finzi 1969, pp. 77-82). In the remaining areas, exploration for prehistoric sites has begun only fairly recently. Systematic research and survey has been carried out in a few regions of Greece only – like Macedonia, parts of Epiros, Thessaly and Messenia. Even this does not always provide all the information wanted. The presence of Neolithic settlements may be mentioned, without indicating whether they were occupied during Early, Middle or Late Neolithic. Cave sites may easily be overlooked in survey, often being difficult of access. Early Neolithic sites have been recovered very rarely on the islands. Since those few settlements which have been found are always situated directly on the coast, we are led to believe that similar settlements have been drowned by the gradual rise in sealevel.

In this chapter we will first investigate the regions of Greece which surround Thessaly, namely Macedonia, Epirus and Boeotia. Afterwards we will move South to Attica and the Peloponnese. Finally we will discuss some of the island sites.

VII. 1. *Macedonia*

Macedonia may be reached from Thessaly by land, through the Vale of Tembe and the valley of the River Xerias, and by sea. The region is quite different from Thessaly. It consists largely of mountain areas, separated by wide river valleys – those of the Aliakmon, Axios (or Vardar) and their tributaries – and by two large plains, of which the plain of Macedonia is the most important. In the Eastern part the peninsula of Chalkidiki stretches into the sea. It consists of rolling hills and mountain ranges.

In Pre- and Protohistoric times, a large part of the present plain of Macedonia, the wide delta of the Aliakmon-Loudhias-Axios was an arm of the sea, stretching deep inland (Bintliff 1976, 241-262).

The climate is in general colder than in Thessaly, although the plain of Macedonia does not show a large difference, and the distribution of annual precipitation is more even. The average January temperature increases from an average of 4° C in the North to an average of 8° C in the South. In inland areas winter may be grim, with much snow in higher

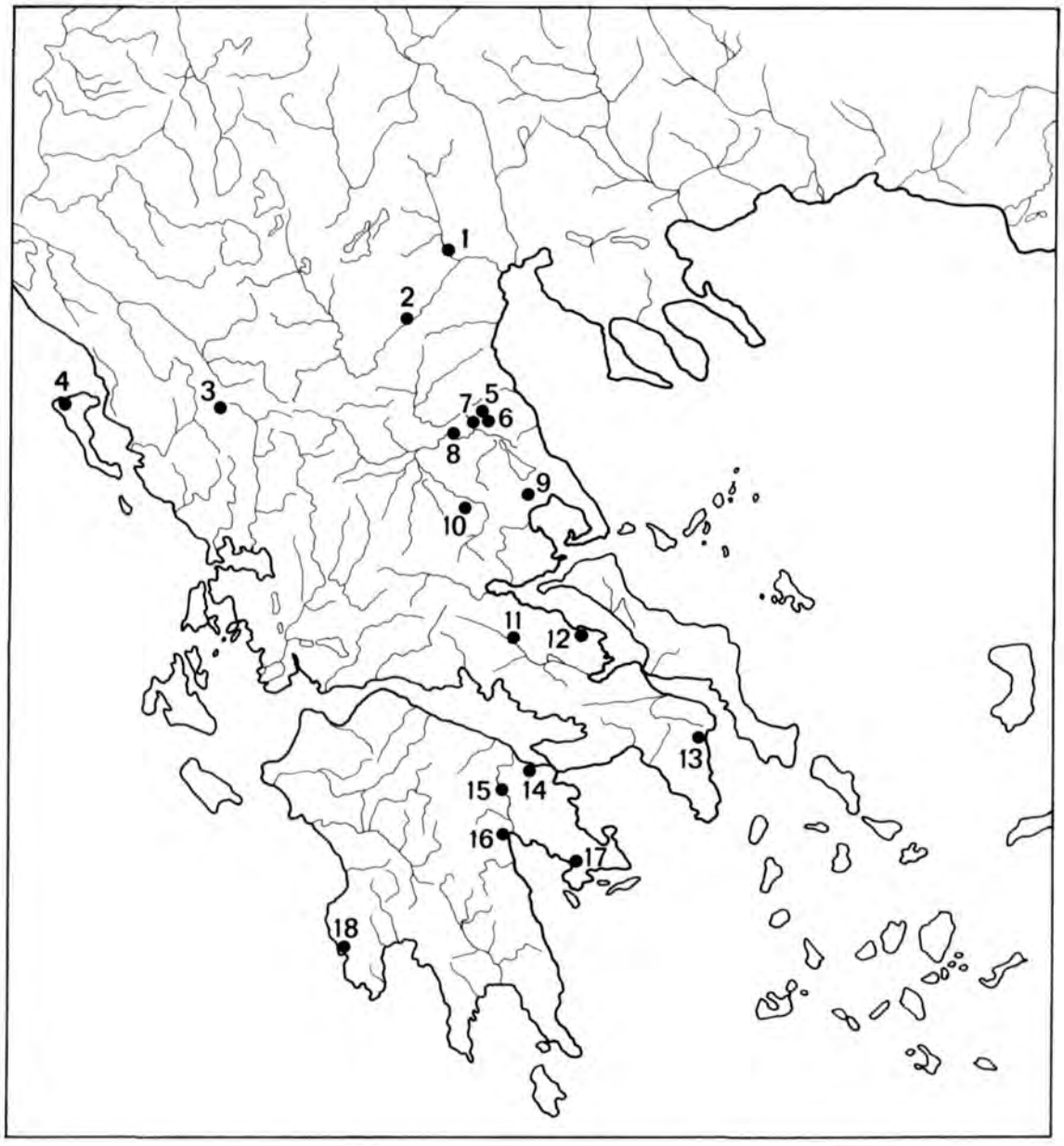


Fig. 22 Map of Greece – distribution of excavated Early Neolithic sites.
1 Nea Nikomedeia. 2 Servia. 3 Asfaka. 4 Sidari. 5 Nessonis. 6 Gendiki. 7 Soufli. 8 Argissa. 9 Sesklo. 10 Achilleion. 11 Elateia. 12 Halai (Locris). 13 Nea Makri. 14 Corinth. 15 Nemea. 16 Lerna. 17 Franchthi Cave. 18 Cave of Nestor, Pylos.

parts, but summers are never as extremely hot as in Thessaly. The highest summer temperatures are still found inland – they vary between 26°C on the coast to 28°C inland. Coastal Saloniki has an average annual temperature of 15.9°C. The annual average of precipitation decreases from 800 mm in the West to some 400 mm in the East.

The data on the vegetation of Macedonia during the Early Neolithic indicate that regions below a height of 500 m were covered with a dense deciduous oak forest (Bottema 1974). The faunal remains are very scarce and will be discussed with the sites on which they were discovered.

VII. 1. 1. *Servia (fig. 22 no 2)*

Until 1974, when flooding by an artificial lake brought an end to its existence, the site of Servia could be found in West Macedonia, some 6 km North of the present village of the same name, near the road connecting Thessaly and Macedonia. It was a low spreading mound on a river terrace, about 17 m above the Aliakmon and in the vicinity of the only convenient ford across that river. It was discovered in 1909 by A.J.B. Wace (1913-14, P. 123) and excavated in 1931 by W.A. Heurtley. When it became clear that the site was immediately threatened by flooding a rescue excavation was undertaken by the Greek Archaeological Service and the British School in Athens (Ridley and Wardle 1979, pp. 185-230). The main area did not contain any Early Neolithic material, but it was found in some trenches laid out 500 m downstream, east of the main site. Both areas stand on the lowest river terrace, within a few hundred meters of a good spring. The soil in this region probably consisted of riverine clay.

We have a little additional data on the vegetation during the Early Neolithic period from charcoal analysis, which so far has revealed maple, plum-type, ash and poplar, with pine and deciduous oak dominating (Hubbard 1979, p. 228). The wild animals represented in the Early Neolithic faunal sample are red deer, roe deer, bear and a small canid.

The only architectural remains of the Early Neolithic settlement consist of a large cobbled yard and a couple of post-holes on the extreme edge of the trench.

Having studied rather superficially a limited sample of the Early Neolithic pottery[1], we concluded that it consistently showed the same characteristics and that it could be described as follows:

Ware: Medium and fine ware most common. Coarse ware present, but rare.

Appearance: Handmade ware of good to high quality. Manufactured by a combination of modelling and coiling techniques. Medium sized vessel walls most common; both thin and heavy walled vessels occur.

Paste: Micaceous clay. Non-plastics include quartz, quartzites, fine limestone chips, possibly fine pottery grit. Grains generally < 1 mm, most not exceeding 4 mm; coarser sand rare.

Firing conditions: Open fire, not entirely controlled firing atmosphere. Temperature 750-850°C. Hardness in most cases around 3; fine wares $> 3 < 5$ on Mohs' scale.

Colour: Light or dark uncertain buffish/reddish most common with a tendency to dark. Non-oxidised dark rare. Relatively few fully oxidised. Burnished ware often mottled black-red: 'Buntpoliert'. Red slip over buff surface.

White ware extremely rare.

Core mostly oxidised.

Surface finish: Mostly disappeared, due to weathering. Rest well to highly burnished. Large part of fine ware red slipped, prone to scale; sometimes with high burnishing gloss. Fine 'Buntpolierte' ware highly burnished.

Accessories/Decorations: Pierced lugs rare.

Plastic decoration: oblong and round knobs, raised bands.

Painted decoration: red-on-red and red-on-buff. Linear patterns and solid triangles.

Incised decoration: nail impressions, very rare.

Vessel shapes: Plate-like vessel rare. Open bowl with flaring vessel wall, convex-walled open bowl, slightly closed globular jar, hole-mouthed jar and low collared vessel occur in all ware types.

Rim: usually plain, a few ledge-rims. Lip: blunt, interior tapered or upturned/folded over.

Base: low plain and higher widely flaring ring-base;

may be oval. Few high trumpet-bases; few flat footed ones.

All things considered, it seems to us that the Early Neolithic pottery from Servia compares either with transitional Early Neolithic II/III or with the beginning of Early Neolithic III from Sesklo. On the one hand we have the presence of early painted material from the very lowest level to the surface, on the other hand we have the repertory of shapes (necked jars, many offset and rolled rims), the plastic decorations as well as the very highly burnished red monochrome.

The finds other than pottery include chert and quartz implements, polished and ground stone tools, bone implements, spindle whorls, bone and terracotta beads, many clay 'spools' or bobbins of unknown use and several figurines.

The subsistence pattern is largely the same as for the Thessalian sites. Carbonised seeds and rubber casts from daub included einkorn, emmer, two-row hulled barley, peas, lentils, flax and the stones of cherry and Cornelian cherry (Hubbard 1979, p. 227). The bone sample contains about 60% sheep/goat. Pig and cattle are next in importance at about 15% each (Watson 1979 p. 228). The remaining 10% is largely made up of roe deer and red deer. This last percentage indicates that hunting was still of some importance.

The building materials recovered were local – wood and cobbles. Raw materials used to manufacture utensils and other objects were largely available locally, but some may have come from other regions.

VII. 1. 2. *Nea Nikomedeia (fig. 22 no 1)*

The site of Nea Nikomedeia is some 45 km Northeast of Servia, at a distance of 10.5 km from modern Verria. It is situated in the plain of Macedonia, an alluvial plain formed by recent silting at the mouth of the Rivers Aliakmon and Axios. In the 7th and 6th millennium B.C., the coast was probably at a distance of some 5 km from the site (Bintliff 1976, p. 247). This is a low mound, built up of occupation debris over a natural rise. In 1958 the site was first noted by Ph. Petsas, then ephoros. It was excavated under the aegis of the British School at Athens by Robert J. Rodden, during the years 1961-1963. The deposit was rather shallow, varying between 0.70 and 1.30 m in thickness. It consisted largely of Early Neolithic material, overlain by a thin level of Late Neolithic.

During the period of first occupation the knoll was probably surrounded by lacustrine silts. According to Bottema (1974 pp. 147-148) "the first farmers found the area covered with deciduous oak forest. To the East and Northeast the forest gave way to swamp forest gradually passing into Tamarisk shrub and saline meadows and, at the edge of the water, to halophytic plant communities including *Salicornia*. The landscape was transsected by small freshwater marshes. This made a mosaic of freshwater and saline habitats; a source of rich plant and animal life. The rivers and marshes were bordered by *Fraxinus exelsior, Salix, Alnus* and *Vitis*. At higher elevations deciduous oaks, *Pistacia terebinthus, Corylus* and perhaps even *Carpinus orientalis* were growing. This forest type must have covered most of the plain outside the swamps". Some additional information is given by the sample of carbonised wood; it contained *Fraxinus, Acer, Cercis, Populus* or *Salix, Castanea* and *Rosaceae* with oak, both deciduous and evergreen, dominant. Faunal remains included red deer and roe deer, hare, a canid, tortoise, fish and bird bones.

Vestiges of several buildings were recovered. According to the excavator there were two Early Neolithic building phases, separated by a thin layer of humus. All buildings were constructed in wattle and daub. Wall slots were cut some 0.30-0.35 m into the virgin subsoil. In the centre of the slots, oak stakes were driven in the subsoil at intervals of some 1.00 - 1.50 m. Upon this framework the walls were erected in wattle and daub. Most of the dwellings were square, measuring some 7.50 x 7.50 m, but there was also a large rectangular construction with sides some 12.00 m long. The buildings had an East-West orientation. The excavator assumes that the houses had pitched, thatched roofs with hanging eaves.

A rather superficial study[2] of all the reconstructed vessels and some boxes of sherds chosen at random

makes it possible to give the following description:
Appearance: Handmade ware of good quality. Mostly medium or fine ware. Little coarse ware. Manufactured in a combination of coiling and modelling techniques.
Generally of medium wall thickness.
Paste: Micaceous clay. Non-plastics include quartz, possibly some limestone, fine pottery grit and – at least in one case – a small shell. Grains in medium ware generally some 1 mm, not exceeding 4 mm. In medium fine not exceeding 2 mm. Coarse inclusions rare.
Firing conditions: Open fire, not entirely controlled firing atmosphere. Hardness generally 3 on Mohs' scale.
Colour: Dark uncertain buffish most common, followed by light uncertain buffish. Reddish shades occur less often. Fully oxidised rare. Relatively few dark non-oxidised. In some cases black base.
Core: Fairly often not oxidised.
Surface finish: Surface always smoothed, often burnished. Quality varying from streaky fugitive to highly glossy. Red slip over buff surface, often exterior only; mostly burnished.
Accessories/Decoration: Many of pierced lugs, most pierced vertically. Fairly high percentage of painted decoration- 9.5%: red-on-white slip or on buff surface; white painted mostly on exterior surface. Linear patterns and solid ones. Red-on-buff flakey, not well burnished. Red-on-white slip highly burnished, not flakey. White paint on red slip, slightly burnished, flakey. Impresso decoration: over entire exterior surface; finger nail, finger tip or pinched; few spatula.
Vessel shape: Open bowl with flaring vessel wall very rare. Convex walled open bowl and slightly closed globular jar most common, followed by hole-mouthed jar. Rim: plain, some up-out-turned. Lip: blunt, some thickened. Tapered inwards and rolled over far less common. Base: low ring-base and flat footed disc type. May be oval.

All things considered the Early Neolithic pottery from Nea Nikomedeia can best be compared with transitional Early Neolithic I/II - beginning of Early Neolithic II from Sesklo. On the one hand we have a complete absence of more complicated vessel forms (like necked jars) and on the other hand we have a fairly large amount of early painted decoration. If the pottery from the two building phases could be dated to slightly different periods we would suggest that the first dates to transitional Early Neolithic I/II and the second to Early Neolithic II. However, the very uniformity of the pottery seems to exclude this. The presence of impresso-decorated ware poses another problem. If this type of decoration was indeed introduced from some region North of Thessaly, it should have come to Nea Nikomedeia before it reached Thessaly. This hypothesis is confirmed by its presence together with early painted ware, whereas plastic decoration does not occur.

The finds other than pottery include quartz, chert and flint blades and flakes, polished and ground stone tools, bone implements- including needles-, clay sling-stones and spindlewhorls, stone ear-studs, stamp-seals, ornaments and stone and ceramic figurines.

Several intramural burials have been discovered but in most cases little trouble had been taken in preparing the graves, except for one case in which a large pebble had been placed between the jaws of the deceased.

The subsistence pattern was an agricultural one. The sample of carbonised seeds included einkorn, emmer, naked barley, lentil, pea and bitter vetch (van Zeist and Bottema 1971). The faunal sample consists of about 65% sheep/goat, 15% pig and 15% cattle, while the remainder is of wild animals. Hunting played therefore a relatively unimportant part. Of the domesticated animals, a large part was slaughtered at an immature age: 90% of the pig, 50% of the cattle and 47% of the caprovines – indicating that the stock was mainly kept for meat.

Building materials were all available locally: oak stakes, mud and chopped plants for daub, wood (willow?) and reed for wattle and roofing.

The raw materials used to manufacture the blade and flake implements are mostly available locally: flint from the outcrops in the Vermion range, some 10 km away, chert and quartz from large pebbles in nearby stream-beds (Rodden 1962 p. 277). Green and bluish-purple serpentine are available within a days reach, too. The same applies to the coarser grained rocks, like basalt, schist, sand- and limesto-

ne, used to manufacture heavy stone tools.

Even if one thinks away all the recent alluvial plains, Macedonia with its large river valleys and its wide, fairly accessible coastline offered favourable conditions for an Early Neolithic ecocomy, unless too dense a forest cover formed an impediment. One would think that the area should already have been settled during Early Neolithic I, but so far we do not have any proof of this.

VII. 2. *Epiros*

Epiros is an entirely different region from Thessaly. It is covered for the most part by high mountains which run parallel to the west coast. In the East it is separated from Macedonia and Thessaly by the steep Pindos range, which can be divided into two parts – southern and northern. These are separated by the Zygos pass, the only way to reach Epiros from Thessaly, which in winter is covered by snow. The mountains are cut through by rivers, occasionally forming lakes. Land below 200 m can only be found in the coastal area, upto a maximum of some 15 km inland, and in many places consists only of river mouths and swamps. The fairly large plain of Arta was acreated by recent alluvium from silting at the mouths of the Rivers Arakhtos and Louros.

The climate of Epiros, even in the lowlands, is entirely different, partly due to the fact that it is situated West of the Pindos range. As a result the yearly amount of precipitation is relatively high – between 1100 and 1200 mm, near the Pindos even up to 1500 mm. From the second half on June to the first week of September it is almost as dry as Thessaly, but from October to May the monthly rainfall varies between 130 and 175 mm. The temperature is lower too, the monthly average being some 24°C in August and 6°C in December, with a yearly average of 14.5°C. In the mountains it is of course much colder, these being covered with snow during most of the winter – sometimes from early October to late May.

Pollen diagrams, from Ioannina (Bottema 1974) provide some good data on prehistoric vegetation. At the beginning of the Early Neolithic period, the lower elevations were covered with dense deciduous oak forest with little shrub vegetation.

On the whole conditions do not quite seem favourable for an Early Neolithic economy, except maybe for the coastal area and in some of the river valleys. So far only one site with traces of Early Neolithic occupation has been discovered. It is *Asfaka* (fig. 22 no 3), a mound situated near the village of the same name, 15 km Northwest of Ioannina on the boundary between the foothills of Mount Mitsikeli and the marshy valley of a small river which debouches in to Lake Ioannina. It was observed during a survey by David Clarke and C. Vita Finzi (Higgs 1966 p. 22) in 1965. The pottery contained some monochrome ware and impresso-decorated ware in simple shapes. A radiocarbon sample gave a date of 7380 ± 240 BP.

VII. 3. *Boeotia*

Boeotia lies South of Thessaly. It can be reached from the plain of Karditsa, by crossing the Western part of Mount Othrys, and from the plain of Almyros, along the coast or by sea. On the North and West the region is bordered by high mountain ranges: Othrys, the Southern Pindos, Parnassos and Elikon – but the Eastern part consists of hill-land, river valleys and basins, in which there are some small lakes. Since the Early Neolithic, the geography of this region has changed slightly, for the once extensive Lake Kopaïs has recently been drained and the present plain of Thermopylae is alluvial and has been created by recent silting at the mouth of river Spercheios. We can not therefore, expect traces of Neolithic occupation in either area.

Climatologically there are no large differences between Thessaly and Boeotia. Summers in the inland are suffocatingly hot whereas winters may be fairly cold. On the whole the climate is slightly more humid, average winter precipitation being a little higher.

For the areas at lower elevations we have some good data provided by the pollendiagrams from cores of Lake Xinias, in Southern Thessaly at an elevation of 500 m, and from Lake Kopaïs (Bottema 1978, 15-28; Greig and Turner 1974, 177-194). Both indicate that the area was covered with deci-

duous oak forest with a considerable amount of shrub vegetation. *Quercus cerris* is dominant, but the spectra contain also high values of *Pistacia, Juniperus* and *Poterium* type.

In several areas of Boeotia conditions would have been quite favourable for an early agricultural economy. However, so far only two Early Neolithic sites have been discovered – Elateia and Halae, which will be discussed hereafter.

VII. 3. 1. *Elateia* (fig. 22 no 11)

The mound of Elateia is some 80 km Southsoutheast of Achilleion, at a distance of 1.5 km Northeast of modern Elateia. It is on the boundary between the valley of the River Kifissos and the Sfingion hills. The mound is some 4 metres high and consists largely of building debris over a low natural rise. During the years 1904 - 1910 it was tested by Prof. G. Soteriades (1912, p. 253-299), who discovered that there had been two Neolithic occupation periods -one with painted pottery, the other with only monochrome ware. In 1953 a small scale excavation was carried out by Prof. Saul S. Weinberg (1962, pp. 158-209), mainly with stratigraphical objectives. He discovered a succession of Neolithic levels, beginning with Early Neolithic.

The soil in the region consisted at least partly of riverine clay. We think that the vegetation will have been the same as in the Kopais basin, twenty km to the Southeast: an oak forest with a considerable amount of shrub vegetation.

In the lowest stratum of one of the trenches, remains of a wattle and daub construction were discovered. It was supported by a line of posts, as could be deduced from a row of four large postholes, a pivot stone on the same line and a parallel row of smaller postholes. A succession of at least four floors belongs to the occupation of the house.

Our study of the pottery from Early Neolithic Elateia[3] makes it possible to give the following description:

Appearance: Handmade monochrome ware, often spongy and rather coarse. Little medium and fine ware. Reasonably good quality. Manufactured by a combination of modelling and coiling techniques. Medium wall thickness.

Paste: Non-micaceous clay. Non-plastics include limestone, micaceous schists, possibly fine pottery grit. Limestone prone to elusion, giving the surface a spongy appearance. Grains in coarse ware up to 6 mm or more. Less medium wares with inclusions not exceeding 4 mm.

Little non-spongy fine ware made of micaceous clay. Non-plastics not exceeding 2 mm in size. Possibly imported.

Firing conditions: Open fire, not entirely controlled firing atmosphere. Hardness around 3 on Mohs' scale.

Colour: Mostly dark or light uncertain buffish/reddish; lower levels mostly dark, becoming lighter in higher levels. Little oxidised, the amount increasing in higher levels. Some 10% dark non-oxidised. Interior surface generally of lower value than exterior; often dark non-oxidised. Often smudged, perhaps secondarily.

Medium ware mostly fired dark uncertain reddish to dark red.

Non-spongy fine ware fired dark uncertain buffish to buff, interior often mottled.

Core: Mostly non-oxidised.

Surface finish: Always smoothed, often traces of burnishing. Medium ware: burnished exterior, sometimes both surfaces.

Fine ware: well smoothed only.

Weinberg mentions slipped ware (1962, p. 168), possibly self-slipped.

Accessories/Decoration: Plastic decoration: small knobs, oval pellets in rows, raised bands, wavy or in zigzags.

Vertical pierced lugs.

Vessel shape: Convex-walled open bowl and slightly closed globular jar most common. Few hole-mouthed jars. Weinberg mentions collared jars from the lowest level onwards (1962 p. 170). These should have been as common as open bowls and globular jars. Most shapes are slightly oval.

Rim: plain, often slightly thinned.

Lip: blunt, irregular; inside tapered quite common.

Base: round or plano-convex. Ring base rare.

Pottery lids: discs with a flat bottom and convex top. Maximum diameter 12 cm.

Comparison of this pottery with Early Neolithic material from Sesklo is slightly difficult, for we are unable to indicate how the monochrome pottery from Elateia developed – partly because several level indications have disappeared in storage and partly because the material seems rather incomplete in comparison with the information provided by the excavation report. However, all things considered, we think that the pottery from the lowest stratum at Elatia can be compared to Early Neolithic I from Sesklo, whereas in the highest monochrome stratum it shows characteristics which may be compared to Early Neolithic III ware. If this was indeed the case, then early painted decoration would have been introduced during the last part of Early Neolithic III, instead of during Early Neolithic II.

The finds other than pottery include obsidian and flint implements, ground and polished stone tools, bone implements, sling bullets, clay spools and disc spindlewhorls.

On the subsistence pattern we have little information, for there are no carbonised seeds and the bone sample has not yet been analysed. The presence of sickle blades, querns, pounding stones and implements made from the bones of domesticated animals points to an agricultural economy.

Building materials were available locally, oak and other timber for posts, wattle, mud and chopped plants for daub, and timber, reeds and mud for roofing.

The raw materials used to manufacture implements and other objects could partly be obtained in the vicinity: clay, coarse grained rocks, pebbles and larger cobbles; the finer grained rocks were available either in the nearby hills or on Mount Parnassos, 20 km to the Southwest. The obsidian is from Melos.

VII. 3. 2. *Halae* (fig. 22 no 12)

The other site in Boeotia where traces of Early Neolithic occupation have been discovered is Halae. It is a site situated on the coast in the straits of Euboia, Northwest of Theologos and 35 km East of Elateia. The prehistoric settlement is underneath a classical acropolis, which was excavated between 1911 and 1921. The prehistoric settlement was investigated in 1931 (Goldman 1940, p. 381-514) and again in 1935. Unfortunately the final publication has never been written.

The pottery from the lowest levels of this site is apparently mostly rather plain and simple. It could belong partly to Early Neolithic I.

Having investigated Early Neolithic sites in the regions surrounding Thessaly, we have seen that our knowledge of the settlement pattern is extremely haphazard. It is certainly too early to reach definitive conclusions on the distribution of settlement, but nonetheless we have seen that some of the ideas suggested in the last chapter have proved to be valid for this wider area too. As was the case in Thessaly, settlements in Macedonia, Boeotia and even in the inhospitable region of Epiros are to be found on the boundary between two different topographic zones: on the interface between river valleys and terrace, between low foothills and plains and on lake and seashores. Moreover we have noted that where contact between regions was reasonably easy, similarities could be noticed in the development of ceramic material, although there are local differences. On the other hand, Epiros, a region which could not easily have been reached from eastern Greece, but which could have had contact with the Italian peninsula, showed a different ceramic development, which might eventually be compared with contemporary Italian material.

The subsistence pattern was the same in all regions, though there may have been slight differences, due to local circumstances.

Building techniques were adapted to the materials available. In manufacturing implements, raw materials available locally were the most widely used, meaning that in general they were available at a distance of no more than 15 km. In some cases material from more remote areas was used, implying long-distance travel or exchange. It is remarkable from this point of view that obsidian – a raw material from the island of Melos – was not been used in Early Neolithic Macedonia and Epiros, whereas it has been found at all Early Neolithic sites in Thessaly, with the exception of Prodromos, and at the Boeotian sites too.

Our next stage is a visit to the Early Neolithic settlements of Attica and the Peloponnese.

VII. 4. *Attica*

South of Boeotia lies the region of Attica. It is most easily reached from Thessaly by following the East coast the straits of Euripos. The North of Attica consists of a range of low mountains, including Mount Parnis and Mount Pendelikon. The Southern part, the peninsula, is composed of coastal lowlands with hills in the centre. The entire lengthy coastline has numerous small inlets, suitable as harbours.

The climate is a maritime Mediterranean one; summers are not so extremely hot as in the Thessalian plain (27°C) and are generally cooled by a sea-breeze, the meltemi. Winters are less cold (10°C) – the average annual temperature amounts to 17.4°C. It is quite dry, with an average annual precipitation of 384 mm – with the greatest downpour in November-December.

On the vegetation at the beginning of the Neolithic period we have no information, but we think that the data from Boeotia are valid to some extent for Attica too – although we must keep in mind that the average precipitation being lower, the vegetation of this region will have been less stable. On the whole one would assume the region to have had a less dense forest cover with a larger amount of scrub vegetation.

Conditions for an agricultural economy are relatively favourable in the coastal area and, with all its natural harbour facilities, one would expect this region to have been settled during Early Neolithic I. The only settlement so far discovered is Nea Makri.

VII. 4. 1. *Nea Makri* (fig. 22 no 13)

The site of Nea Makri is situated on the shore, some 120 km Southeast of Elateia, near Marathon. It is an extensive flat site which apparently spreads over several hectares. The site was partly excavated by Prof. D.R. Theocharis in 1954 (Theocharis 1956, pp. 1-29). This proved that the deposit, which was over three metres thick, could be divided into two parts. The upper part contained Late Neolithic material and the lower part Early Neolithic.

On this shore several small streams debouch into sea. The soil is fertile, supporting vine and grain.

In the lowest levels remains of pit-houses have been discovered, dug into the virgin soil. The buildings in the following stratum had been erected in wattle and daub over stone foundations.

The following description results from our study of the pottery from Early Neolithic Nea Makri:

Appearance: Handmade, monochrome, slightly spongy ware of reasonably good quality. Manufactured by a combination of coiling and modelling techniques. Mostly medium wall thickness. In higher levels many thin walled vessels.

Paste: Micaceous clay. Non-plastics include fine limestone, quartz, possibly fine pottery grit. In lower levels coarse grains, up to 6 mm, in higher levels generally finer, not exceeding 4 mm. Limestone elusive on surface.

Fine ware: micaceous clay. Non-plastic inclusions not exceeding 2 mm, generally finer. No limestone.

Coarse ware: 4 fragments with chaff-temper. May be of wall plaster.

Firing conditions: Open fire, not entirely controlled firing atmosphere. Hardness of coarse and medium ware 3; fine ware $> 3 \leqslant 5$ on Mohs' scale.

Colour: Lowest level all dark, non-oxidised. Afterwards introduction of incompletely oxidised colours. In higher levels increase of lighter shades and of mottling with black. Interior surface often grey. Higher levels also oxidised colours. Majority remains dark non-oxidised.

Storage jars: dark uncertain reddish.

Core: of sherds with (slightly) oxidised surface, mostly oxidised.

Surface finish: In lowest levels roughly smoothed. Afterwards mostly burnished, sometimes very shiny. Coarse ware smoothed.

Accessories/Decorations: Plain and pierced lugs.

Incised ware from lowest levels onwards. Linear motifs; parallel zigzags in horizontal or vertical bands; in a few cases dots between zigzags. May be filled with white paste.

Plastic decoration: in higher levels oblong and rounded knobs in rows. Coarse jars decorated all over with rounded knobs.

Vessel shape: In lowest level convex walled open bowl and slightly closed globular jar most common; few hole-mouthed jars. In higher levels introduction of open bowl with flaring vessel wall, collared jar and storage vessel.
Rim: mostly plain in lower levels. In higher levels also up-/out-turned and thinned types.
Lip: in lowest levels mostly blunt or interior tapered. In higher levels also rolled over lip.
Base: plano-convex base and low ring-base equally common. Incised ware always has a flat base.
All in all, the pottery from the lowest level at Nea Makri may be compared with Early Neolithic I from Sesklo. It has simple shapes, the vessel walls are not very regularly shaped and are quite thick; the paste is rather coarse. Some regional difference occurs already in the use of incised decoration. It is clear that the development does not follow exactly the same lines as at Sesklo or elsewhere in Thessaly, but one still finds certain similarities, such as the introduction of collared vessels and plastic decoration. Professor Theocharis suggested that the site may have had ceramics before the beginning of the Thessalian Early Neolithic (Pers. comm. 1977). So far there is no proof of this, but it was hard to obtain well stratified material.

The material other than pottery included four flint blades, many obsidian implements including cores and waste flakes, polished and ground stone tools, bone implements including a haft, white marble and sandstone or gypsum plates and bowls, figurines, slingstones and disc spindlewhorls.

The subsistence pattern is agricultural. Carbonised grains are not available and the bone sample has not been analysed. According to the excavator a lot of bones were discovered in the lowest stratum, including sheep/goat, cattle, pig and deer.

Building materials were available locally. The raw materials used to manufacture utensils and other objects are partly found in the vicinity. The pure white marble may be from Mount Pendelikon, some 7 km to the West. Obsidian came from the island of Melos. It is noteworthy that many cores and waste flakes have been discovered at Nea Makri, indicating that blades were manufactured on the spot: So far this is the only site for which this is attested. Since it is situated on a shore which is easy accessible from Melos, one has to accept the possibility that people from this area shipped obsidian from Melos, knapped blades and then transported them over the country -or exchanged them for other goods.

VII. 5. *The Argolid*

The Argolid forms the Northeastern part of the Peleponnese. To reach it from the North one had either to cross the Isthmos or to go by sea. For the most part, the region consists of low mountains and hills through which small streams seek their way to the sea. Along the Northern coast of the gulf of Argos are stretches of lowland, of which the plain of Argos is the largest.

The climate is a maritime Mediterranean one. Summer temperatures tend to be higher than in Attica, with the same average precipitation. Winters are, however, slightly more humid: the average precipitation in November-January is 60-70 mm, whereas in Attica it is only 40-45 mm. The average annual temperature is 18.1°C, the average annual precipitation is 495 mm.

We do not have any information on the vegetation of the region at the beginning of the Neolithic. Bintliff (1977 p. 72) has suggested that "the present picture with steep soilless, barren limestone ridges is the natural one for the Southeast of Greece. But on moister zones, the areas with a deep soil, higher vegetation would in the natural state find greater scope for flourishing, e.g. into a savanna woodland on the dry but deep soiled Older Fill of the plain, a dense woodland on the moist and deep soiled Neogen and Flysch sediments of the hill-land.'

Conditions for an agricultural economy would in that case have been favourable in the lower areas. So far four sites with Early Neolithic occupation have been discovered in the region. We will begin our discussion with the settlement which has the best Neolithic stratigraphy and which certainly had human occupation from Early Neolithic I onwards.

VII. 5. 1. *Franchthi Cave* (fig. 22 no 17)

The Franchthi Cave is at present situated on the

coast, opposite the village of Koilada, some 65 km Southsoutheast of Corinth. In front of it is a small rocky terrace. Beneath it the present surface slopes gently down to the shore, some 50 m. away. On the base of the heavily eroded slope have been discovered many remains of prehistoric occupation, including obsidian, animal bones and Neolithic sherds.

The excavation of the cave has been carried out in six summer seasons, between 1967 and 1974, as part of a joint project in the Porto Cheli area by the Universities of Indiana and Pennsylvania. The Field director was Prof. Th. Jacobsen (1969 pp. 343-381 and 1973 pp. 45-89 and pp. 253-283). In the front section of the cave an enormous deposit has been excavated – in some places it was over eleven metres deep. The stratigraphy stretches from the Palaeolithic, divided into three phases, through the Mesolithic, divided into two phases, and Neolithic to surface deposits containing a mixture of Classical and post-Classical material. In all trenches a clear division was found between Mesolithic and Upper Palaeolithic. In most of them there was a break of some one metre thickness between the Mesolithic and Neolithic, but in one trench the development appears to be continuous, including an Aceramic (Pre-Pottery) phase. In all cases the change from Mesolithic to Neolithic was obvious in the finds, especially in the animal bones, being marked by the appearance of domesticated sheep and goat.

The trenches on the shore only contained Neolithic material, which could be divided stratigraphically into Early and Middle Neolithic.

During the period of the first Neolithic occupation the topography of the site was quite different. The sealevel was lower than at present. As a result there was a coastal plain in front of the cave, the shore being some two km. from the present coast, except for a narrow slough which developed some 500 m from the cave in the entrance to the present bay. South of the Franchthi headland there was a stream and in the immediate vicinity there were two springs. The coastal plain had a covering of old alluvium, the old 'red deposits' (van Andel et alii, 1980, pp. 389-402).

On the vegetation we have some additional data in the form of carbonised almonds and pistachio. The faunal sample included remains of red deer, hare and fox, bird bones, tortoise shell and large fish bones, indicating that the biotopes of these animal species could be found in the vicinity of the settlement. We think the area was lightly wooded with a lot of shrub vegetation.

The excavator assumes that the settlement stretched further to the West than the present coastline indicates. As a result we are left with only a small part of the Neolithic site. In view of the finds, this part may have been an area of craft activity rather than living quarters. There are no traces of architecture, except for some crude wall fragments, made in stone, which may have been terrace or retaining walls.

Study of the pottery of the good stratigraphical sequence of trench L5, units 54 - 30, permits us to give the following description:[4]

Appearance: Handmade ware, reasonably good to high quality. At first only medium ware, from unit 41 onwards, fine ware too, in a lower percentage. Coarse ware rare.

Manufactured by a combination of coiling and modelling techniques. Medium wall thickness most common. Black burnished ware very thin.

Paste: Non-micaceous clay. Non-plastics include grey, black and white grits. From unit 45 onwards, limestone. Grains generally around 1 mm, not exceeding 4 mm.

Fine ware: no limestone. Grains smaller than 2 mm. In a few cases golden mica flakes (Import?)

Firing conditions: Open fire, incompletely controlled firing atmosphere. Hardness of medium ware at first 2 - 3, increasing to 3 - 4. Fine ware $\geqslant 5$.

Colour: Lower units, light uncertain buffish/reddish most common. In higher units dark uncertain reddish gradually increases. Dark non-oxidised increasing. Few sherds fully oxidised.

Fine ware: Red variegated light buff fired through light uncertain buffish to light non-oxidised.

Grey variegated from light non-oxidised to dark non-oxidised.

Black burnished: dark non-oxidised.

Red Urfirnis (unit 32 and higher) light red fired.

Core: mostly oxidised in all wares.

Surface finish: Always smoothed; from beginning exterior often burnished, at first streaky. From unit

35 all burnished outside, inside when possible; very streaky to very glossy.
Red slip introduced in unit 34, use increasing rapidly.
Accessories/Decoration: Horizontal and vertical pierced lugs, amount decreasing slightly in units higher than 44.
Painted decoration introduced in unit 46; at first red on surface; linear patterns and soon solid triangles. Flaky, rare to unit 40. From unit 35 more complicated patterns, including cross-hatching. From 33 on red-on-cream slip.
Plastic decoration introduced in unit 35; rounded or oblong knobs, single or in groups; rare.
Vessel shape: Deep convex walled open bowl, slightly closed globular jar and hole-mouthed jar most common. Mostly medium sized. Introduction of low necked pseudo-collared jar, carinated vessel and shallow open bowl with flaring vessel walls in unit 30. All remain rare.
Rim: straight simple in lower units – either thinned or unchanged. From unit 42 up-/out-turned rim.
Lip: blunt or tapered.
Base: only a few fragments of ring-bases. Indications of convex base scarce.

Considering these observations we conclude that the development is a very gradual one. Slight changes are to be noted somewhere in units 46-45 with the slow introduction of early painted ware, the slightly diminishing frequency of pierced lugs and the introduction of limestone in the non-plastics of the clay. This development is not completed until unit 40, when fine wares are introduced. Around unit 35 we notice another change with the introduction of red slipped ware, the pseudo-collared vessel (38), plastic decoration and red-on-cream painted ware.
We tend to divide the Early Neolithic sequence here into two phases, the first containing units 54-39 and the second units 38-30. The slow changes within each phase may be indicated by a and b.
Early Neolithic Ia (unit 54-46)
– medium gritty monochrome ware.
simple vessel shapes.
Early Neolithic Ib (45-39)
– slow introduction painted decoration.
limestone temper
Early Neolithic IIa (38-36)
– Introduction fine ware; more complicated vessel shapes.
Early Neolithic IIb (35-30)
– Introduction slip, red and cream
Introduction plastic decoration.
This would however create a difference between the division of the Northern and Southern Greek Early Neolithic. Hence it seems better to make a tripartite division in which Early Neolithic II begins with the introduction of painted ware (unit 45) and Early Neolithic III with the introduction of slip and plastic decoration. Since we will compare the pottery from other, less well stratified sites to the Franchthi material, we will speak of Peleponnesian Early Neolithic I, II and III.

The finds other than pottery include obsidian and flint/chert implements, polished and ground stone tools, stone bowls and plates, bone implements, figurines, ceramic objects and worked shell. Hundreds of beads, made of stone, bone, clay and shell have been recovered by water sieving. The worked shell included spondylus, oyster and *cowrie*, but no *Cardium edule*.

In the lowest Early Neolithic levels several child burials were discovered. Most of the children were aged six months or less. One of the graves, discovered in the cave, had grave gifts: a small marble bowl and half of a burnished hole-mouthed jar. The grave had been covered with a stone cap.

The subsistence pattern was an agricultural one. The sample of carbonised seeds included emmer, einkorn, 6-row hulled barley, lentil and pea. The faunal sample consisted for the largest part of sheep/goat. Of the bones which could be identified to species, the majority belonged to sheep. 5 - 15% of the sample was of pig, 5 - 10% of cattle, 5% was of wild animals and 5 - 10% consisted of large sized fish vertebrae, of which some were identified as tuna. These fish were also present in the Upper Mesolithic levels. Fishing and hunting seem to have played some part, albeit a minor one, in the food pattern.

Since there are no architectural remains, except for the stone walls, we can say little on building materials. Stone was available in plenty.

The raw material used to manufacture implements and other craft objects were largely available locally. Blue flint was present on the hilltop of Palaiokastro, 2 km Northeast of the cave and among the cobbles along the beach. The volcanic stone used for querns perhaps came from one of the islands. Obsidian was of the best quality from Melos. It was already being used during the Upper Mesolithic.

VII. 5. 2. *Lerna* (fig. 22 no 16)

Lerna is situated on the shore near the village of Myloi, some 40 km (by sea) Northwest of Franchthi. It is on the south bank of the Amymone stream, which debouches into the gulf of Argos. It is an artificial mound, made up entirely of building debris of successive ancient settlements, principally of the Bronze Age. It was excavated by the American School of Classical Studies in Athens, during the years 1952-1959. The director was John L. Caskey (1954, pp. 2-30; 1955 pp. 25-49; 1956, pp. 147-173; 1957 pp. 142-162; 1958, pp. 125-140 and 1959 pp. 202-207). A fully stratified Neolithic sequence was discovered in a deposit which sometimes reached nearly four metres in thickness. It could be divided into Early Neolithic, resting on virgin soil, and Middle Neolithic. The entire settlement could not be a excavated. In some parts the deposit was at or below the water-table and in others it had been cut by Early Helladic builders.

The soil in the area is a fertile riverine clay. On the vegetation during the Early Neolithic we have some additional data, provided by the analysis of carbonised wood, which for the most part consisted of oak (M. Hopf 1962, p. 16). The faunal sample included *Bos primigenius,* wild swine, red deer, fox, hare, mallard, grey goose, crane and molluscs (Gejvall 1969 p. 10 and 48). The biotopes of these species could probably be found in the vicinity of the settlement. According to Gejvall the birds indicate a biotope with humid conditions and high ground water.

The architectural remains consist of rectangular dwellings of unknown size. They were built in wattle and daub over a stone foundation. There were at least three different phases, marked by superimposed walls. The earliest was over 0.50 m thick and stood to a height of five courses.

Of the pottery of Lerna we can give the following description[5]:

Appearance: Handmade ware. Good to high quality. Fine and coarse spongey ware. A little medium ware.

Manufactured by a combination of coiling and modelling techniques.

Spongey ware heavy walled, fine ware may be thin walled.

Paste: Fine and medium ware: non-micaceous clay. Non-plastics including fine quartz and little limestone. Fine ware generally 0.4 mm not exceeding 1.5 mm; medium ware 1 mm not exceeding 4 mm.

Spongey ware: non-micaceous clay. Non-plastics including much limestone, some quartz, grey and black grits. Generally 2-4 mm, can be as large as 8 mm or more.

Firing technique: Open fire, not entirely controlled firing atmosphere.

Hardness: spongey ware ca 3 on Mohs' scale; fine ware $4 \geqslant 5$.

Colour: Spongey ware: dark uncertain buffish/reddish; not oxidised.

Core mostly not oxidised. Red variegated: rim light buff fired through light uncertain buff body to dark non-oxidised base.

Grey variegated and black burnished, both non-oxidised.

Plain monochrome: light buff fired.

Core: oxidised or not oxidised, mostly according to surface colour.

Surface finish: Spongey ware: exterior often burnished, interior smooth.

Fine ware: often burnished exterior and interior. Black burnished very glossy.

Few red slipped, both variegated and spongey ware.

Accessories/Decoration: Pierced lugs, few lugs on spongey ware.

Plastic decoration: pellets and knobs, without pattern (Vitelli 1977 pp. 17-30).

Painted decoration: few red on buff surface, most spongey ware. Linear patterns and solid triangles. Some patterned variegated ware. Paint and biscuit very powdery, pattern not recognisable.

Vessel shape: Convex-walled open bowls and slightly closed globular jars most common, well rounded profiles.
Rim: simple straight. Lip blunt or symmetrically tapered (variegated ware).
Base: round base. Ring-base, from low to large wide out-flaring (spongey ware).

We conclude that the pottery is dated by the presence of painted and plastic decoration and of fine wares. Allowing for the possibility that plastic decoration, which we did not have in our sample, is introduced only in the higher levels, we assume that the pottery from the lowest levels belongs to the second part of the Peleponnesian Early Neolithic II.

The finds other than pottery include obsidian and flint implements, ground and polished stone tools, bone implements, ceramic objects and a few figurines.

The highest level of the Early Neolithic stratum contained a pit grave with the skeleton of an adult. It had a burnished monochrome bowl as a grave gift.

The subsistence pattern was probably an agricultural one. No samples of carbonised seeds have been taken, nor were there impressions on pottery (M. Hopf 1962 pp. 1-16). The faunal sample was small, 165 identifiable bones in total. It consisted of 52.8% sheep/goat, 20.6% pig, 10.3% cattle, 15.7% wild animals and 0.6% dog. This seems to indicate that hunting still played a fairly important role in subsistence, especially since the wild animals include *Bos primigenius,* a good supplier of meat. Fish bone remains are rare in the entire bone sample: from Early Neolithic to Late Roman times there are 13 fragments only. Gejvall supposes they were eaten by pigs, dogs, foxes and other scavengers.

Building materials could be found in the vicinity: stone from the stream beds and the shore, mud, branches, reeds and chopped grasses. Raw materials for manufacturing utensils were largely available locally – only the obsidian came from a distance, being Melian.

VII. 5. 3. *Nemea* (fig. 22 no 15)

The site of Nemea is situated near the modern village of the same name, some 30 km Northnorthwest of Lerna, in the vicinity of the Corinth-Argos road. The valleys of several streams, coming down from Mount Thraki, unite here in a small basin. It is an area which is well known for its wine and its olives. It was known that the Classical site of Nemea was to be found here. The site was excavated between 1924 and 1926 by the American School of Classical Studies at Athens. The directors were Carl W. Blegen and B.H. Hill. By mere change Blegen (1975, pp. 224-227) discovered at a distance of some 600 m from the main site a rather large amount of Neolithic material and he decided to make a trial trench. This was enlarged till it measured 30 x 8 m. Apparently it had been a kind of cave or overhanging rockshelter, which had collapsed. The hard packed layers of earth, containing animal bones and potsherds, lay both below and above the fallen rock material. The whole deposit dated to the Early and Middle Neolithic periods. When the excavation was reopened in 1973 a rescue excavation was carried out near the 'cave' (Miller 1975, pp. 143-172). The area had been deep-ploughed to make it ready for viticulture, disturbing a large part of the ancient fill. Fortunately there were still some remains in the form of large amorphous pits cut into bedrock.

Architectural remains have not been discovered, neither in the old excavation nor in the new one. Blegen supposed the cave to have been a rubbish deposit near the settlement and the pits were clearly rubbish pits. If these pits were within the settlement, then it has been largely destroyed. If they were slightly outside, then there would still be some hope of recovering further remains.

The study of the Early Neolithic pottery permits us to give the following description[6]:
Appearance: Handmade ware, good to high quality. Fine and sometimes spongey medium and coarse ware. Manufactured by a combination of coiling and modelling techniques.
Medium wall thickness most common. Spongey ware may be heavy walled.
Paste: Fine ware: red variegated non-micaceous clay. Grey variegated slightly micaceous clay. Non-plastics include quartz, brown grits and fine limestone; most smaller than 0.4 mm, not exceeding 1.5 mm. Medium and coarse ware: slightly micaceous

clay. Non-plastics include much limestone, quartz, brown and grey grits. Medium generally around 1 mm, not exceeding 4 mm; coarse generally 2 mm, not exceeding 8 mm. Limestone on surface prone to elusion: spongey effect.
Firing conditions: Open fire, nor entirely controlled firing atmosphere.
Hardness 3 on Mohs' scale; of variegated ware $> 3 \leqslant 5$.
Colour: Spongey ware never completely oxidised. Mostly dark uncertain buffish/reddish. Few dark non-oxidised. Core always non-oxidised.
Red variegated: rim light buff fired, through light uncertain buffish body to dark non-oxidised base. Core irregular (oxidised to non-oxidised).
Grey variegated: light non-oxidised rim to dark non-oxidised base.
Surface finish: Medium and coarse ware mostly exterior burnished, interior smooth. Finish of spongey ware has disappeared.
Variegated ware: well burnished exterior, smooth interior.
Accessories/Decoration: Vertical pierced lugs.
Plastic decoration: on variegated ware, small round knobs in a row below lip or diagonally over body.
Painted decoration: on spongey ware only. Red on buff surface, fugitive rectilinear pattern and solid triangles.
Among the 1925/26 material one bowl with incised decoration, a line pattern in lozenges.
Vessel shape: Spongey ware: convex walled open bowl and slightly closed globular jar with plain rim and blunt or flattened lip most common. Supported by ring-base. Few pseudo-collared jars.
Red variegated convex-walled open bowl and open bowl with flaring vessel wall. Plain rim; interior or symmetrically tapered lip. Plano-convex base or ring-base, low straight to wide out-flaring.
Grey variegated: convex-walled open bowl and open bowl with flaring vessel wall most common, but also semi-carinated closed globular jar and semi-carinated shallow open bowl. All have plain rims; simple shapes unchanged with tapered lip, more complicated shapes thinned with interior tapered or sharp lip. Plano-convex base or low ring base.

From the above description we conclude that the Early Neolithic pottery from the rubbish pits of Nemea can be dated around the beginning of the third Peloponnesian phase: there is spongey ware, but there are also fine wares; there is painted decoration, but also plastic decoration.

The material other than pottery included quite a lot of obsidian blades, flakes and cores and two chert cores, indicating that blades were manufactured locally. Other finds consisted of ground and polished stone tools, bone implements, a few stone ornaments and various bone material.

The only evidence we have for the subsistence pattern is given by some of the stone tools (querns); they seem to point to an agricultural economy. The bones have not yet been analysed.

The raw materials are for the largest part available locally or at a modest distance, with the exception of the obsidian.

VII. 5. 4. *Corinth* (fig. 22 no 14)

The road from the Isthmos to Argos leads, immediately South of the Gulf of Corinth, through a three km. wide valley between Mounts Oreios and Akrokorinthos. At the foot of the latter lies the site of Ancient Corinth.

Since 1896 excavations have been carried out all over the site by the American School of Classical Studies. It is no easy matter to reconstruct the earliest settlement, for the site has been inhabited from the Neolithic until the last century. Since the site is situated on a fault-line it has been subject to catastrophic earthquakes rather often, including that in 1858 which demolished the last settlement. The most recent series of earthquakes at this site was during the winter of 1980/1981. This does not facilitate the investigations either.

Weinberg has tried several times to establish the stratigraphy of the prehistoric settlement (1937, pp. 487-524; 1947, pp. 165-182) and finally succeeded in establishing a neat sequence from the beginning of the Middle Neolithic to the Early Helladic (Weinberg and Robinson 1960, pp. 240-253). Unfortunately the trench was too small to get a good stratigraphy for the Early Neolithic as well. In 1968 and 1973 further evidence for an Early Neolithic strati-

graphy was brought to light (Lavezzi 1978, pp. 402-451; Williams II, 1974, pp. 24-25), but as yet only a small part of the Neolithic settlement has been recovered.

None of the excavations has revealed architectural remains. In fact, the finds are largely restricted to pottery. We studied some of this material[7] and in doing so were struck by the fact that many of the mock-variegated fragments (see below) seemed to have an additional layer of clay spread over the interior and exterior surfaces- a kind of clay slip. The core often had many holes, which apparently were not caused by the burning out of the non-plastics, but looked like air-bubbles, giving the impression that the clay did not cohere very well. We wondered whether the consistency of this paste had been too dry and whether an additional coating of clay had been used to cover weak spots. Of the Early Neolithic pottery from Corinth we can give the following description:

Appearance: Handmade ware, good to high quality. Fine ware, medium and coarse spongey ware, medium fine and medium ware. Manufactured by a combination of coiling and modelling techniques. Medium wall thickness most common. Fine ware may be thin walled.

Paste: Spongey ware: micaceous clay. Non-plastics include much limestone, quartz, brown and black grits. In medium ware grains 1-2 mm, not exceeding 4 mm; in coarse ware 2 mm, generally not exceeding 8 mm.

Other wares: non-micaceous clay. Non-plastics include quartz, brown, grey and black grits; little or no limestone. In fine ware granules generally ca 0.1 mm, not exceeding 1 mm; in medium fine ware ca 0.6 mm, not exceeding 2 mm; in medium ware ca. 1.0 mm, not exceeding 4 mm. Some sherds contain golden mica.

Firing conditions: Open fire, incompletely controlled firing atmosphere. Hardness of spongey and medium wares generally 3; fine ware $> 4 \leqslant 5$ on Mohs' scale.

Colour: Fine ware: red variegated exterior light buff fired rim through light and dark uncertain buffish body to dark non-oxidised base; interior entirely buff, entirely non-oxidised or changing from buff to non-oxidised.

Grey variegated: exterior from light non-oxidised rim to dark non-oxidised base; interior non-oxidised.

Black monochrome: dark non-oxidised.

Medium fine ware: mock-variegated as red variegated, often with non-oxidised core.

Red slip over light uncertain buff surface. Painted decoration on light buff fired or light uncertain buffish surface.

Medium ware: mostly dark uncertain buffish.

Spongey ware: light and dark uncertain buffish and reddish most common. Fair amount of dark non-oxidised. No oxidised colours.

Surface finish: Often disappeared on spongey ware; where present, smoothed or slightly burnished.

Variegated wares: most burnished, some very glossy.

Medium ware: lightly burnished. Towards end of period introduction of red slip over exterior only or over exterior and interior surface; flakey and fugitive, burnished.

Painted ware burnished, sometimes before, sometimes after.

Accessories/Decoration: Horizontal and vertical pierced lugs. Strap handles on small bowls.

Plastic decoration: round knobs in groups all over vessel; beads in rows.

Painted decoration scarce: red on white slip (very few) and red on buff surface, both on medium and on spongey ware. Linear patterns, net patterns, solid triangles.

Vessel shape: Convex-walled open bowl and slightly closed globular jar most common. Few shallow bowls with flaring vessel walls. More complicated shapes like a spouted vessel, biconical and gouged bowls, the latter only with fine variegated ware. Pseudo-collared jars in spongey ware.

Transition Early to Middle Neolithic: introduction of askoïd jug, in red on white painted ware only.

Rim: straight thinned, unchanged rare.

Lip: blunt or flattened; with unchanged rim tapered symmetrically or interior. Some coarse spongey ware has blunt lip with impressions, causing corded appearance. One ledge-rim on red slipped ware.

Base: rounded base or low ring-base. Lavezzi (pers. comm. 1977) suggested introduction of ring-base to be slightly later. Grey variegated occasionally flat

footed base or flat base.

This is the description of an unstratified, mixed Early Neolithic assemblage. From the stratigraphy we have only the indication that red slipped ware was introduced during the transition from the Early to Middle Neolithic. Comparing the above to the well stratified pottery from Early Neolithic Franchthi, we notice, that all the characteristic elements for the entire Early Neolithic sequence are present. Although we have no proof, we assume that Corinth had human occupation from the earliest phase of the pottery bearing Neolithic.
The very scarce data give no information on the subsistence pattern, nor on the raw materials used, except for clay.

VII. 6. *Messenia*

The region of Messenia is in the Southwestern part of the Peleponnesos. It is largely built up of low mountains, cut through by many streams and rivers. The high and barren Taïgetos separates it in the East from Laconia. The only lowland areas are the coastal plains and the valley of the River Pamisos. The latter is covered by recent alluvium.

The climate is a maritime Mediterranean one; summers are hot, though less suffocating than in the inland areas. The annual rainfall is far higher than in the Eastern Peleponnesos, albeit less than in Epiros – amounting to some 700 mm.

A lot of work has been carried out in this region by the University of Minnesota, in an attempt to reconstruct the Bronze Age environment (McDonald and Rapp 1972). This has had some results for the Neolithic as well, since it provides us with the vegetation history of the region (Wright 1972). More recently the bay of Navarino, better known as Homeric 'sandy Pylos', has been investigated (Kraft et alii 1980) in order to reconstruct the palaeogeomorphology. Pollen analysis indicates once again a forest cover with a fair amount of shrub vegetation, oak, pine and olive being the dominant trees.

The areas best suitable to settlers with an agricultural economy are the coastal plain and the valley of the Pamisos. The only proof of such habitation has been discovered on the Northeastern slope of Palaiokastro, a ridge near the bay of Navarino. The site is known as the *cave of Nestor* (fig. 22 no 18). Survey of the region was carried out during the excavation of the Palace of Nestor at Ano Englianos, some 7.5 km to the Northeast. A few test trenches have been dug in the cave, under the supervision of D.R. Theocharis and W.A. McDonald (Blegen 1954, p. 32; McDonald and Hope Simpson 1961, p. 243). These explorations have not yielded any architectural remains, but there was a deep accumulation of stratified debris. It showed that the cave had been used over a long period, from the Neolithic till at least the end of the Late Helladic. According to D.R. Theocharis (1977, pers. comm.) there was Early Neolithic I material among the pottery. It is not clear what purpose the cave served, although it is not unlikely that it served as a shelter.

Having investigated the Early Neolithic sites of those parts of mainland Greece which do not border on Thessaly directly, we notice that, although the data are extremely scarce, Early Neolithic settlements are again situated on the boundary between two different sorts of topography: on or near the shore and in the low foothills near a plain. We have also noticed that although there are similarities in the earliest ceramic material, regional differences in development are soon detectable. A tripartite division of the Early Neolithic may still be maintained, although we have to bear in mind that it is best to make comparisons with the nearest well stratified site instead of looking at a fixed model like Sesklo.

The subsistence pattern is basically the same at all sites, that is agricultural, although at some sites hunting and/or fishing still played a certain role. This seems especially to be the case in the Argolid, where the environment is less stable and the soil less fertile than in, for example, Thessaly.

Building was, as far as we know, adapted to the raw materials available. The raw materials used to manufacture implements and other objects were mostly available locally – that is to say either in the immediate vicinity or within a day's reach. The only exception is obsidian, which is present at all sites. This all came from Melos. Proof of the manufacture of obsidian implements has however been discover-

ed at only one site for certain, Nea Makri, and possibly at Nemea too. Geographically, Nea Makri would be well suited to serve as a harbour for boats coming from Melos.

VII. 7. *The islands*

Our next step will be to investigate whether there were any Early Neolithic settlements on the Greek islands and whether there was any similarity with the mainland sites.

One of the problems which presents itself immediately, is the fact that sea-level has risen some seven metres since the Early Neolithic. Considering the fact that Greek islands are rather rocky and that most of them, especially those in the Eastern part of the Aegean, do not have a high average annual precipitation, one assumes that the most suitable areas for an agricultural economy would be near the coast, if possible near a bay or on the side of the island which is best protected against the heavy winter storms. Settlements situated in such a location will more likely than not have been submerged.

The only sites at which traces of Early Neolithic have been recovered are Sidari on Corfu, Aghios Petros and Skyros in the Sporades, Kythnos in the Cyclades and Knossos on Crete.

VII. 7. 1. *Sidari*

The east side of Corfu is covered with rolling hills. The coast has many beaches and inlets. The north side is dominated by the forbidding Mount Pantokrator, but the coastal area is gently sloping and has the same character as the eastern shore. The west side plunges steeply into the Ionian sea and heavy breakers lash the cliffs. Even at present there are no fishing activities near this shore.

The climate is mild and fairly humid. The average January temperature is 10°C, the average in August 26.6°C, while the yearly precipitation amounts to 1170 mm.

On the vegetation during the Early Neolithic we have no information, but it probably did not differ much from the Epirot lowland vegetation: a dense forest cover with some shrub vegetation. The area best suited to Early Neolithic settlers seems to be on the eastern and northern coast. At present only one site has been recovered, that of Sidari on the northwest coast.

The mound or cliff of Sidari consists of a deposit of building debris over a low natural elevation. In 1965 survey and a trial excavation were undertaken by Dr. A. Sordinas (1968, pp. 29-96; pp. 401-407). This revealed a stratigraphical sequence from the Mesolithic, through the Neolithic to the local Bronze Age. The Neolithic directly overlay the Mesolithic and has been divided into two phases with a sterile layer in between. The lower phase belonged to the earliest pottery-bearing Neolithic and the upper to a later phase of Early Neolithic.

No architectural features have been discovered, except for some lumps of baked clay which could be daub remains.

The pottery can be described as follows:
Appearance: Handmade monochrome ware of reasonably good quality.
Manufactured by a combination of coiling and modelling techniques. First phase: heavy walled vessels. Second phase: Thin vessel walls.
Paste: First phase: non-micaceous clay with fine sand, granules some 0.1-0.3 mm.
Second phase: non-micaceous clay. Non-plastics including crushed chert, granules 0.6-2 mm.
Firing conditions: First phase possible sun-dried.
Second phase: open fire, not entirely controlled firing atmosphere.
Colour: First phase: dark uncertain buffish, core lower values.
Second phase: dark uncertain red to dark red fired, core oxidised.
Surface finish: Smoothed.
Accessories/Decoration: First phase some incised decoration; zones filled with parallel wedges.
Second phase: horizontal lugs. Impresso decoration, made with fingernail or stamp; all over body.
Vessel shape: First phase: convex-walled open bowl and hole-mouthed jars.
Rim simple, straight. Lip blunt or flattened. Convex base.
Second phase: convex walled open bowl most

common. Rim straight, a few out-turned. Lip blunt or interior tapered.
Base: low ring-base or flat footed base, often slightly concave centre.

The first phase material can be compared with the earliest pottery from most other Early Neolithic I sites, except for the fact that it may have incised decoration. The second phase material might in Greece best be compared to the pottery from Early Neolithic Nea Nikomedeia, although painted decoration is absent. This would place it somewhere in the beginning of Early Neolithic II. On the whole we have, however, the impression that it may be better to relate Corfu to Early Neolithic Italy or to the Epirot/Dalmatian coast rather than to the Greek mainland.

The finds other than pottery from the Early Neolithic strata consisted of flint implements made of local raw material. The Mesolithic stratum consists of a shell midden. The most distinctive feature was the presence of a large number of microliths, struck on diminutive nodules of fine grained grey translucent flint of unknown provenience. According to the excavator the microliths had typological affinities with the Italian Mesolithic (Sordinas 1969, p. 405).

The prevalent subsistence pattern during the Mesolithic was attested by the number of *Cardium* shells, although some small game was evidenced too. During the Early Neolithic there was an agricultural economy, or at least stock-rearing as is attested by the presence of bones of sheep/goat.

VII. 7. 2. *The Sporades*

Investigation of the provenience of the different raw materials used at Early Neolithic sites in Thessaly and consideration of the manner in which domesticated sheep/goat and crops may have reached the Northern part of the Greek mainland, inevitably draws one's attention to the long chain of islands, which runs out into the Aegean from Thessaly.

These islands consist mainly of hill-land, gentle in some places but with steep precipices in other areas. In general the soil is quite fertile. The climate is maritime Mediterranean, milder and slightly more humid than in inland Thessaly. In winter, northern and western coasts may be subject to heavy gales, in which even well enclosed beaches may be inaccessible.
In view of the fact that even now some of the islands are well wooded by Greek standards, one may assume that they had some forest cover during the Early Neolithic period too.

Southern and eastern coasts offer the best conditions for settlement by early agriculturalists. Unfortunately many of these settlements may have disappeared, since the shore slopes gently into the sea on most coasts.

By very careful investigation, Prof. D.R. Theocharis succeeded in discovering two island sites which still have traces of Early Neolithic settlement: Aghios Petros and Skyros. Only at *Aghios Petros* has he excavated (1970, pp. 271-277). This revealed that the site had been occupied during Early Neolithic II/III and the Middle Neolithic. The Early Neolithic stratum had some architectural features in the form of a stone foundation wall.

The pottery included early painted ware, red slipped ware and impresso decorated ware[8]. The material other than pottery consisted of flint and obsidian implements, ground and polished stone tools, bone implements, ceramic objects and figurines.

We have only the results of a preliminary analysis of the bone sample. It included sheep/goat, pig and cattle and only a few bones of wild mammals. The subsistence pattern was agricultural and hunting played a role of little importance. There is no evidence of fishing.

It is not clear whether raw materials, other than obsidian, were available locally, that is to say on nearby Alonissos, or whether they had been brought from greater distances.

The other site was situated on the eastern coast of *Skyros,* below the present town of Skyros. Unfortunately it has building debris some 10 m high overlying it. Part of it has been washed away by the sea. According to Theocharis (1977, pers. comm.) some of the pottery from this natural profile could be dated to Early Neolithic I.

VII. 7. 3. *Kythnos*

Kythnos is one of the islands of the Cyclades. The

climate is drier than in the Sporades, the average annual precipitation being only some 380 mm.

A preliminary survey of the island led to the discovery of an apparently Pre-Ceramic camp and cemetery (Honea 1975, pp. 277-279). The artefacts consisted of a flaked stone industry which could be divided into two groups, one native and one imported. In the former, quartz and quartzite were dominant; the tools are large and heavy. In the latter group, flint and obsidian were dominant. The flint came from Paros or Naxos, the obsidian from Melos. A tendency towards the production of tools on small flakes could be noticed, but retouched tools were infrequent – it was largely a flake industry.

One complete and three partial ochre-sprinkled burials have been discovered. All were located under disturbed rock-caving. The bodies were in a tightly flexed position and had a flat stone between the knees and chin.

One carbon sample taken from an exposed burial yielded a date of 7875 ± 500 BP (GX 2837).

VII. 7. 4. *Knossos*

The site of Knossos is to be found on Crete. The centre of the island is dominated by several groups of high mountains from West to East Mount Levka, Mount Ida, Mount Dikti and Mount Thripitis. They are separated by river valleys running from North to South. The northern coast is largely composed of gentle sloping hills, the southern coast partly of steep cliffs, partly by the large plain of Mesara.

The climate of northern lowland Crete is a maritime Mediterranean one. The average temperature in the coldest winter month is 12°C, the average of the warmest summer month is 28.5°C. The average annual precipitation is some 530 mm, of which the largest fall is in December and February, whereas the summer months are almost entirely dry. The southern part of the island is far warmer, especially in summertime.

At present, most lowland areas and the highland plain of Lasithi are fertile and extensively used for agriculture . They used to be irrigated by small windmills. We have no information on the vegetation of Crete during the Early Neolithic. However, there are historical sources which cite Crete as having an extensive forest cover. During Roman times it was famous for timber and even in the 17th century Mount Ida was covered by cypresses (Bintliff 1977 p. 74). It seems quite probable that the fertile lowland, which at present grows many olives and fruit trees, had a forest cover during the Early Neolithic, possible intermingled with shrub vegetation.

The site of Knossos is situated in the North of Crete, 5 km Southeast of Iraklion, in the wide valley which separates Dikti and Ida. The area is covered with rolling hills and several streams seek their way to the sea through this valley. The site is world famous for its Minoan palace, but the presence of a Neolithic settlement below the palace remains had already been recognised by Sir Arthur Evans at the beginning of this century (Evans 1921, p. 34). His soundings established that it was of considerable size and that occupation had lasted for a long time, the depth of the deposit being nearly ten metres. Most of the soundings were too small to get any real stratigraphy. For this reason the excavation of the Neolithic settlement was undertaken by the British School of Archaeology during the late 1950's, at first under the direction of M.F. Sinclair Hood, later under John D. Evans (Evans 1964, pp. 132-240; 1968, pp. 239-276). These excavations revealed that the Neolithic sequence at Knossos covered the entire Neolithic period, including an Aceramic phase. There was no marked break between the Pre-Pottery and pottery-bearing Neolithic.

Architectural remains have been recovered from the Aceramic stratum on. In the lowest three strata these consisted of more or less rectangular buildings, 4 x 5 m in size and built in mudbrick. In strata IX and VIII the mudbrick had apparently been fired (Evans, 1964, p. 144). In the foundations mudbrick alternated with large stones, including discarded grinding slabs. The roofs are supposed to have been flat. From stratum VII onwards the dwellings had been erected in pisé on a stone foundation, often made of large slabs and kouskouras – a very soft local limestone. This technique was used during the remainder of the Neolithic.

John D. Evans has estimated the size of the settlement in different periods (1971, pp. 95-118). The Pre-Pottery settlement measured some 0.25 ha,

while at the end of stratum VIII it covered a little over 0.50 ha.

The Early Neolithic pottery is very different from the mainland material. Dr. A. Furness has refined and modified a sequence made by Dr. D. Mackenzie for the pottery excavated by Sir Arthur Evans (Furness 1953, pp. 94-134). The material excavated by John D. Evans corresponded remarkably well to this sequence (Evans, 1964, p. 194). Paste, firing conditions and general appearance are not very different from those of the mainland pottery, but vessel shapes and decoration show no relationship. The vessel shapes include open bowls with splayed profiles from the lowest level on, whereas on the mainland they are only introduced at the end of Early Neolithic III. Bases are all flat. Accessories include wishbone handles, strap handles and trumpet lugs from the lowest level onward. Plastic decoration is restricted to coarse ware, whereas incised decoration is found only on fine ware. The latter has motifs outlined by incised lines, while the patterns are then filled in with points. The designs include triangles, chevrons, chequers and step patterns. The incisions are often filled with white chalky matter. The only mainland site where a similar type of decoration, albeit with simpler designs, has been found is Nea Makri, where it is present from the lowest level on – as is the case at Knossos too.

On the whole, the pottery does not fit a normal Early Neolithic pattern, be it Greek or Near Eastern. This is not the case with the finds other than pottery. These include abundant obsidian and a little chert – largely a blade industry; ground and polished stone tools, including quite a few mortars and querns; bone implements, ceramic and stone objects and ornaments, including ear-studs; ceramic and marble figurines.

Several child burials have been discovered within the settlement, most of infants aged six months or less. There were no grave gifts.

The subsistence pattern was undoubtedly agricultural. The Pre-Pottery stratum yielded a fairly large sample of 3000 seeds, of which 2900 were of bread wheat – *Triticum aestivum* – a remarkably pure crop for the period. In addition there were seeds of emmer, einkorn and lentil. The carbonised wood was in every case undoubtedly oak. The faunal sample consisted largely of sheep/goat, pig and some cattle. There was evidence of slaughtering at an immature age.

All raw materials used, either for building or for manufacturing utensils and other objects, are of local origin, with the exception of the obsidian, which is from Melos.

It will be clear from the above that there are some imponderables in the earliest Neolithic strata from Knossos: the pure crop of a wheat type which does not occur elsewhere in Greece during the same period; the use of (fired) mudbrick in the lowest strata; the presence of highly developed pottery shapes from the lowest pottery bearing levels onwards. Given the fact that there is no satisfactory evidence for earlier human occupation on the island, it is even more difficult to solve the problem of the origin of the Cretan Neolithic. The early dates for the lowest strata do not permit any links with Asia Minor, where similar pottery developments are found during the Late Chalcolithic. There may have been some contacts with mainland Greece – Nea Makri – but the two regions have clearly developed independently from each other.

The investigation of the island sites is rather unsatisfactory, in so far as only a few settlements have been located. But even these sites are situated on the boundary between two topographic zones. Four of them are directly on the shore, whereas the fifth is situated in the low foothills of a mountain range, an hour's walk from the shore.

The pottery develops differently from that of the mainland. Corfu shows influences, which are related to Italy rather than to Greece. Crete has a completely independent style. For other sites we do not possess enough data, although some of the material from Aghios Petros is related to the pottery of Thessaly.

The subsistence pattern was probably agricultural, although fishing may have played a role too.

Most of the raw materials used in building and in manufacturing utensils and other objects were available locally or within a day's travel. The only exception is again the Melian obsidian, which was used at all sites except Corfu.

VII. 8. *Final remarks*

We have now discussed all the known Early Neolithic settlements in Greece in this and previous chapters. The main stress has been on pottery, since this happens in most cases to be the only reasonably reliable dating material. We have, however included an overall impression of other categories of artefacts as well.

Looking at the climate of the various regions, we were struck by the fact that there are fairly great differences, not so much in temperature as in precipitation – from some 1200 mm in Epirus to a bare 380 mm in Attica. This makes some areas better suited for agricultural purposes than others. One would not expect many early Neolithic settlements in a region where conditions are marginal for agriculture.

As to the location of the settlements, the idea expressed in the last chapter has proved to be valid for Early Neolithic settlements outside Thessaly too. Quite a number are found near the sea, which is hardly surprising given the important role played by the sea in Greek history. Moreover Thessaly was known as the granary of Greece. It will be no surprise if coastal sites are shown to have larger marine component in the diet once more attention is paid to the recovery and analysis of fishbones.

At sites with stratigraphical evidence, we have tried to apply the Sesklo model for the development of pottery. With the necessary reservations, this model can also be used for unstratified material from settlements in the regions nearest to Thessaly. The Greek mainland – Corfu included – may be divided into five regions:

1. Northern Greece (Macedonia, Epiros and Corfu)
2. Thessaly
3. Central Greece (Boeotia, Locris)
4. Attica
5. The Northeast Peloponnese (Korinthia and the Argolid)

Characteristic of region (1), Northern Greece, is the early introduction of impresso ware, before or together with early painted ware. This may have its origins in contacts with Yugoslav Macedonia. Characteristic of (3), Central Greece, is the late introduction of early painted ware and the complete absence of impresso and incised ware. Characteristic of (4), Attica, – at least of the only site representing Attica – is the incised line pattern decoration, which is often filled with white paste. Characteristic of (5), the Northeast Peloponnese, is variegated ware and the late introduction of red slipped ware at the transition from Early to Middle Neolithic. A case apart is the development at Knossos, which from the first pottery bearing stratum onwards is entirely different from the pottery both of the Greek mainland and of the Near East. Late Neolithic vessels from some of the Greek islands and Late Chalcolithic pots from West Anatolia are the only material showing any similarity.

Comparison with the Sesklo sequence proved to be rather difficult where the Peloponnesian sites without stratigraphy were concerned. It was more useful to compare them to a local model: Franchthi. Here we are confronted with a problem, for the obvious changes in pottery types, that is the introduction of fine wares together with the introduction of new shapes, seemed to demand a division of the Early Neolithic into two parts, whereas at Sesklo we have a tripartite division. In this way a difference would be created between Thessalian Early Neolithic II and Argolid Early Neolithic II and this is just what we are trying to avoid. The solution would be either to make the Thessalian sequence bipartite – by renaming Early Neolithic I and II as Ia and Ib – or to make the Argolid sequence tripartite – by introducing a phase for the period when early painted decoration appears. The latter would in our opinion be preferable, given the fact that the introduction of painted decoration is one of the characteristics of Thessalian Early Neolithic II. The only caveat to this proposal is that regional developments in Thessaly and the Argolid are so divergent that ceramic material from an unstratified site in the South should only be compared to a Southern model and not to a Northern one.

All sites, regardless of location, had basically the same subsistence pattern, an agricultural economy, but at several sites hunting and/or fishing will have played some role. In areas where the economic equilibrium was extremely delicate and where the soil was less fertile than in Thessaly, people may have had to relapse temporarily to hunting and/or

fishing.

Caprovines were the most common domestic animals. At those sites where the bones could be attributed to one or other of the species, sheep predominated over goat (cf. Chapter VI). The bone samples from Knossos and Nea Nikomedeia indicate that a fairly large proportion of these animals was slaughtered immature – indicating that they were kept for meat.

Emmer was apparently the most important crop at all sites but Knossos.

At all sites outside Thessaly raw materials were available locally, or at not too great a distance, whereas in Thessaly they came in some cases from distances beyond a day's reach. The only exception at most sites is obsidian. It was not used at sites which were far removed from the island of Melos and to which the access was difficult: those in Macedonia, Epiros and Corfu. The chipped stone industry was a simple flake industry, but the only site where local manufacture of obsidian tools is in evidence is Nea Makri, and possibly Nemea.

ments were inhabited by people with a similar life style. There are local and regional differences in the development of the pottery; there are slight differences in the subsistence pattern – which are probably due to local circumstances. The architecture is in all cases adapted to local opportunities. But on the whole the pattern is the same at all sites.

The next question to arise will be how the appearance of an agricultural economy, involving domestic crops and domesticated animals which apparently were not native to Greece – at least as far as the caprovines and wheat are concerned – took place.

A few scattered burials, mostly of infants, pit graves and human bones are the only data we have on the way people disposed of their deceased. They have been found all over Greece, at Nea Nikomedeia, Franchthi and Lerna as well as at Knossos.

We have seen now that all over Greece settle-

NOTES

1. The Hon. C.C. Ridley kindly permitted me to study the material and provided all the necessary stratigraphic information.
2. By courtesy of Robert J. Rodden.
3. By courtesy of Prof. Saul S. Weinberg.
4. Prof. Th. Jacobsen and Mrs. K.D. Vitelli kindly permitted me to study the material. Mrs. Vitelli selected the sample and gave all required stratigraphic information.
5. By courtesy of Prof. John L. Caskey.
6. Prof. S. Miller kindly permitted me to study the 1974 material and provided all further necessary information.
7. By courtesy of Prof. Saul S. Weinberg and Prof. John L. Lavezzi. Prof. Lavezzi selected the sample and provided all necessary information.
8. The material recovered in the excavation is being studied, and will be published, by N. Evstratiou of the London Institute of Archaeology.

CHAPTER VIII

RELATIONSHIPS WITH ASIA MINOR

VIII. 1. *Introduction*

In the last two chapters we have seen that settlements with an agricultural economy appear over the whole of Greece during the same period. The subsistence pattern involves animals and crops which are not endemic. There are several theories which try to explain this sudden appearance.

The diffusionist hypothesis was first formulated by V.G. Childe during the 1920's (Childe 1925) and is still widely supported (Murray 1970 p. 30; Tringham 1971 p. 68; Mellaart 1975 p. 244, 261), although no longer communis opinio. It supposes that the entire Neolithic culture, including domestic animals and food plants and the knowledge of pottery manufacture, was introduced to Greece and the Balkans by immigrants from the Near East -e.g. Anatolia, Syria or Lebanon. The settlers are believed to have arrived in Greece with a fully developed farming economy during the late seventh or early sixth millennium B.C. Since the new settlements have produced some material – e.g. transverse arrowheads – which is not typical of the Near East, the possibility of an admixture with indigenous people has also been considered (Mellaart 1975 pp. 261-62).

Two important factors have inspired many to defend this theory:

1. In Greece there is only a scanty record of human occupation from earlier periods.
2. The wild progenitors of most Neolithic Greek crops seem to be present in the Near East, around the so called Fertile Crescent. Therefore domestication of these species should have taken place in that area. The same applies to sheep.

Another theory is the Kulturtrift theory of Schachermeyr (1955 p. 52 ff.), which postulates a continuous movement from Asia Minor (Mesopotamia and Cilicia) throughout the entire Early and Middle Neolithic.

More recently, the idea of indigenous development, postulating that the knowledge of animal and plant husbandry was transmitted through contacts with people from the Near East, has received some support (Theocharis 1973a, p. 24).

In the following chapter, we will investigate to what extent this theoretical tangle can be unravelled, using such facts as are available. We will consider the following points:

1. What do we know of Pre-Neolithic and Pre-Pottery inhabitation in Greece, especially of Mesolithic occupation?
2. To what extent may the domestication of plants and animals have taken place in Greece?
3. Would migration from Asia have been the only way to introduce an agricultural economy?
4. Is there any evidence of such a migration available?

VIII. 2. *Pre-Neolithic and Pre-Pottery occupation*

The record of human occupation in Greece during the periods preceding the Neolithic is very scanty. This is largely due to the fact that research has been very limited – interest being largely focussed on the Neolithic and Early Bronze Age, as far as prehistory is concerned. Surveys of Palaeolithic sites have been undertaken in Epirus (Higgs et al. 1964 pp. 199-245; 1966 pp. 1-29), in the plain of Larisa (Milojčić, Boessneck, Jung and Schneider 1965) and in restricted parts of the Peloponnese (Lambert 1974 pp. 723-758). Sites have been discovered in caves or – especially in the case of the Middle Palaeolithic – in open air locations in the "Red Beds".

Methodical excavation has as yet been carried out only at three possible Mesolithic sites: at Franchthi Cave (Jacobsen 1969, pp. 343-381; 1973 pp. 45-89, 253-283) and the open air sites of Viviis (Theocharis

1967 p. 40) and Sidari (Sordinas 1969 pp. 401-424). The presence of a Mesolithic stage has been proved only at Sidari and at Franchthi Cave. Viviis does not have a definite Mesolithic stratum, although there are many microlithic implements, alien to both the Upper Palaeolithic and Neolithic. At Franchthi Cave the Mesolithic debris was very thick indeed, measuring over four metres. It could be divided into two phases, of which the second was characterised by the use of obsidian. It yielded a good sequence of dates, the earliest being 9477 ± 134 and the latest 8717 ± 110 BP for the Lower Mesolithic, the earliest 9152 ± 97 and the latest 7897 ± 88 BP for the Upper Mesolithic. The Sidari Mesolithic stratum provided a date of 7770 ± 340 BP.

It seems highly improbable that these geographically remote sites would have been the only Mesolithic sites in the whole of Greece.

Pre-Pottery Neolithic is, at many places in the Near East, considered to be the incipient stage of the Neolithic period. In Greece the record is scanty, being restricted to five sites in Thessaly and to three sites elsewhere in the country. It has often been doubted whether the non-pottery bearing strata of the Thessalian magoulas really belonged to a Pre-Pottery phase, as the trenches were rather small. The fact that the Pre-Pottery pits at Argissa contained some small pottery fragments has rather enhanced these doubts. However, Knossos, Kythnos and Franchti Cave have all yielded a stratum which is void of ceramic vessels and which stretches over a larger extent than at the Thessalian sites. Vessels in an alternative raw material have not been discovered at any of the sites, unlike in Cyprus and the Levant where stone vases were used. Wood and reeds may have been used to construct vessels and these are very perishable materials.

Evidence that the use of clay was already known – e.g. clay figurines and ill-fired sling bullets – have been discovered at some of the sites. This does not necessarily mean that they had also acquired the knowledge of pottery manufacture (Schmandt-Besserat 1974, pp. 11-18; 1977a pp. 28-43 and 1977c pp. 133-150).

The earliest date of the Pre-Pottery phase is 8130 ± 100 and the latest date 7755 ± 97 BP (see table of dates); most of these dates slightly precede those for Early Neolithic I.

It cannot be excluded that a Pre-Pottery Neolithic existed in Greece, even if different from that of the Near East and of shorter duration. Comparing the dates of the initial stage of the pottery bearing Neolithic in Greece to those of the Near East, we notice that they run almost in parallel (see table 28). In the context of the migration theory, this would mean that people moved from Asia Minor to Greece when the technique of pottery manufacture was not yet, or only barely, known in the areas of origin.

VIII. 2. 2. *Domestication of plants and animals*

The theory that the domestication of crops and livestock took place in Asia Minor is generally taken for granted. As far as crops are concerned this is based on what is known of the possible distribution of the wild ancestors of these domesticates and on the fact that nowhere else has evidence of domestication been recovered. The distribution of the wild progenitors – based on the present day pattern – is as follows (Zohary 1969 pp. 47-66 figs 1, 2 and 3):

– The wild ancestor of einkorn *(Triticum boeoticum)* has a relatively wide distribution: Western Asia and the Southern Balkans including Greece.

– Wild emmer *(Triticum dicoccoïdes)* has a more restricted area: Palestine, Southern Syria, Southern Turkey and Northern Iraq.

– The distribution centre of the wild ancestor of barley *(Hordeum spontaneum)* lies in the Fertile Crescent Belt – starting in Cyrenaïca (North Africa) and Palestine, stretching to Southern Turkey, Iraqi Kurdistan and Southwestern Iran, it occurs further (North)West – in the Aegean region – and further East. Supposedly it spread to the latter regions as a weed – a consequence of agricultural activity. The same might be true for the peripheral zones in the distribution area of wild einkorn.

Domestication of einkorn is assumed to have taken place in Southwestern Turkey; that of emmer in the Upper Jordan watershed. Barley domestication could have started at less humid sites in the Fertile Crescent Belt.

Recent excavation has added some new data.

Hordeum spontaneum has been discovered in a Late Pleistocene context at Franchthi Cave (Hansen and Renfrew 1978), apparently contradicting the above mentioned theory that it spread only to the peripheral location of the Aegean as a weed. Dennell (1978 p. 159) thinks it unlikely that the distribution of wild emmer and barley has remained unchanged since the Late Pleistocene. Although there is no proof, we may not entirely exclude the possibility that the domestication of some crops was an independent, indigenous achievement. To reach a more conclusive understanding of this matter we need considerably more data from Early Neolithic settlements, in which the use of adequate sampling methods, as well as locational and environmental studies, are an absolute necessity.

The theory that the domestication of caprovines took place in Asia Minor is based on the fact that no site outside this area shows evidence of local domestication. The earliest appearence of domestic goat has been noticed at Asiab, Kermanshah, Iran (Bökönyi 1977 p. 9), dated between 10.000 and 9650 BP.

Although the wild ancestor of goat was present in Greece during the Palaeolithic – as attested by the bone sample from Franchthi Cave, which is dominated by wild *Equus* and wild *Capra* during that phase – it had disappeared before the Mesolithic period (Payne 1973 p. 59). Payne assumes that this happened when open dry conditions gave way to more wooded ones, a change taking place around 10.000 – 10.500 BP. This would be in agreement with the results from pollen analysis elsewhere in Greece (Bottema 1978 p. 19). No remains at all of the wild ancestor of sheep have been discovered in Greece (Dennell 1978 p. 158).

The case is different with both pig and dog. Their wild progenitors are present on the Greek mainland during the Mesolithic period. Dog certainly and pig probably were domesticated in Southwest Asia before they first appeared in Southeast Europe, but the domestication of these animals in Greece independently of the developments in the Near East cannot be excluded (Bökönyi 1977 p. 10). There is, however, no positive evidence.

The data available indicate that the domestication of cattle has taken place at Argissa as early as 8300 BP -during the Pre-Pottery Neolithic (Boessneck 1962; Bökönyi 1977 p. 15). The non-pottery bearing levels at Sesklo contained bone fragments of domesticated cattle too. The earliest occurrence reported in the Near East is at Catal Hüyük, in stratum VI, dating around 7750 BP, though it may have been present in stratum XII too – somewhere around 8100 BP (Perkins 1969 pp. 177-179). This indicates that the domestication of cattle was indigenous on the Greek mainland.

VIII. 2. 3. *Possible contacts between Southwest Asia and Southeast Europe (fig. 23)*

Next we will see in what manner domestic caprovines and crops could have been introduced into the subsistence pattern of the inhabitants of Greece.

In the case of colonisation, the migrants would have taken with them the knowledge of plant and animal husbandry and, possibly, the technique of manufacturing pottery vessels. If there were no migrants, this knowledge must still have come to Greece in some way, together with seeds to sow and (young) animals.

The colonisation theory postulates that fairly large groups migrated from somewhere in the Near East due to an overpopulation in the donor region. Mellaart gives evidence (1975 p. 261) for Anatolia rather than Syria or the Lebanon. It is possible that we are not dealing with the emigration of a large group directly from Anatolia to Greece, but rather with the gradual migration westwards of small groups in a series of short steps until they eventually reached Greece. In this way they would lose all contact with the mother site.

There are two routes leading from Asia Minor to the Greek mainland – the first goes by land, the second by sea. The first one involves either going all the way round the Black Sea or crossing the Dardanelles, before reaching Thrace. From Thrace it leads into Macedonia and from there on to Thessaly, Boeotia etc. The dense wood cover of Thrace will, however, not have been an encouragement. So far we have no evidence for the use of this route. The earliest settlements in Thrace date to 6450 BP, already well into the Middle Neolithic (Theocharis 1971 b).

The second route would probably involve 'island-hopping' – going by boat from island to island until a site, suitable for founding a settlement was discovered. The few island sites recovered to date may be remains of such a migratory movement (e.g. Knossos, Kythnos).

We know that already in the Mesolithic the occupants of Franchthi Cave were seafaring people, not afraid to cover large distances over water. Obsidian appeared here for the first time during the Lower Mesolithic (Jacobsen 1973 p. 77). Analysis showed that it originates from the island of Melos. Almost half of the bone sample recovered from the Upper Mesolithic stratum consisted of large fish vertebrae. Some of these have been identified as being bones of tuna fish – a deep sea and migratory species (Bintliff 1977 p. 241).

With this in mind, we think John Bintliffs theory that the '*transmerance*' of fishermen was very significant in the spread of Neolithic culture and domestic crops and livestock across the Aegean is very attractive (Bintliff 1977 pp. 120, 241). It is very likely that seafaring brought people from the Eastern Aegean coast in contact with those from the Western Aegean shores. That new developments, knowledge of techniques and goods were exchanged in both directions seems plausible. Though we do not have any proof, we can certainly not exclude the possibility that the knowledge of plant and animal husbandry was spread in this way. Therefore the change from Mesolithic to Neolithic society in Greece was not necessarily introduced by migrants from the Near East – another kind of diffusionism, in the form of transmerance by seafaring people may have played an important role in this process.

The problem which still has to be solved is why this change became necessary. We think that David L. Clarke's model described and discussed in 'Mesolithic Europe' pp. 26-34 (Clarke 1978) provides us with a, for the moment, satisfactory answer. He stresses cultural adaptations to the changing environment – an expanding evergreen ecology and diminishing herds of large herbivores.

VIII. 2. 4. *Western Anatolia and the western coast of Turkey*

Whether the knowledge of plant and animal husbandry was brought into Greece by migrants or whether it was transferred by contacts with seafaring people, one assumes that Western Anatolia and the Western coast of Turkey would be involved.

If for some reason people from the Central Anatolian plateau decided to move Westward they would probably follow the river valleys of Gediz, Büyük Menderes and their tributaries[1]. One would expect that seafaring people had contacts with the inhabitants of the neighbouring coasts – i.e. of the Western shore of Turkey.

Unfortunately little is yet known of the Neolithic and Chalcolithic periods of these regions. David French (1965, p. 15-25) has conducted a survey, covering the lower stretches of the above mentioned rivers, in which he discovered eight mounds. All except two were built up on an alluvial plain.

French assumes that most sherds are contemporary with Hacilar IX-VI, belonging to the Late Neolithic of Anatolia, dating around the second half of the sixth millennium B.C. No traces of earlier occupation of the river valleys have yet been discovered, although one would have expected them, since the valleys seem suited to the needs of early agricultural settlement. Of inhabitation of the coastal area we do not have any proof either.

VIII. 2. 5. *The artefactual data*

Assuming that Greece had been colonised by migrants from the Near East, one would expect some stylistic similarities in architecture, ground and chipped stone tools, bone implements and other objects from the newly founded settlements with those from the donor regions. If – as often stipulated – they brought the knowledge of pottery manufacture, there should also be some similarity in this aspect of material culture.

Of Pre-Pottery architecture in Greece we know nothing but for the pits and associated postholes. The exception is Knossos, where the dwellings were constructed in mudbrick on a stone foundation.

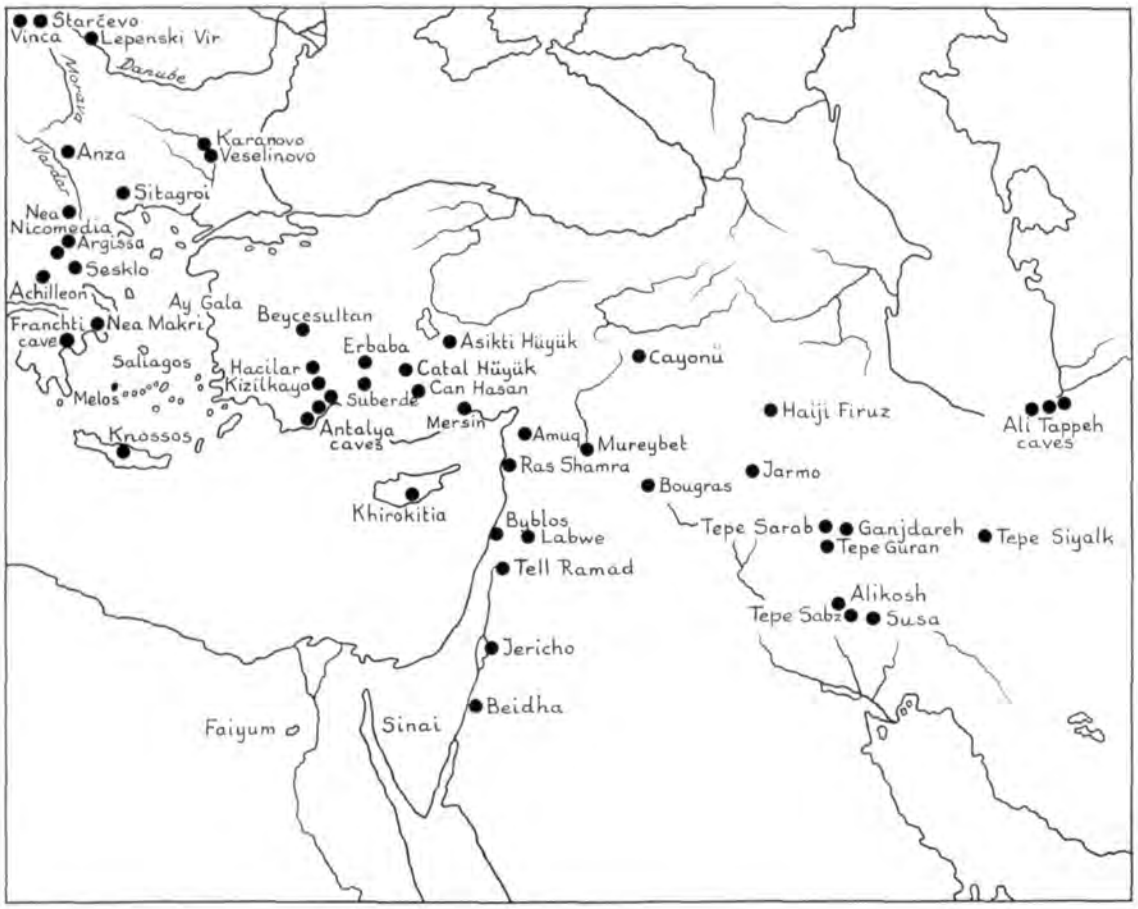


Fig. 23 Map of the Near East; some of the important Early Neolithic sites (free after Mellaart).

Early Neolithic architecture shows constructions erected in wattle and daub on a stone foundation wall or in a wooden framework, according to the material available. During the Middle Neolithic houses were built of mudbrick on stone foundation walls.

The architecture in the supposed donor region – Anatolia – was already fully developed between 7500 and 6800 BC, involving techniques like mudbrick making, bonding and even the use of terrazzo floors (Schmandt-Besserat 1977c, pp. 136-37). At Aceramic Hacilar (Mellaart 1970) clay platforms have been discovered in which saddle querns and mortars were embedded, constructions as yet unheard of at contemporaneous Greek sites.

The chipped stone industry of Early Neolithic Greece is a flake/blade industry, in which deliberately retouched blades are almost absent. The Aceramic and ceramic settlements in Anatolia have a far more complicated array of implements, including spearheads, scrapers, notched blades and other deliberately retouched blades and flakes (Mellaart 1975, p. 94 ff). At Catal Hüyük chipped stone tools even include facetted spearheads and flint daggers

(Mellaart 1975, figs. 48-49).

Most of the bone and the ground stone implements are represented on the Anatolian sites too, but the latter have a more extensive repertoire.

Earstuds are represented in both areas, but the shapes are slightly different. Greek Early Neolithic figurines bear no resemblance to the Anatolian ones.

Research into stylistic similarities has been restricted to Anatolia. Looking at more remote areas – Cilicia, Syria, the Levant and the Zagros – the differences are even larger.

Even accepting the fact that small groups of migrants – having lost all contact with the mother site – may have moved into Greece, we find it difficult to believe that they would not have retained a single aspect of their original material culture, especially where the manufacture of chipped stone tools is concerned.

It has often been stated that the technique of pottery manufacturing was introduced from the Near East, which in our opinion would presuppose a second wave of immigrants or continuous contacts. Searching for possible resemblances between the pottery of these two areas we have to conclude that it is not very likely that it was introduced by migrants. During the period when ceramic vessels were first manufactured in the Greek region, around 7700-7400 BP (see chronological table), pottery was still a rare phenomenon in Anatolia itself. It was in full use at five sites: Beldibi, Belbasi, Okuzin, Karain and Carkin – which are all situated on or near the Southsouthwestern coast of Turkey. It has been documented in quantity at two open air sites: Mersin and Erbaba (Schmandt-Besserat 1977c, p. 145). At the other sites – Tarsus, Catal Hüyük, Baradiz, Kizilkaya and Suberde – it is rare. In some cases – Can Hasan, Cayönü Tepesi – it is totally absent.

We have not been able to study the pottery of this region ourselves. For the description we have to rely on evidence given by the respective excavators and the article on the use of clay by D. Schmandt-Besserat (1977c, p. 145). Summing up we come to the following description:

The paste is mineral tempered, except for Suberde III, where is has a heavy vegetable temper. Beldibi and Belbasi (coastal caves) have a distinctive shell and chalk temper. Colours vary from red and orange (dark red and buff fired) to grey and black (dark and light non-oxidised), with at Catal Hüyük a majority of light grey and buff shades (light uncertain buffish and light non-oxidised). The usual surface finish is burnishing, polishing or at least smoothing (rare) with the exception of Suberde, where the surface is left rather rough. Wall thickness is usually around 5 mm. The hardness is variable, but the majority are very hard. Oxidation is mostly incomplete and black cores are a usual feature. The vessel shapes consist mostly of small bowls and jars with simple straight rims; one or two oval shaped vessels occur at Catal Hüyük. Nail-incised decoration is frequently found at Mersin and Tarsus. Pierced lugs are present on small jars. Catal Hüyük has – rarely – primitive painted motifs. The Beldibi pottery frequently has handles.

On the whole there are many similarities between this rare Anatolian pottery and Greek Early Neolithic pottery, but these similarities seem to exist between all early pottery from the Eastern Mediterranean and the Near Eastern regions. The repertoire of shapes is not very different, but the vessels seem to be deeper than their Thessalian counterparts (Mellaart 1975, fig. 52; Singh 1974 fig. 38 no 11-23; Mellaart 1961 fig. 2). Shallow, slightly open bowls do not apparently occur. The ring base was almost unknown, whereas flat and plano-convex bases were very common indeed. Altogether the appearance of the vessels is different.

The very rare pottery from levels XII and XI at Catal Hüyük closely resembles in shape the very coarse ware of Early Neolithic I from Sesklo, but the paste is quite different, having a partly vegetable temper (Mellaart 1966, p. 170 fig. 4). As discussed already in Chapter III. 4, this pottery is contemporaneous with the better made ware and not a predecessor of the Thessalian meterial.

A direct influence by migrants seems improbable, so we are left with the possibility that either an indigenous development took place or that there was some exchange of ideas. Fishermen may have seen pottery vessels in the coastal areas, in which case we might say that 'introduction on hearsay evidence' has taken place.

On the whole we would say that the artefactual data argue in favour of a largely independent deve-

lopment of the Greek Neolithic settlements.

V III. 3. *Final Remarks*

Summarising our re-evaluation we may conclude the following:

1. We may have to alter the general idea of a sparse inhabitation of the Greek mainland by Epi-Palaeolithic hunter/gatherers. It is highly improbable that Franchthi Cave was the only area with Mesolithic inhabitation in Greece.
2. Domestic crops and livestock were at least partly introduced from the Near East. Domestication of cattle is almost certainly an indigenous achievement.
3. Migration from the Near East is not the only way in which the knowledge of plant and animal husbandry could have been transferred to Greece. Transmerance of fishermen may have played a hitherto largely underrated role in the spread of Neolithic culture.

For the moment we have no proof that either a land or sea route was used by possible migrants from the Near East. There is no artefactual evidence which clearly relates Greek and Near Eastern settlements.

The diffusionist hypothesis still retains its original value, in as far as it involves contact between the two regions-possibly even including migration of small groups or individuals. Colonisation, in the present meaning of the word – i.e. the migratory of large groups – seems excluded.

The Kulturtrift theory is very rigid, postulating only unilateral influence, in the form of migratory groups. It is however by no means impossible that there was bilateral influence. Such movements are not restricted to the Early and Middle Neolithic, but continue to exist thereafter.

Much more research will be necessary – not least scientific analysis – to solve the questions of possible relations between the Anatolian plateau, the coast of Turkey and the Western Anatolian region. The same applies to more remote areas like Cilicia, Syria, Iraqi Kurdistan, the Levant and even the Zagros region. For the moment, however, we support the theory of indigenous development, with room still left for contacts with the Near East by which the knowledge of plant and animal husbandry was transmitted.

NOTE

1. Better known respectively as Hermos and Maiandros. The following has to be kept in mind (Eisma 1978, p. 67): "..... during the rise in sea level the sea entered the valleys to a point far deeper inland – further East – than the present coastline. By contrast, even during historical times the coastline has been seen to move Westward over a considerable distance due to stream-deposition and this process undoubtedly began much earlier."

CHAPTER IX

SUMMARY AND DISCUSSION

Our first and most important goal was to acquire better knowledge of the Early Neolithic I phase as represented at Sesklo. The second was to investigate to what extent other Early Neolithic sites in Thessaly and in the rest of Greece showed similarities with the Sesklo settlement. In the third place we examined whether it was possible to get a general idea of the environmental context of Early Neolithic settlements in Greece. In the fourth and last place we wanted to elucidate some points on the origin of Neolithic culture in Greece.

To this effect we discussed in the previous chapters the artefactual, geographical and environmental data relevant to the Early Neolithic I settlement at Sesklo. Subsequently we reviewed the other Early Neolithic sites in Thessaly and contemporaneous sites elsewhere in Greece. Finally we discussed their relationship with the Near East.

We have to admit that the data are very scarce, especially where ecological and geographical studies are concerned. The areas excavated are mostly too small to provide good information on architecture and settlement size. As a result there are many blank spaces which remain to be filled. Despite this fact it seems very useful to give a full account of our present knowledge of the Greek Early Neolithic, for still too often data are placed in the wrong context.

Sesklo is a settlement which was inhabited from the Pre-Pottery Neolithic to the Bronze Age. It is situated in a zone of low foothills an hour's walking distance from the plain of Volos and the plain of Larisa.

The Early Neolithic occupation should be divided into three phases both on stratigraphical and on ceramic evidence. The changes are gradual and there is no clear break between them. The first phase is characterised by monochrome pottery. It is made of micaceous clay, to which fine sand, in a few cases, pottery grit, generally not exceeding 3 mm in size, has been added. The shapes are simple, a convex-walled open bowl and a slightly closed globular jar being the most common. The vessels are mostly supported by a ring-base. The colour is generally incompletely oxidised. There is no decoration, except for pierced lugs.

During the second phase, painted decoration is introduced as well as red slip. The tempering material is finer grained. Shapes are still simple. Colours become more and more oxidised. During the third phase early painted decoration disappears, but plastic decoration is introduced. A large part of the vessels has a red slip. Shapes become slightly more complicated; they include collared vessels. Some 10% of the wares has a fine grained tempering material and is quite hard. The largest part has a fully oxidised surface colour. It was possible to discern changes within the phases, but they were gradual and are not stratigraphically indicated. Hence it is not possible to subdivide the phases, although within Early Neolithic I it is possible to assign large numbers of sherds to the beginning, middle or end of the phase.

Of the architecture of Early Neolithic Sesklo little is known. The Pre-Pottery stratum has traces of pits and of postholes in and near the pits – possibly pit – houses. The subsequent phases have dwellings erected in wattle and daub on a stone foundation. The house were rectangular although the exact dimensions are unknown.

Artefacts other than pottery included simple unretouched chert and obsidian blades, ground and polished stone tools, bone implements, ceramic utensils, ornaments and ceramic and marble figurines. With these objects it was not really possible to define clearly the different phases, although the

typology becomes more and more differentiated as the period proceeds.

The subsistence pattern was an agricultural economy, involving cereals and pulses, caprovines, pig and cattle. Hunting and fishing were apparently of little significance to the diet.

Most raw materials are to be found in the vicinity of the settlement. Chert, greenstone and marble are probably Thessalian, but come from distances beyond a day's reach. The obsidian originates from Melos.

The data provided by our chronological table indicate the Early Neolithic – including Pre-Pottery – to have begun around 8100 BP (all dates are given in radiocarbon years BP). Pre-Pottery Neolithic would have lasted till ca 7750 BP, Early Neolithic I to 7400 BP, whereas Middle Neolithic begins around 7000 BP. Early Neolithic I is contemporaneous with the Early Neolithic of Anatolia and other parts of the Near East, the Near Eastern Levantine Pre-Pottery Neolithic excluded, and it precedes the Pre-Pottery Neolithic of Cyprus.

To date, more than half of the Early Neolithic sites recovered are situated in Thessaly . This is partly due to the fact that more systematic investigation has been carried out in Thessaly than elsewhere in Greece, partly to the fact that several areas suitable for the Early Neolithic economy are covered with recent alluvium. Thirdly, and perhaps most importantly, climate and environment have influenced the density of inhabitation. There are many areas in Greece where conditions are marginal, because of a low annual precipitation – e.g. Attica, Arcadia and the Cyclades – or because of very broken terrain – e.g. Epirus, which moreover has a very high annual rainfall. Thrace and Macedonia were probably densely wooded at the beginning of the Neolithic and may therefore have been less inviting. Thessaly, on the other hand, may have been very suitable for an agricultural economy. After all, it is still known as the granary of Greece.

The settlements are all situated on the boundary between two different ecological zones. It is hardly surprising that, outside Thessaly, quite a number are found on or near the seashore.

Investigating whether the development of Early Neolithic ceramic material would largely be the same for the whole of Greece or whether differences would exist between the various regions, we used as a model the pottery from Early Neolithic Sesklo and examined to what extent this was applicable to contemporaneous sites elsewhere. We noted that variations occur even within the restricted area of one settlement. We should realise, therefore, that a model derived from the analysis of artefacts from an incompletely excavated site has to be treated with caution. On the other hand, we are confronted with an even greater problem in applying the model to material from other sites, since the sample we investigate for comparative purposes will be chosen for supposedly representing the best sequence.

Even taking this sample bias into account, we observe that in Thessaly regional differences occur first only after Early Neolithic II. A subdivision into three phases remains valid for the Southern part of the region, although painted decoration continues to exist throughout the entire third phase. The Northeastern region requires however a four – part division – the fourth phase being characterised by impresso decorated ware. Of the Southwestern part we know little, but both early painted and impresso ware apparently occured along with plastic decoration in the third phase. Regional differences in Thessaly seem to be restricted to the use of decoration and do not much affect our model.

Divergences from the Sesklo sequence begin as early as during Early Neolithic II in Macedonia, Attica and Central Greece. We can still use the tripartite division in Macedonia when we take into account the difference of the early introduction of impresso ware. The situation is more difficult in Central Greece and Attica, where we encounter a greater shift in the appearance of characteristics. If we are able at all to make a subdivision within the period it should be bipartite rather than tripartite. We can therefore use the Sesklo sequence with certain reservations at Macedonian sites. In Central Greece and Attica it serves only to indicate the beginning and end of the period.

Pottery from the Northeastern Peleponnese shows an even greater divergence. Differences are no longer restricted to decoration, but also concern types of ware. Nevertheless, we can compare a well stratified site to the Sesklo sequence, since there are

some similarities. The division remains basically tripartite if we use the introduction of early painted ware to define the second phase and take the introduction of fine ware as characteristic of the beginning of the third phase. However, if we want to compare material from an unstratified context, we are completely at a loss. The only solution is to use a sequence from a stratified site in that region.

Knossos on the island of Crete is a unique case to which no external model can be applied, be it Near Eastern or Greek.

Everywhere the artefacts other than pottery include a simple chipped stone industry, consisting largely of unretouched blades. Polished and ground stone tools, bone implements, ceramic objects such as sling missiles and disc spindlewhorls, ornaments and figurines are found at all sites. The latter may show some regional differences.

At all sites local materials were used for building purposes. As a result there are local differences – some dwellings being erected in wattle and daub on a stone foundation, others in wattle and daub in a wooden frame. The basic houseplan is, however, the same everywhere: either a single rectangular room or a rectangular block with two rooms, a larger and a smaller one. Knossos is the only site where mudbrick has been used.

In Thessaly some of the raw materials seem to have the same origin, situated within the region – like chert and volcanic stone. They are often found at a distance of more than a day's journey from the settlement. In other parts of Greece, most raw materials are found in the direct vicinity or within a day's reach. The exception is obsidian. This material, used in all regions but Epirus, Corfu and Macedonia, derives from the island of Melos. To obtain it a long voyage had to be made over land and sea.

In Thessaly, the only data on the way in which people disposed of their dead are given by a group of cremation burials, all accompanied by a well burnished pot and, in some cases, a tiny, crudely made pot, found at Soufli Magoula and dating to Early Neolithic III. Outside Thessaly there are only a few scattered burials, mostly of infants, and some pit-graves. Two burials have associated grave goods, in each case a burnished vessel.

All sites, within and outside Thessaly, had basically the same subsistence pattern – an agricultural economy. In Thessaly hunting apparently played no role, but at several sites outside Thessaly hunting and/or fishing seem to have been of some importance to the diet. Caprovines were the most common domestic animals (mostly 60-75%). There are indications that sheep dominated over goat. Pig and cattle make up the rest of the stock – in various percentages. A fairly large proportion of these animals, especially of pig, were slaughtered immature, indicating that they were kept for meat.

The crops included cereals, emmer being the most important at all sites except Knossos. A hitherto underestimated role may have been played by the pulses, which included peas and lentils.

It is undeniable that both domestic caprovines and wheat were imported from the Near East. Domestication of other crops and of the pig may have been local achievements. This was almost certainly the case with cattle. It is not clear in what way wheat and caprovines were introduced to Greece. There is no artefactual evidence indicating migration from the Near East: there are no similarities in architecture and technology. It is likely that the transmerance of seafaring people was rather important in the distribution of domestic crops and livestock.

In Greece the investigation of Early Neolithic settlements has often concentrated too much on the larger artefactual material, ceramics and other objects. Due to limited finances, excavations were mostly undertaken on a very small scale only. Many blanks in our present knowledge of the Greek Early Neolithic period could be filled if excavations were undertaken on a larger scale, if methods like water sieving, flotation and the scientific analysis of materials were used and if more attention was paid to ecological and geographical studies. There are also problems which are less easy to solve, like the relationship with the Near East, but even these will benefit from a better use of the possibilities which are at our disposal. With this in mind, we offer the conclusions from our present study.

We consider the development from Mesolithic to Neolithic society to be largely an indigenous achievement, albeit that the vital knowledge of plant and

animal husbandry was acquired in some way from inhabitants of the Near East.

At the beginning of the Early Neolithic, settlements with a mixed farming economy are found over the whole of Greece. The importance of fishing and hunting depended on local circumstances, whereas the gathering of fruits, berries and seeds was still of significance at all sites. The existence of sea travel and/or exchange of goods can be deduced from the widespread distribution of Melian obsidian and non-local chert.

Our study of the Early Neolithic ceramic material leads to the following theses:

1. The whole of mainland Greece shows a similar initial stage of pottery manufacture; the 'Frühkeramikum' from Sesklo is well suited as a model.
2. The use of Sesklo as a model for the development of Early Neolithic ceramic material is possible to a limited extent only.
3. Regionalism begins earlier than generally suspected. After the initial stage, strong differences in development occur between the Northeastern Peloponnese, Attica, Central Greece and the Northern regions.
4. In most regions we are able to divide the Early Neolithic into three phases.
5. Knossos shows no similarities at all with mainland Greece in its ceramic production.

The final conclusion is that the overall development within the Early Neolithic period is largely the same for the whole of mainland Greece, but that strong regional differences exist where the ceramic material is concerned.

APPENDIX I

PETROGRAPHIC THIN SECTION, AND X-RAY DIFFRACTION ANALYSIS OF POTTERY FROM SESKLO AND ACHILLEION

C.J. OVERWEEL*

Macroscopic description

Judged by colour and thickness the Sesklo sherds under investigation are heterogeneous. The fresh fracture of number 79, the thinnest sherd (0.3 cm), is light reddish brown (2.5 YR 6/4**). The thicknesses of numbers 21a, 14, 8 and 5 vary from 0.5 to 0.9 cm, and the colours of the fresh fractures of these are red (YR 4/6), light red (2.5 YR 6/6), very pale brown (10 YR 7/3), and dusky red to reddish brown (2.5 YR 3/2 – 4/4) respectively. Number 22 is 1.4 cm, and numbers 29 and 89 are both 1.8 cm thick. The fresh fracture of 22 is reddish to light brown (5 YR 5/4 - 5/3), of 29 light brown (7 YR 6/4), and of 89 light reddish to reddish brown (5 YR 6/4 - 5/3).

In spite of this heterogeneity, the Sesklo sherds under investigation are all hard, compact, completely oxidised, and have a smooth surface. Sporadic, glittering mica flakes about 0.1 mm in size show up in the dense aphanic clay. The non-plastic component consists of schist-fragments from 0.3 to 0.6 mm and from 1.0 to 3.0 mm in size. But number 22 is out of tune. It not only contains far more schist-fragments, but these are larger, measuring 2 to 4 mm, darker and finer grained. The smooth surface of the Sesklo sherds is not painted.

Two of the three Achilleion sherds under investigation are much alike. Number A1-L33 and A5 are both 1.5 cm thick and the colour of the fresh fracture is brown (7.5 YR 5/2) to pinkish gray (7.5 YR 6/2). Oxidation during firing has not been complete as both sherds have a 0.3 to 0.4 cm wide dark centre. On the exterior side they are painted red (2.5 YR 4/6 - 4/8) and white: A5 pinkish white (5 YR 8/2), and A1-L33 light gray (2.5 YR 7/2).

Both sherds are hard, and like the Sesklo sherds their clay is dense and compact. Mica flakes averaging 0.1 mm are relatively abundant in A1-L33, but macroscopically wanting in A5. The non-plastic component is made up of schist-fragments also. The larger grains from 1.0 to 2.0 mm are above all black. Lighter coloured whitish grains predominate in the 0.3 to 0.5 grain size range. In places herbaceous material is perceptible in the non-oxidised zone.

The third sherd from Achilleion looks quite different. The 1.1 cm thick pottery fragment, D3-L21 is red (2.5 YR 5/6) and completely oxidised. Its non-plastics are not schistose. The majority is white and predominates in the 0.2 to 0.6 mm grain size range. Apart from these differences D3-L21 resembles the two other sherds from Achilleion in hardness, and in density and compactness of the clay. Its smooth outer surface is decorated with a white line design.

Microscopic study of the non-plastics

Optical petrographic, thin section analysis of the sherds under examination reveals that all sections contain fragments of schists, thrown together as tiny pieces of one or more jigsaw puzzles. It is hard to say whether the individual fragments belong to one or another kind of schist. In spite of this drawback it

* Institute of Prehistory, Leiden University, Leiden.

** Colours according to "Munsell Soil color charts".

was possible to subdivide the thin sections into three groups.

The first group, the lion's share, comprises thin sections of the Sesklo sherds No. 5, 8, 14, 29, 79 and 89. They contain quartz grains in the 0.01 to 1.0 mm particle size range, with a modal average of 0.2 to 0.3 mm. Sporadic feldspar and epidote occur in the same size range. The larger grains measuring 1.0 to 2.0 mm, in some cases even 3.0 up to 5.0 mm, are schist-fragments, but in three different forms: rather fine grained quartz-biotite, quartz-biotite-epidote-feldspar, and quartz-epidote-muscovite schists.

The quartz of the rather fine grained quartz-biotite schist is made up of an equigranular mosaic with granules of 0.02 to 0.03 mm, and of patches measuring 0.1 to 0.3 mm with wavy extinction. In most cases, the granules and the larger wavy patches show a parallel arrangement, parallel also to the biotite, and sericite they enclose. In the majority of these schist-fragments quartz predominates. Grains nearly or all biotite and sericite are in the minority.

The quartz-biotite-epidote-feldspar schist is composed of parallel bands: bands of fine grained biotite, sericite, subordinate quartz, and epidote granules, bands of albite and quartz, and quartz bands made up of equigranular mosaics with granules of 0.02 to 0.03 mm, and quartz patches with wavy extinction. These patches measure 0.1 to as much as 2.0 mm. The albite of the bands of albite and quartz occurs in the 0.1 to 0.6 particle size range. An albite in the thin section of Sesklo sherd 29, however, has a length of 2.5 mm.

The quartz-epidote-muscovite schist is a coarse grained quartz mosaic containing some epidote grains, and muscovite flakes. The quartz ranges between 0.05 and 0.5 mm. The epidote granules average 0.05 mm, but the muscovite flakes reach up to 0.5 mm. Single epidote grains also occur. Quartz mosaic-epidote-muscovite fragments are particularly abundant in the Sesklo sherds 5 and, 14, where they form the greater part of the non-plastic component.

The second group of thin sections are sections of the red oxidised baked sherds 21a and D3-L21. They are characterised by quartz grains measuring 0.1 to 0.6 mm, and by granules of microcristaline calcite (micrite) with cross-sections from 0.2 to 1.2 mm. Schist-fragments in the same size fraction are occasionally encountered.

Macroscopically non-apparent, a 0.3 mm thin slip on the outside of 21a showed up beneath the microscope. A slip with non-plastics in the 0.01 to 0.03 mm grain size.

Very fine grained sericite schist-fragments, and amphibole enclosed in rock fragments, and as single grains set the thin sections of the sherds A1-L33 and A5 apart as a third group.

The grain size of the constituent parts of the very fine grained sericite schist falls under a quite different order of magnitude to those met so far in the thin sections under investigation. The quartz grains measure 4 μm - 10 μm (0,004 - 0,01 mm) and the lengths of the sericite flakes range between 4 and 20 μm. There are sericite schist-fragments where sericite and quartz occur in approximately equal quantity. But in most cases sericite is in excess of the quartz. Most of the amphibole carrying rock fragments of A1-L33 in particular, are made up of unoriented equigranular quartz grains in the size range of 0.05 - 0.1 mm, of muscovite flakes with lengths of 0.2 to 0.5 mm, and of amphibole with prism lengths measuring 0.2 up to 0.3 mm. The amphibole is colourless, has an inclined extinction of $Z \wedge c = +21°$, is biaxial negative with $-2V = \pm 80°$, and a weak $r < v$ dispersion. Its lack of colour and its maximum extinction angle of 21° point to tremolite, a magnesium-rich calcium amphibole.

Next to these relatively coarse grained, unorientated amphibole-muscovite-quartz rock fragments, one or two fragments of a fine grained amphibole carrying sericite schist occur. Muscovite flakes, and amphibole prisms both with lengths of 0.1 - 0.2 mm, are embedded in a matrix of a felty mass of sericite, and quartz. The grain size of the matrix ranges from 0.01 to 0.03 mm.

As we have seen the amphibole does not occur as a constituent of rock fragments only, but as single grains as well. The prism lengths of the loose grains measure 0.3 to 0.5 mm. These single amphibole grains are met with especially in the thin section of A5.

A5 differs from A1-L33 by containing also quartz sericite schists with sparry calcite aggregates. The equigranular quartz grains of these schists measure

0.02 to 0.03 mm, the sparite aggregates 0.05 - 0.1 mm. Loose sparry calcite grains of 0.01 to 0.02 mm also occur.

Sherd 22 stands alone. Its thin section contains a very fine grained sericite schist with quartz grains measuring 4 - 10 μm. These very fine schists favour A1-L33 and A5, but the amphibole carrying rock fragments, or the single amphibole grains are missing. On the other hand no epidote holding sericite schists occur, which sets sherds 22 also apart from the major Sesklo group.

The sherds investigated, generally do not contain sherd temper. There are three cases, however, sherds No. 22, 89, and D3-L21, which contain some pottery grit.

Results of thin section analysis of the non-plastics

The results of the thin section analysis of the non-plastics are summarised in Table 29. Except for numbers 21a and 22, the Sesklo sherds have single epidote granules, and epidote bearing mica schists in common.

Some of the Achilleion sherds are characterized by amphibole. D3-L21 from Achilleion does not contain amphibole. It stands out by a high percentage of quartz and microcristalline calcite grains, and its lack of epidote. Not including epidote bearing schists either, but microcristalline calcite and quartz grains, 21a seems to take after D3-L21.

Sesklo sherd 22 is a solitary case.

Collection of reference material of Sesklo schists

Miss M. Wijnen collected a representative assortment of schists on the surface at Sesklo to compare with the non-plastics of the scherds. Among these are several specimens, to a certain extent related to the schist fragments in the investigated sherds. Such as an amphibole holding schist, but without the sparry calcite, a quartz-mica-epidote schist, but with muscovite instead of biotite, and a quartz-biotite-epidote feldspar schist, but with additional sparry calcite, which should be wanting.

So, in spite of the variety of the collection of reference material, it does not contain schists that tally with those of the non-plastics of the pottery. This disparity suggests that the raw material for the temper was not collected at random but carefully selected.

The clay component

In both the Sesklo sherds, and those from Achilleion, the clay component appears as a brown to red brown filty mass in thin section. It is aswarm with sericite flakes that are 0.01 to 0.5 mm long. Apart from disseminated patches, hematite occurs in rounded grains as well.

To compare with the clay member of the pottery, Miss M. Wijnen, drew a raw clay sample at Sesklo. The dry sample is macroscopically reddish yellow (7.5 YR 6/6) and just as the Sesklo sherds, the clay contains mica flakes measuring 0.1 mm . Sporadic fragments of mica schists in the 1.0 to 1.5 mm size range account for the non-plastic component of our clay sample.

In thin section the clay, like the plastic member of the Sesklo sherds, has a filty appearance on account of numerous sericite flakes, measuring also 0.01 to 0.5 mm. The clay contains iron oxides in disseminated form, and as round and oblong granules. The non-plastics turn out to be rather fine grained quartz-biotite schists.

X-ray diffraction analysis

In order to examine the clay component of the sherds more closely an X-ray diffraction method was applied. Powder diagrams of the mineral mixtures of the pottery were obtained by a Guinier-de Wolff focussing, monochromator camera, Cu K_d radation, 35 kV, 20 mA, and an exposure time of 3 hours. The quadruple exposures No. 5262 and 5269 were recorded by a camera kindly placed at our disposal by Prof. Dr. P. Hartman of the Geological Mineralogical Institute of Leiden University and operated by Mr J. Verhoeven. Prof. Dr. P.C. Zwaan of the Netherlands National Museum of Geology and Mineralogy in Leiden was so kind as to allow us

to use the Guinier-de Wolff camera of his museum, by which Mr J.J.F. Hofstra made the quadruple exposures Nos. 8001, 8002, 8003, and 8004.

With reference to the combined thermal and X-ray diffraction techniques for identification of ceramic materials, introduced by Ipshording, 1974, X-ray photographs of the untreated powder samples were obtained first. Thereafter, the samples were heated at 1100° C for 4 hours, and the resulting diffraction patterns of the high temperature minerals were compared with the diagrams of the untreated samples.

The X-ray diagrams of the untreated samples.

From the Sesklo sherds 8, 14, 21a, 22, 89, and two added ones 21b and 21c powder samples were drawn, likewise from the Achilleion sherds A1-L33 and D3-L21. The Sesklo sherds 21b and 21c were added on account of heating experiments by Dr H.J. Franken, director of the Institute of Ceramic Technology of Leiden University. After heating these sherds for several hours at 1200° C, he found them to differ in colour, and he wondered as to how far this difference could be due to a non-conformity of the clay.

In the X-ray diagrams of all powder samples, the röntgen patterns of quartz, low albite, and possible lines of illite with d values of 4.5, 2.59, 2.56 and 1.50 Å are found. The 3.31 Å line of illite can not be seen as it coincides with the 3.34 Å quartz spacing. Faint reflections of hematite were noted in the diagrams of the Sesklo sherds 14, 22 and 89, whereas the X-ray diagrams of the Sesklo sherds 21a, and D3-L21 contain distinct hematite lines.

The strongest 3.03 Å reflection of calcite is faintly discernible in the X-ray diagrams of Sesklo numbers 14, 21a, 21b and of the Achilleion sample, D3-L21. An amphibole pattern is met with in the X-ray diagrams of 21a and A1-L33. In addition the diagram of A1-L33 carries reflections of chlorite affected by heat.

In the X-ray diagrams of the samples heated for A hours at 1100° C the patterns of quartz, low albite, spinel, mullite and hematite are generally encountered. Hematite, though, is missing in the diagram of number 8 and spinel in those of number 21a and A1-L33. As is to be expected, the diagrams of 21a and A1-L33 show the additional reflections of amphibole. Whereas A1-L33 stands out with a supplementory, distinct pattern of enstatite.

Spinel and mullite are high-temperature phase minerals of illite. However, according to Bradley and Grim, 1972, they should occur separately: the spinel between 1000° C and 1200° C, and the mullite above 1200°. But on the other hand, the same writers state that "very small amounts of some chemical elements may exert great influence on the high-temperature phases formed by heating the clay minerals. Descriptive data for any given illite are necessarily illustrative only and are not be construed as typical for the group."

For all that, in our case the first consideration is comparative. It is of importance that, except for 21a and A1-L33, the clays of the X-ray analysed sherds are characterised by the very same high-temperature minerals. The heat-treated sample of sherd 21a resembles A1-L33 in lacking spinel and containing amphibole.

Next to the high-temperature phase mullite, A1-L33 holds enstatite. As the unheated sample of A1-L33 carries chlorite and chlorite above 800° C should convert to olivine, the absence of olivine, and presence of enstatite is not understood. But, here again, the comparative aspect is the first consideration. It is quite possible that these enstatite reflections are an indicative feature of heat treated pottery material of sherds of the same category to which A1-L33 belongs.

General results of the X-ray diffraction analysis

Röntgenographically all sherds investigated have in common illite as a mineral, which by being heated for 4 hours at 1100° C is transformed into spinel and mullite.

Sherds 21a, and A1-L33 are a group apart. They both contain amphibole, and lack spinel in the high-temperature phase. It is questionable, however, whether the spinel is actually missing. The percentage of this mineral in the heat treated sample might

have been too low to show up in the X-ray diagram. No amphibole being observed in the thin section of 21a, the amphibole pattern in its röntgen diagram came as a suprise. From this it follows that beyond the resemblance to the Achilleion sherd D3-L22 that was revealed microscopically, 21a takes after the amphibole bearing Achilleion sherds as well. This might imply that 21a belongs more likely to the Achilleion sherds than to those of Sesklo. Besides their conformity, A1-L33 differs from 21a by its additional chlorite reflections and the enstatite in the high-temperature phase.

Bearing no amphibole reflections next to their illite pattern, the Sesklo sherds 21b, and 21c, which were investigated on account of the heating experiments of Dr H.J. Franken, turn out as true representatives of the Sesklo group. In spite of their parity, these sherds show a slight divergence. The X-ray diagram of 21b holds reflections of calcite, that of 21c not. In consequence, this divergence, the calcite in 21b, might account for the colour difference of these heated sherds.

The local raw clay, chosen for comparison, shows the pattern of quartz and illite also. The illite spacings, however, coincide with those of muscovite. In addition the strongest lines of hematite are faintly visible. The pattern of low albite is failing.

Mullite and hematite show up strongly in the diagram of the heat treated sample. Of spinel, only the strongest 244 Å spacing is discernible.

Temperature of firing

In the X-ray diagrams of the unheated sherd samples, the illite pattern was still discernible. According to Bradley and Grim, 1972, the anhydrous illite will be destroyed above 850° C. At 1-atmosphiric pressure the dissociation of calcium carbonate occurs at 812° C. As both the illite and calcite patterns of the sherds that contain calcite are still visible in the röntgen diagrams and as the calcium carbonate in the thin sections does not appear to be affected, the firing temperature of the investigated sherds must have been less than 812° C. This might indicate that they were fired in an open fire.

Analysis of the white and red decoration

The Achilleion sherds A1-L33 and A5 are decorated white and red, and the outer surface of D3-L21 carries a white line design. Macroscopic investigation indicates that the burnished surface of A1-L33 and A5 is covered by a 0.3 mm thin white coat. In the red parts of the decoration the white coat bears an extremely thin red coating. Diluted cold hydrochloric acid caused the white and red coatings to effervesce.

To gain more insight into the nature of the decoration, a Guinier-de Wolff exposure No. 5018 was made by Mr J. Verhoeven, using Cu radiation, 25 kV, 20mA, and an exposure time of 3.5 hours. Prof. Dr. P. Hartman was so kind as to place the camera at our disposal.

As is to be expected on account of the effervescence, the X-ray powder diagram of the white coating shows a distinct calcite pattern. Next to this pattern, those of quartz, albite, illite and amphibole occur. The powder diagram of the red coating contains reflections of the same minerals as its white counterpart. But, in addition, the strongest lines of hematite are faintly discernible.

From this we learn that the white coating may be looked upon as a slip prepared from a very fine fraction of the same clay from which the pot was formed but with an added calcite pigment. On top of this slip the coating with iron oxides must have been added, which turned red after firing in an oxidising atmosphere.

Röntgenographically the white line decoration of D3-L21 proves also to be an admixture of calcite powder and very fine particles of the same clay of which the vessel was produced.

A final grouping

Having illite in common the investigated Sesklo and Achilleion sherds may be presented as belonging to a system of non-empty sets. In one of these sets the plastic member contains amphibole next to illite. The schematic boundaries of this set, and of the system are shown by broken lines in figure 24 to indicate that they are defined by components of the plastic parts of the sherds.

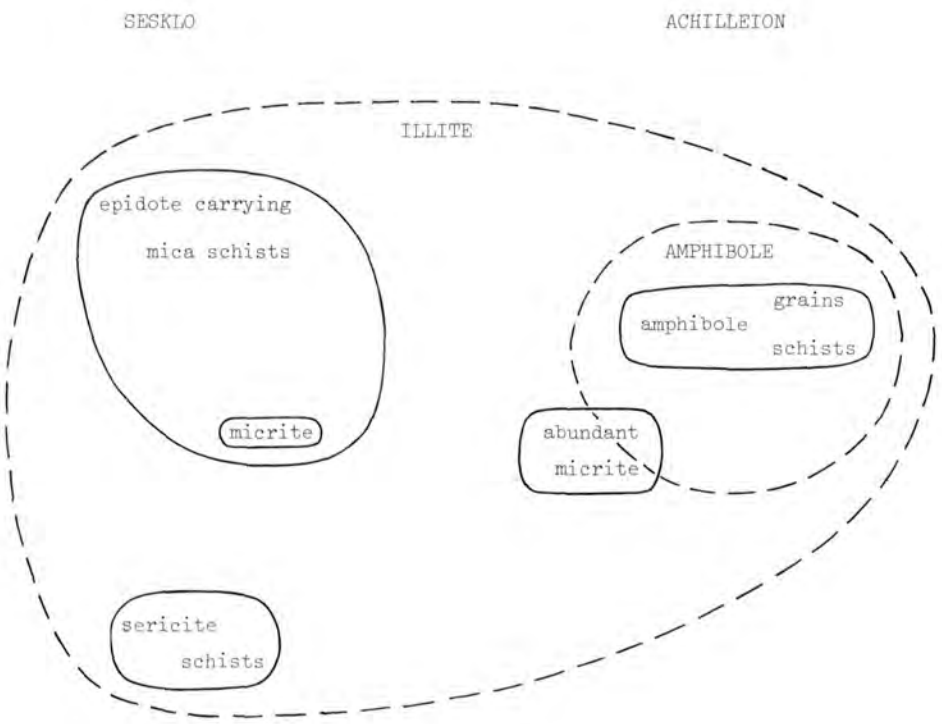


Fig. 24. Provisional diagram to compare the petrographic features of the investigated Sesklo sherds with those from Achilleion

Sets defined by characteristic non-plastics are represented by unbroken lines, such as the set of the epidote carrying mica schists that determine all but one of the Sesklo sherds. The exception just mentioned is Sesklo sherd 22, where epidote carrying mica schists are lacking, but fine grained sericite schists prevail. These two Sesklo sets are disjointed.

Due to differences in their non-plastics, the sherds with amphibole in the plastic member may be subdivided into two sets: One set where the non-plastics hold amphibole, the other where amphibole in the non-plastics is wanting. The latter set contains one element only, i.e. sherd 21a, which, instead of amphibole bearing non-plastics, holds abundant grains of micrite.

As micrite prevails also in the non-plastic component of D3-L22, this sherd and 21a may be considered to belong to one set. On account of no amphibole being perceived in the plastic member of D3-L22, the set defined by prevailing micrite non-plastics intersects the set of sherds with amphibole in the plastic member, 21a belonging to the intersection. It is true that a few of the Sesklo sherds carry some micrite grains too, but this subset holds epidote carrying mica schists as well, which are lacking in D3-L22 and 21a.

This provisional diagram, provisional on account of the relatively small number of sherds investigated, may facilitate a comparative review of the Sesklo and Achilleion sherds. The clays come up for discussion first.

Illite has been found in both groups. The plastic part of the Sesklo group does not hold amphibole, neither does the sample of raw clay taken from a recent pottery clay source in Sesklo.

At that, as appeared from the thin sections, the clay of the Sesklo sherds, and the raw clay have a filty mass of sericite and a noteworthy amount of iron oxides in common. But of more importance are the rather fine grained quarz-biotite schist-fragments that were found as non-plastics in both the Sesklo sherds and the raw clay. In view of these corresponding characteristics, the possibility is not precluded that a comparable raw clay, rich in sericite, has been used at Sesklo for the manufacture of the Sesklo pottery under investigation.

The plastics of the Achilleion sherds hold additional amphibole. But there is one sherd, D3-L21, where amphibole is lacking. Does this mean that there were two different raw clay sources in Achilleion, one with amphibole, the other without? Or did D3-L21 come from elsewhere? It would be interesting to examine if there are clays with and without amphibole in and around Achilleion. One thing is sure, however, the slips coloured by pigment of the Achilleion pottery indicate that the potters of Achilleion had reached an advanced stage in refining the clay. It remains in question whether, and if so how far, they have made use of refining pits.

As regards the non-plastics, epidote carrying mica schists distinguish about all the investigated Sesklo sherds from those of Achilleion. Amphibole, or abundant micrite characterise the sherds from Achilleion. Sesklo sherd 22, with its sericite schist-fragments is an exceptional case.

So far, the indices of relationships of the investigated Sesklo sherds do not intersect those of Achilleion. Out of this non-intersection, thin section analysis of the non-plastics is the obvious way to try to solve questions about sherds of uncertain origin in this area.

REFERENCES

Bradley, W.F., Grim, R.E. 1972: "Mica clay minerals." In Brown, D. (ed.): The X-ray identification and crystal structures of clay minerals. Mineralogical Society (Clay minerals group). London: 208-241.

Isphording, W.C., 1974: Combined thermal and X-ray diffraction technique for identification of ceramicware temper and paste minerals. *American Antiquity, 39:*477-483.

Munsell Color Company, Inc., 1954: *Munsell Soil Color Charts*. Baltimore, Munsell Col. Comp. Inc.: 21 p.

APPENDIX II

THE FAUNA FROM EARLY NEOLITHIC SESKLO

C.A. SCHWARTZ*

The animal bone sample from the 1972 season at Sesklo compares favourably with other Early Greek Neolithic samples though it is statistically small (table 30).

Caprovines (sheep and goat) are the most frequent domestic species (60.1%) with pig (18.1%), cattle (12.1%) and dog (0.4%) following respectively. The wild fauna is relatively small (9.3%) consisting of red deer, roe deer, wild pig and hare (table 31). No aurochs material is present. Badger and bird are also identified.

A high sample fragmentation is reflected by a low identification rate; from a total of approximately 1950 bones only 25% were identifiable. The constitution of the sample is mainly due to butchering practices though a few elements had fresh breaks. Two elements, a humerus and femur shaft (caprovine) had butchering marks; some worked bone also occurred with the majority having been sorted out prior to analysis (the latter have been analysed in 1978, M.W.). There is burned bone and evidence of gnawing by carnivores.

Age distributions of cattle, sheep/goat and pig are difficult to ascertain with such a small sample. Cattle are represented by one juvenile, two sub-adult and two adult individuals while caprovines had only one sub-adult specimen with several individuals in the other two categories. Pigs are represented (one each) in all three categories including one immature and one senile individual.

Both sheep and pig from Sesklo compare well with those from Achilleion and Aghios Petros. There seems to be a slight tendency for the Sesklo forms to be broader anteriorly-posteriorly. Only one measurable cattle element is identified; a distal humerus (88 mm width - 81 mm diameter). It is similar in size to those found at Achilleion (Bökönyi, personal communication 1977).

Two interesting features are the occurrence of crab and the two hornless sheep skull fragments. The latter, which do occur infrequently in modern day populations, are good indicators of early domestic forms in the Neolithic (Bökönyi 1974). The presence of only one crab claw is surprising considering the proximity of Sesklo to the sea. However, other crab elements may have been included in the molluscan sample not examined by the author.

Any conclusions at this time, without additional samples are premature.

* London Institute of Archaeology, March 1977.

APPENDIX III

GEOLOGISCHE ÜBERSICHT THESSALIENS

T. DOUTSOS*

Thessalien liegt im Zentral-Griechenland und geologisch gesehen gehört wie sie im Alpinischen Raum. Der geologische Bau Thessaliens gliedert sich in zwei übereinander folgenden Einheiten, die sich stratigraphisch, lithologisch und tektonisch aneinander unterscheiden: Das Grundgebirge und das Deckgebirge.

GRUNDGEBIRGE

Das Grundgebirge wird von alpidisch gefalteten und metamorphisierten Gesteinserien aufgebaut. An einigen Stellen sind Fossilreste von der Metamorphose nicht betroffen, so daß heute eine grobe Stratigraphische Einteilung möglich ist:

Paläezoikum. Sandige Tonsteine, Sandsteine, mergelige Sandsteine mit basichen Einschaltung sind durch intensive Metamorphose in Glimmerschiefern, Gneissen und Ampiboliten umgewandelt. Stellenweise sind Anatexiten, Migmatiten und Graniten anzutreffen.

Perm-Trias. Auf den paläozoischen Metamorphiten liegen konkordant permische bis triasische dickbankige Marmorserien. Der Übergang zwischen beiden Gesteinseinheiten scheint kontinuierlich zu sein. Leitfossilien wie Diplopora dokumentieren hier das Alter der Gesteinen.

Kreide. Auf den permotriasischen Carbonatgesteinen sind transgressiv kretazischen dick-bis dünnbankige Kalkserien sedimentiert. Sehr oft treten bituminösen Einschaltungen auf. Die Alterbestimmung dieser gesteine wurde durch Rudisten durchgeführt.

* Geological Service, Larisa

Flysch. Der eozäne Flysch wird von mächtigen Sandsteinen, kalkige Sandsteinen, Mergeln und Tonen zusammengesetzt. Faltung und Metamorphose haben dieses Sedimentpakett erheblich verändert. Entstehung: Einige Gebirgsstreifen der alpidischen Orogenese sind schon früh gefaltet und herausgehoben; ihr Abtragungsmaterial wird in unruhigen Absenkungszonen zugeführt und als Fluß-bzw Deltabildungen abgesetzt. Flysch-Ablagerungen sind generell Fossilarm, enthalten aber in bestimmten Gesteinhorizonten reiche Globigerina-Fauna.

DECKGEBIRGE

Nach der post-eozäne Faltungs-bzw Deckenbewegungen ist das ganze alpidische Orogen hauptsächlich isostatisch aufgehoben. Dabei sind langgestreckte Intramontane Becken herausgebildet, die von Abtragungsmaterial des aufsteigenden Grundgebirges gefüllt wurden.

Molasse. Oligozäne bis Miozäne marine linsenartige Ablagerungen. Feinkörnige bis grobkörnige Sandsteine wechsellagern mit Tonschiechten, so daß im Mikro-und Makrobereich Rhythmiten entstehen. Als wesentliche Bestandteil der oft auftretenden Konglomeraten (z.b. bei Meteora) sind Kristallin-Geröllen anzusehen. Manche Gesteinsbereiche tragen reiche Korallen-Fauna.

Neogen. Seit Pannon (Pikermi Fauna) sind in den Intramontanen Becken kontinentale Sedimente, limnisch-fluviatiler Entstehung abgelagert. Außer Sandsteine und Tone sind sporadisch limnisch Kalke und Kohlenbildungen anzutreffen.

Pleistozän. An der letzten Stadien der postorogenen Herauswölbung bilden sich ebenfalls kontinentale

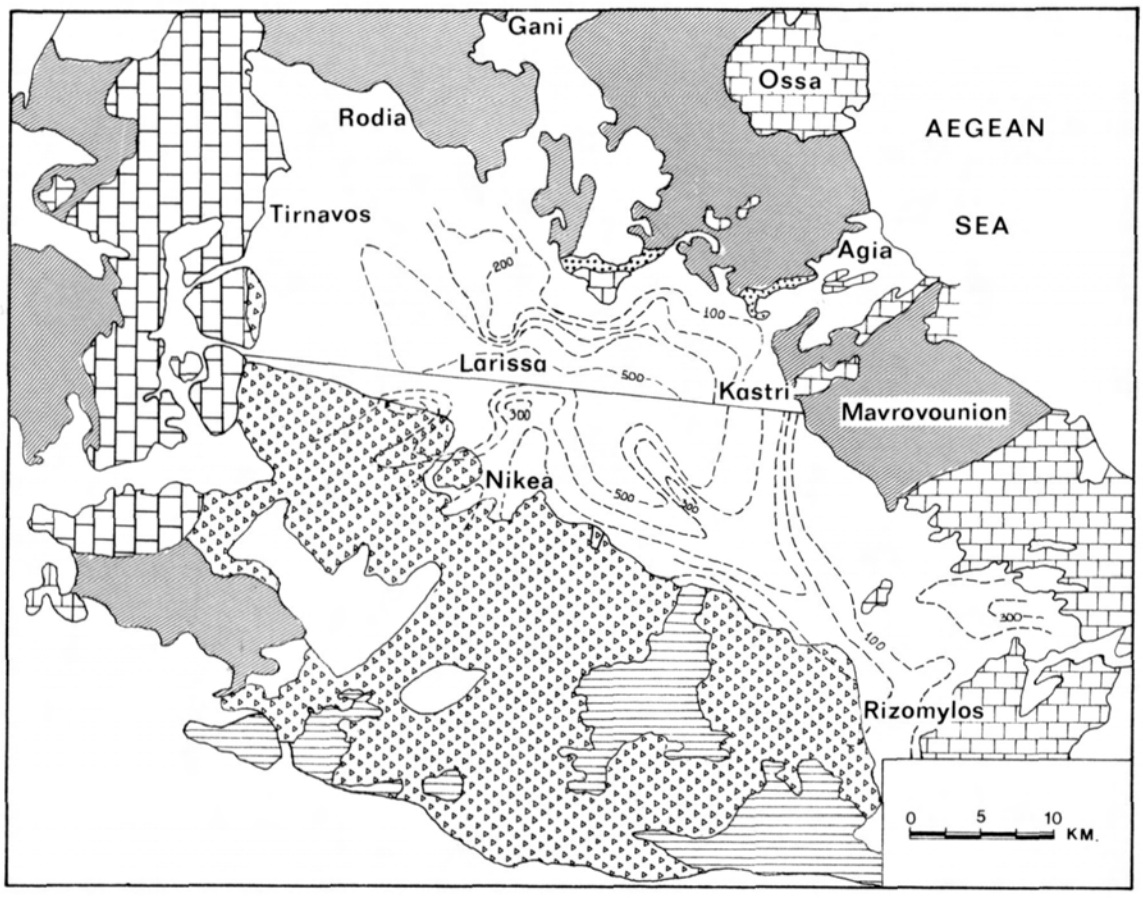


Fig. 25 Geological outline map of East Thessaly.

meist fluviatile Schuttablagerungen. Sie sind in tektonischen Gräben abgelagert.

Außer der vertikalen Gliederung Thessaliens in übereinander folgenden scharf abgegrenzten tektonischen Stockwerken läßt sich auch eine *horizontale Einteilung* feststellen: Von Osten nach Westen werden 3 Geotektonische Einheiten unterschieden. (fig. 25)

Pelagonische Zone. Hauptsächlich wird von paläozischen Gneissen und permotriasischen Carbonaten gebaut. Darauf sind Kreidereste von der postorogenen Abtragung verschont geblieben. Neogen ist nur hier weit verbreitet.

Subpelagonische Zone. Gegen Westen sinkt die Pelagonische Zone ein und wird vorwiegend durch Jurasische Schiefern, Ophiolithen und kretazischen Kalken zugedeckt. Postalpidisch bildet sich hier die Mesohellenische Furche, in der Oligozäne bis Miozäne Molasse sedimentiert ist. Pelagonische- und Subpelogonische Zone bauen die Pelagonische Plattform zusammen. Sie ist weit aus dem ägäischen Raum durch Deckenbewegungen in die heutige Lage verfrachtet.

Pindos Zone. Mächtige Jurasische und kretazische Kalksedimente sind unter alpidischen eugeosynklinalen Bedingungen abgesetzt. Die darüberfolgenden Flyschserien besitzen einen miogeosynklinalen Charakter.

TABLE 1: Stratigraphic distribution of colours. Percentages

	Incompletely oxidised light	Incompletely oxidised dark	Non-oxidised dark	Oxidised	Total
Stratum C	80/28.4%	136/48.2%	53/18.8%	13/ 4.6%	282
Stratum B	89/24.2%	224/60.9%	50/13.6%	5/ 1.4%	368
Stratum A	164/41.5%	164/41.5%	46/11.6%	21/ 5.3%	395

TABLE 2: Stratigraphic distribution of colours according to vessel shape. χ^2 computation

	Incompletely oxidised light		Incompletely oxidised dark		Non-oxidised dark		Oxidised		Total
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Stratum C	14/11.9	7/6.7	21/24.1	1/5.1	7/4.8	9/6.1	1/1.2	0/0	60
Stratum B	9/15.2	6/8.6	39/30.9	8/6.6	6/6.2	9/7.8	0/1.6	0/0	77
Stratum A	14/ 9.9	8/5.6	15/20.1	7/4.3	2/4.0	1/5.1	3/1.1	0/0	50
Total	37	21	75	16	15	19	4	0	187

2 a: Hole mouthed jar. (1) oxidised core (2) non-oxidised core

$\chi^2 = 27.419$ df = 12 α = .01 → 26.217 α =.001 → 32.989

	Incompletely oxidised light		Incompletely oxidised dark		Non-oxidised dark		Oxidised		Total
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Stratum C	22/22.6	4/10.3	54/48.0	3/ 9.3	13/ 9.3	9/ 7.8	6/2.5	0/1.3	111
Stratum B	31/35.4	12/16.1	94/75.2	14/14.6	12/14.7	9/12.2	0/3.9	2/2.0	174
Stratum A	37/32.0	25/14.6	43/67.8	20/13.1	12/13.1	13/11.0	4/3.6	3/1.8	157
Total	90	41	191	37	37	31	10	5	442

2 b: Slightly closed globular jar (1) oxidised core (2) non-oxidised core

$\chi^2 = 50.146$ df = 14 α =.001 → 36.123

	Incompletely oxidised light		Incompletely oxidised dark		Non-oxidised dark		Oxidised		Total
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Stratum C	21/18.7	4/ 9.8	34/32.0	13/11.9	3/2.3	8/7.8	2/2.8	1/0.8	86
Stratum B	14/20.4	7/10.8	49/35.0	10/13.0	3/3.5	9/8.5	1/3.0	1/0.8	94
Stratum A	39/34.9	28/18.4	44/60.0	24/22.2	3/4.2	14/14.6	8/5.2	1/1.4	161
Total	74	39	127	47	9	31	11	3	341

2 c: Convex-walled open bowl (1) oxidised core (2) non-oxidised core

$\chi^2 = 26.45$ df = 14 α = .06 → 23.685 α = .02 → 26.873

(contd.)

	Incompletely oxidised light		oxidised dark		Non-oxidised dark		Oxidised		Total
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Stratum C	6/7.0	2/3.3	8/8.0	2/2.3	3/1.0	1/1.3	1/1.3	2/0.7	25
Stratum B	9/6.4	1/3.1	10/7.4	0/2.1	0/0.9	2/1.2	1/1.2	0/0.6	23
Stratum A	6/7.6	7/3.6	6/8.6	5/2.5	0/1.1	1/1.4	2/1.4	0/0.7	27
Total	21	10	24	7	3	4	4	2	75

2 d: Open bowl with flaring wall (1) oxidised core (2) non-oxidised core

$\chi^2 = 24.111$ df = 14 $\alpha = .05 \rightarrow 23.685$ $\alpha = .02 \rightarrow 26.837$

	Incompletely oxidised light		oxidised dark		Non-oxidised dark		Oxidised		Total
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Stratum C	63/59.9	17/30.0	117/112.5	19/28.9	25/17.3	27/22.9	10/ 7.8	3/2.7	282
Stratum B	63/78.2	26/39.1	192/146.6	32/37.7	21/22.5	29/29.9	2/10.2	3/3.5	368
Stratum A	96/83.9	68/42.0	108/157.6	56/40.4	17/24.2	29/32.1	17/11.0	4/3.8	395
Total	222	111	417	107	64	85	29	10	1045

2 e: All rims, disregarding vessel shape (1) oxidised core (2) non-oxidised core

$\chi^2 = 89.34$ df = 14 $\alpha = .001 \rightarrow 36.123$

TABLE 3: Stratigraphic distribution of oxidised and non-oxidised vessel cores. Percentages

	(slightly) oxidised surface		Non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Stratum C	190/67.4%	39/13.8%	26/ 9.2%	27/ 9.6%	282
Stratum B	257/69.8%	61/16.6%	21/ 5.7%	29/ 7.9%	368
Stratum A	221/55.9%	128/32.4%	17/ 4.3%	29/ 7.3%	395

TABLE 4: Stratigraphic distribution of oxidised and non-oxidised vessel cores, according to vessel shape. Percentages

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Hole-mouthed jar	36/12.8%	8/ 2.8%	7/ 2.5%	9/ 3.2%	60
Slightly closed globular jar	82/29.1%	7/ 2.5%	13/ 4.6%	9/ 3.2%	111
Convex-walled open bowl	57/20.2%	18/ 6.4%	3/ 1.1%	8/ 2.8%	86
Open bowl with flaring wall	15/ 5.3%	6/ 2.1%	3/ 1.1%	1/ 0.4%	25
Total	190/67.4%	39/13.8%	26/ 9.2%	27/ 9.6%	282

4 a: Stratum C

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Hole-mouthed jar	48/13.0%	14/ 3.8%	6/ 1.6%	9/ 2.4%	77
Slightly closed globular jar	125/34.0%	28/ 7.6%	12/ 3.3%	9/ 2.4%	174
Convex-walled open bowl	64/17.4%	18/ 4.9%	3/ 0.8%	9/ 2.4%	94
Open bowl with flaring wall	20/ 5.4%	1/ 0.3%	0/ 0.0%	2/ 0.5%	23
Total	257/69.8%	61/16.6%	21/ 5.7%	29/ 7.9%	368

4 b: Stratum B

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Hole-mouthed jar	32/ 8.1%	15/ 3.8%	2/ 0.5%	1/ 0.3%	50
Slightly closed globular jar	84/21.3%	48/12.2%	12/ 3.0%	13/ 3.3%	157
Convex-walled open bowl	91/23.0%	53/13.4%	3/ 0.8%	14/ 3.5%	161
Open bowl with flaring wall	14/ 3.5%	12/ 3.0%	0/ 0.0%	1/ 0.3%	27
Total	221/55.9%	128/ 32.4%	17/ 4.3%	29/ 7.3%	395

4 c: Stratum A

TABLE 5: Stratigraphic distribution of oxidation of vessel core, according to vessel shape. χ^2-computation

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Stratum C	190/180.3	39/61.5	26/17.3	27/22.9	282
Stratum B	257/235.2	61/80.3	21/22.5	29/29.9	368
Stratum A	221/252.5	128/86.2	17/24.2	29/32.1	395
Total	568	228	64	85	1045

5 a: All vessel shapes. χ^2= 47.390 df = 6 α = .001 → 22.457

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Stratum C	36/35.5	8/11.3	7/ 4.6	5/ 4.6	56
Stratum B	48/48.8	14/15.6	6/ 6.3	9/ 6.3	77
Stratum A	32/31.7	15/10.1	2/ 4.1	1/ 4.1	50
Total	116	37	15	15	183

5 b: Hole-mouthed jar. χ^2= 9.406 df = 6 α = .20 → 8.558
= .10 →10.645

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Stratum C	82/ 73.1	7/20.8	13/ 9.3	9/ 7.8	111
Stratum B	125/114.6	28/32.7	12/14.6	9/12.2	174
Stratum A	84/103.4	48/29.5	12/13.1	13/11.0	157
Total	291	83	37	31	442

5 c: Slightly-closed globular jar. χ^2= 30.415 df = 6 α = .001 → 22.457

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Stratum C	37/ 53.5	18/22.4	3/ 2.3	8/ 7.8	86
Stratum B	64/ 58.4	18/24.5	3/ 2.5	9/ 8.5	94
Stratum A	91/100.1	53/42.0	3/ 4.2	14/14.6	161
Total	212	89	9	31	341

5 d: Convex-walled open bowl. χ^2= 7.978 df = 6 α = .30 → 7.213
= .20 → 8.558

(contd.)

	(slightly) oxidised surface		non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Stratum C	15/16.3	6/ 6.3	3/ 1.0	1/ 1.3	25
Stratum B	20/15.0	1/ 5.8	0/ 0.9	2/ 1.2	23
Stratum A	14/17.6	12/ 6.8	0/ 1.1	1/ 1.4	27
Total	49	19	3	4	75

5 e: Open bowl with flaring wall. $\chi^2 = 17.487$ df = 6 α = .01 → 16.812
α = .001 → 22.457

TABLE 6: Stratigraphic distribution of wall thickness. Percentages

	< 5 mm	> 5 < 10 mm	Total
Stratum C	95/34.1%	184/65.9%	279
Stratum B	155/42.2%	212/57.8%	367
Stratum A	165/42.9%	220/57.1%	385
Total	415/40.3%	616/59.7%	1031

TABLE 7: Stratigraphic distribution of wall thickness, according to vessel shape. Percentages

	Hole-mouthed jar	Slightly closed globular jar	Convex-walled open bowl	Open bowl with flaring wall	Total
Stratum C	14/14.7%	36/37.9%	36/37.9%	9/ 9.5%	95
Stratum B	21/13.5%	72/46.5%	46/29.7%	16/10.3%	155
Stratum A	14/ 8.5%	63/38.2%	71/43.0%	17/10.3%	165

7 a: Wall thickness < 5 mm

	Hole-mouthed jar	Slightly closed globular jar	Convex-walled open bowl	Open bowl with flaring wall	Total
Stratum C	46/25.0%	71/38.6%	51/27.7%	16/ 8.7%	184
Stratum B	56/26.4%	100/47.2%	45/21.2%	11/ 5.2%	212
Stratum A	35/15.9%	97/44.1%	78/35.4%	10/ 4.5%	220

7 b: Wall thickness > 5 < 10 mm

TABLE 8: Stratigraphic distribution of wall thickness. χ^2-computation

	< 5 mm	> 5 < 10 mm	Total
Stratum C	95/112.3	184/166.7	279
Stratum B	155/147.7	212/219.3	367
Stratum A	165/155.0	220/230.0	385
Total	415	616	1031

$\chi^2 = 6.144$ df = 2 $\alpha = .05 \rightarrow 5.991$

$\alpha = .02 \rightarrow 7.824$

TABLE 9: Stratigraphic distribution of vessel shapes. Percentages

	Hole-mouthed jar	Slightly closed globular jar	Convex-walled open bowl	Open bowl with flaring wall	Total
Stratum C	59/20.7%	113/39.6%	88/30.9%	25/ 8.8%	285
Stratum B	78/21.1%	173/46.9%	93/25.2%	25/ 6.8%	369
Stratum A	48/12.2%	158/40.3%	158/40.3%	28/ 7.1%	392

TABLE 10: Stratigraphic distribution of vessel shapes. χ^2-computation

	Hole-mouthed jar	Slightly closed globular jar	Convex-walled open bowl	Open bowl with flaring wall	Total
Stratum C	59/50.4	113/121.0	88/ 92.4	25/21.3	285
Stratum B	78/65.3	173/156.6	93/119.6	25/27.5	369
Stratum A	48/69.3	158/166.4	158/127.0	28/29.2	392
Total	185	444	339	78	1046

$\chi^2 = 27.76$ df = 6 $\alpha = .001 \rightarrow 22.457$

TABLE 11: Stratigraphic distribution of surface finish types, according to vessel shape. Percentages

	Interior / Exterior } smooth	Interior smooth / Exterior burnished	Interior / Exterior } burnished	Total
Hole-mouthed jar	43/15.6%	9/ 3.3%	8/ 2.9%	60
Slightly closed globular jar	89/32.2%	6/ 2.2%	10/ 3.6%	105
Convex-walled open bowl	56/20.3%	9/ 3.3%	20/ 7.2%	85
Open bowl with flaring wall	19/ 6.9%	1/ 0.3%	6/ 2.2%	26
Total	207/75.0%	25/ 9.0%	44/15.9%	276

11 a: Stratum C

	Interior / Exterior } smooth	Interior smooth / Exterior burnished	Interior / Exterior } burnished	Total
Hole-mouthed jar	52/14.6%	6/ 1.7%	14/ 3.9%	72
Slightly closed globular jar	118/33.2%	18/ 5.1%	32/ 9.0%	168
Convex-walled open bowl	57/16.0%	13/ 3.7%	19/ 5.3%	89
Open bowl with flaring wall	15/ 4.2%	5/ 1.4%	7/ 6.0%	27
Total	242/68.0%	42/11.8%	72/20.2%	356

11 b: Stratum B

	Interior / Exterior } smooth	Interior smooth / Exterior burnished	Interior / Exterior } burnished	Total
Hole-mouthed jar	35/ 9.2%	6/ 1.6%	7/ 1.8%	48
Slightly closed globular jar	114/30.1%	16/ 4.2%	20/ 5.3%	150
Convex-walled open bowl	110/29.0%	10/ 2.6%	34/ 9.0%	154
Open bowl with flaring wall	19/ 5.0%	3/ 0.8%	5/ 1.3%	27
Total	278/73.3%	35/ 9.2%	66/17.4%	379

11 c: Stratum A

TABLE 12: Stratigraphic distribution of the different rim shapes, according to vessel shape. Percentages

	Plain	Thickened	Thinned	Turned up/out	Total
Hole-mouthed jar	35/12.2%	12/ 4.2%	12/ 4.2%	2/ 0.7%	61
Slightly closed globular jar	60/21.0%	16/ 5.6%	27/ 9.4%	9/ 3.1%	112
Convex-walled open bowl	45/15.7%	11/ 3.8%	30/10.5%	1/ 0.3%	87
Open bowl with flaring wall	15/ 5.2%	5/ 1.7%	6/ 2.1%	0/ 0.0%	26
Total	155/54.2%	44/15.4%	75/26.2%	12/ 4.2%	286

a: Stratum C

	Plain	Thickened	Thinned	Turned up/out	Total
Hole-mouthed jar	49/13.5%	13/ 3.6%	10/ 2.7%	4/ 1.1%	76
Slightly closed globular jar	108/29.7%	25/ 6.9%	35/ 9.6%	2/ 0.5%	170
Convex-walled open bowl	61/16.8%	6/ 1.6%	22/ 6.0%	3/ 0.8%	92
Open bowl with flaring wall	17/ 4.7%	4/ 1.1%	4/ 1.1%	0/ 0.0%	25
Total	235/64.7%	48/13.2%	71/19.6%	9/ 2.5%	363

b: Stratum B

	Plain	Thickened	Thinned	Turned up/out	Total
Hole-mouthed jar	22/ 5.6%	8/ 2.0%	6/ 1.5%	12/ 3.1%	48
Slightly closed globular jar	90/23.0%	28/ 7.1%	29/ 7.4%	14/ 3.6%	161
Convex-walled open bowl	102/26.0%	11/ 2.8%	46/11.9%	1/ 0.3%	160
Open bowl with flaring wall	17/ 4.3%	1/ 0.3%	5/ 1.3%	0/ 0.0%	23
Total	231/58.9%	48/12.2%	86/21.9%	27/ 6.9%	392

c: Stratum A

TABLE 13: Stratigraphic distribution of rim shapes, according to vessel shape. χ^2-computation

	Plain	Thickened	Thinned	Turned up/out	Total
Stratum C	35/35.0	12/10.9	12/ 9.2	2/ 5.9	61
Stratum B	49/43.6	13/13.6	10/11.5	4/ 7.4	76
Stratum A	22/27.5	8/ 8.6	6/ 7.3	12/ 4.7	48
Total	106	33	28	18	185

a: Hole-mouthed jar. χ^2= 18.632 df = 6 α = .01 →16.812
α = .001 →22.457

	Plain	Thickened	Thinned	Turned up/out	Total
Stratum C	60/64.7	16/17.4	27/23.0	9/ 5.8	112
Stratum B	108/99.0	25/26.5	35/34.9	2/ 8.8	170
Stratum A	90/93.8	28/25.1	29/33.1	14/ 8.4	161
Total	258	69	91	23	443

b: Slightly closed globular jar. χ^2= 16.393 df = 6 α = .02 → 15.033
α = .01 → 16.812

	Plain	Thickened	Thinned	Turned up/out	Total
Stratum C	45/53.8	11/ 7.2	30/25.4	1/ 1.3	87
Stratum B	61/56.3	6/ 7.6	22/26.5	3/ 1.4	92
Stratum A	102/97.9	11/13.2	46/46.1	1/ 2.4	160
Total	[illegible]	28	98	5	339

c: Convex-walled open bowl. χ^2= 7.924 df = 6 α = .30 → 7.213
α = .20 → 8.558

	Plain	Thickened	Thinned	Turned up/out	Total
Stratum C	15/17.2	5/ 3.5	6/ 5.3	0/ 0.0	26
Stratum B	17/16.6	4/ 3.4	4/ 5.1	0/ 0.0	25
Stratum A	17/15.2	1/ 3.1	5/ 4.7	0/ 0.0	23
Total	49	10	15	0	74

d: Open bowl with flaring wall. χ^2= 3.050 df = 4 α = .50 → 3.357

	Plain	Thickened	Thinned	Turned up/out	Total
Stratum C	155/170.6	44/38.5	75/63.7	12/13.2	286
Stratum B	235/216.5	48/48.8	71/80.9	9/16.7	353
Stratum A	231/233.8	48/52.7	86/87.4	27/18.1	392
Total	521	140	232	48	

e: All rims, disregarding vessel shape. χ^2= 15.633 df = 6 α = .02 → 15.033
α = .01 → 16.812

TABLE 14: Stratigraphic distribution of base forms. Percentages

	Ring base	Flat	Plano-convex	Flat-footed	Total
Stratum C	22/57.9%	2/ 5.3%	13/34.2%	1/ 2.6%	38
Stratum B	36/58.1%	5/ 8.1%	14/22.6%	7/11.3%	62
Stratum A	83/83.0%	4/ 4.0%	5/ 5.0%	8/ 8.0%	100
Total	141/70.5%	11/ 5.5%	32/16.0%	16/ 8.0%	200

TABLE 15: Stratigraphic distribution of base forms. χ^2-computation

	Ring base	Flat	Plano-convex	Flat-footed	Total
Stratum C	22/26.8	2/ 2.1	13/ 6.1	1/ 3.0	38
Stratum B	36/43.7	5/ 3.4	14/ 9.9	7/ 5.0	62
Stratum A	83/70.5	4/ 5.5	5/16.0	8/ 8.0	100
Total	141	11	32	16	200
	χ^2= 24.80	df = 6	α = .001 → 22.461		

TABLE 16: Relationship between colour and vessel shape. Percentages

	Incompletely oxidised		Non-oxidised	Oxidised	Total
	light	dark	dark		
Hole mouthed jar	58/ 5.6%	91/ 8.7%	34/ 3.3%	4/ 0.4%	187
Slightly closed globular jar	131/12.5%	228/21.8%	68/ 6.5%	15/ 1.4%	442
Convex-walled open bowl	113/10.8%	174/16.7%	40/ 3.8%	14/ 1.3%	341
Open bowl with flaring wall	31/ 3.0%	31/ 3.0%	7/ 0.7%	6/ 0.6%	75
Total	333/31.9%	524/50.1%	149/14.3%	39/ 3.7%	1045

TABLE 17: Relationship between surface colour, oxidation of the core and vessel shape. Percentages

	Incompletely oxidised				Non-oxidised		Oxidised		Total
	light		dark		dark				
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Hole-mouthed jar	37/19.8%	21/11.2%	75/40.1%	16/ 8.6%	15/8.0%	19/10.2%	4/2.1%	0/0.0%	187
Slightly closed globular jar	90/20.4%	41/ 9.3%	191/43.2%	37/ 8.4%	37/8.4%	31/ 7.0%	10/2.3%	5/1.1%	442
Convex-walled open bowl	74/21.7%	39/11.4%	127/37.2%	47/13.8%	9/2.7%	31/ 9.1%	11/3.2%	3/0.9%	341
Open bowl with flaring wall	21/28.0%	10/13.3%	24/32.0%	7/ 9.3%	3/4.0%	4/ 5.3%	4/5.3%	2/2.7%	75

(1) = oxidised core (2) = non-oxidised core

TABLE 18: Relationship between vessel shape and colour. χ^2-computation

	Incompletely oxidised				Non-oxidised		Oxidised		Total
	light		dark		dark				
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Hole-mouthed jar	37/39.7	21/19.9	75/ 74.6	16/19.1	15/11.5	19/15.2	4/ 5.2	0/1.8	187
Slightly closed globular jar	90/93.9	41/46.9	191/176.4	37/45.3	37/27.1	31/36.0	10/12.3	5/4.2	442
Convex-walled open bowl	74/72.2	39/36.2	127/131.1	47/34.9	9/20.9	31/27.7	11/ 9.8	3/3.3	341
Open bowl with flaring wall	21/15.9	10/ 8.0	24/ 24.9	7/ 7.7	3/ 4.6	4/ 6.1	4/ 3.2	2/0.7	75
Total	222	111	417	107	64	85	29	10	1045

(1) = oxidised core (2) = non-oxidised core

χ^2 = 34.533 df = 21 α = .05 → 32.671

α = .02 → 36.343

TABLE 19: Relationship between oxidation of the core and vessel shape. Percentages

	(slightly) oxidised surface		Non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Hole-mouthed jar	125/11.8%	23/ 2.2%	16/ 1.5%	17/ 1.6%	181
Slightly closed globular jar	294/27.8%	101/ 9.5%	32/ 3.0%	28/ 2.6%	455
Convex-walled open bowl	212/20.0%	93/ 8.8%	9/ 0.8%	29/ 2.7%	343
Open bowl with flaring wall	52/ 4.9%	18/ 1.7%	3/ 0.3%	6/ 0.6%	80
Total	684/64.4%	235/22.2%	60/ 5.7%	80/ 7.6%	1059

TABLE 20: Relationship between oxidation of the core and vessel shape. χ^2-computation

	(slightly)oxidised surface		Non-oxidised surface		Total
	oxidised core	non-oxidised core	oxidised core	non-oxidised core	
Hole-mouthed jar	125/116.9	23/ 40.2	16/10.3	17/13.7	181
Slightly closed globular jar	294/293.9	101/101.0	32/25.8	28/34.4	455
Convex-walled open bowl	212/221.5	93/ 76.1	9/19.4	29/25.9	343
Open bowl with flaring wall	53/ 51.7	18/ 17.8	3/ 4.5	6/ 6.0	80
Total	684	235	60	80	1059

χ^2= 25.092 df = 9 α = .01 → 21.656
α = .001 → 27.877

TABLE 21: Relationship between wall thickness and vessel shape. Percentages

	< 5 mm	> 5 < 10 mm	> 10 mm	Total
Hole-mouthed jar	52/ 4.8%	141/13.1 %	0/ 0.0%	193
Slightly closed globular jar	177/16.4%	273/25.3%	6/ 0.6%	456
Convex-walled open bowl	155/14.4%	191/17.7%	2/ 0.2%	348
Open bowl with flaring wall	43/ 4.0%	36/ 3.3%	2/ 0.2%	81
Total	427/39.6%	641/59.5%	10/ 0.9%	1078

TABLE 22: Relationship between wall thickness and vessel shape. χ^2-computation

	< 5 mm	> 5 < 10 mm	> 10 mm	Total
Hole-mouthed jar	52/ 76.4	141/114.6	0/ 1.8	193
Slightly closed globular jar	177/180.6	273/271.1	6/ 4.2	456
Convex-walled open bowl	155/137.8	191/206.9	2/ 3.2	348
Open bowl with flaring wall	43/ 32.1	36/ 48.2	2/ 0.8	81
Total	427	641	10	1078

χ^2= 28.936 df = 6 α = .001 → 22.457

TABLE 23: Relationship between surface finish and vessel shape. Percentages

	Interior }smooth Exterior	Interior smooth Exterior burnished	Interior }burnished Exterior	Total
Hole-mouthed jar	133/12.9%	23/ 2.2%	32/ 3.1%	188
Slightly closed globular jar	333/32.2%	43/ 4.2%	62/ 6.0%	438
Convex-walled open bowl	227/22.0%	28/ 2.7%	76/ 7.4%	331
Open bowl with flaring wall	52/ 5.0%	8/ 0.8%	17/ 1.6%	77
Total	745/72.1%	102/ 9.9%	187/18.1%	1034

TABLE 24: Relationship between surface finish and vessel shape. χ^2-computation

	Interior }smooth Exterior	Interior smooth Exterior burnished	Interior }burnished Exterior	Int. burnished Ext. smooth	Total
Hole-mouthed jar	133/134.0	23/18.3	32/32.6	1/3.1	189
Slightly closed globular jar	333/316.9	43/43.4	62/79.5	9/7.2	447
Convex-walled open bowl	227/239.6	28/32.6	76/60.1	7/5.5	338
Open bowl with flaring wall	52/ 54.6	8/ 7.5	17/13.7	0/1.2	77
Total	745	102	187	17	1051

$\chi^2 = 16.152$ df = 9 $\alpha = .10 \rightarrow 14.684$

$\alpha = .05 \rightarrow 16.919$

TABLE 25: Relationship between rim shape and vessel shape. Percentages

	Plain	Thickened	Thinned	Turned up/out	Total
Hole-mouthed jar	109/10.3%	33/ 3.1%	29/ 2.7%	18/ 1.7%	189
Slightly closed globular jar	265/25.0%	72/ 6.8%	94/ 8.9%	25/ 2.4%	456
Convex-walled open bowl	212/20.0%	28/ 2.6%	98/ 9.2%	7/ 2.0%	345
Open bowl with flaring wall	50/ 4.7%	9/ 0.8%	15/ 1.4%	1/ 0.1%	75
Total	636/60.0%	142/13.4%	236/22.3%	51/ 4.8%	1065

TABLE 26: Relationship between rim form and vessel shape. χ^2-computation

	I. Plain				II. Thickened				Total
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	
Hole-mouthed jar	76/ 83.4	17/ 7.4	11/20.0	2/0.7	19/13.8	12/ 7.2	2/3.9	0/0.0	
Slightly closed globular jar	202/204.6	16/18.1	47/49.0	0/1.7	31/34.0	24/17.6	17/9.5	0/0.0	
Convex-walled open bowl	153/154.1	8/13.6	49/36.9	2/1.3	22/25.6	3/13.3	3/7.1	0/0.0	
Open bowl with flaring wall	42/ 33.8	1/ 3.0	7/ 8.1	0/0.2	7/ 5.6	2/2.9	0/1.6	0/0.0	
Total	476	42	114	4	79	41	22	0	

	II. Thickened				IV. Turned up/out				
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	
Hole-mouthed jar	18/32.6	8/2.6	2/ 5.6	1/0.5	16/ 6.7	0/0.2	1/1.9	1/0.2	189
Slightly closed globular jar	75/80.0	6/6.4	12/13.8	1/1.3	16/16.3	1/0.4	8/4.7	0/0.4	456
Convex-walled open bowl	79/60.2	1/4.9	17/10.4	1/1.0	5/12.3	0/0.3	2/3.6	0/0.3	345
Open bowl with flaring wall	14/13.2	0/1.1	1/ 2.3	0/0.2	1/2.7	0/0.1	0/0.8	0/0.1	75
Total	189	15	32	3	36	1	11	1	1065

χ^2=112.584 df = 30 α = .001 → 59.703

(1) = blunt lip (2) = flattened lip (3) = tapered lip (4) = rolled lip

Categories I.4, II.4, III.4, IV.2 and IV.4 have not been considered in the computation of χ^2.

TABLE 27: Relationship between surface colour and oxidation of the core. χ^2-computation

	Oxidised	Incompletely oxidised light	dark	Non-oxidised	Total
Oxidised core	29/27.3	222/233.3	417/367.1	64/104.4	732
Non-oxidised core	10/11.7	111/ 99.7	107/156.9	85/ 44.6	313
Total	39	333	524	149	1045

27 a: All vessel shapes. χ^2= 77.063 df = 3 α = .001 → 16.268

	Oxidised	Incompletely oxidised light	dark	Non-oxidised	Total
Oxidised core	4/ 2.6	37/ 37.5	75/ 58.9	15/22.0	131
Non-oxidised core	0/ 1.2	21/ 17.4	16/ 27.3	19/10.2	56
Total	4	58	91	34	187

27 b: Hole-mouthed jar χ^2= 31.503 df = 3 α = .001 → 16.268

	Oxidised	Incompletely oxidised light	dark	Non-oxidised	Total
Oxidised core	10/11.1	90/97.2	191/169.2	37/50.5	328
Non-oxidised core	5/ 3.9	41/33.8	37/ 58.8	31/17.5	114
Total	15	131	228	68	442

27 c: Slightly closed globular jar χ^2= 27.401 df = 3 α = .001 → 16.268

	Oxidised	Incompletely oxidised light	dark	Non-oxidised	Total
Oxidised core	11/ 9.1	74/73.2	127/112.8	9/25.9	221
Non-oxidised core	3/ 4.9	39/39.8	47/ 61.2	31/14.1	120
Total	14	113	174	40	341

27 d: Convex-walled open bowl. χ^2= 37.542 df = 3 α = .001 → 16.268

	Oxidised	Incompletely oxidised light	dark	Non-oxidised	Total
Oxidised core	4/ 4.2	21/21.5	24/ 21.5	3/ 4.9	52
Non-oxidised core	2/ 1.8	10/ 9.5	7/ 9.5	4/ 2.1	23
Total	6	31	31	7	75

27 e: Open bowl with flaring wall χ^2= 3.474 df = 3 α = .50 → 2.366

α = .30 → 3.665

TABLE 28: Chronological Table

Site	No	Date BP
LOWER MESOLITHIC		
Franchthi	P 1665	9477 ± 134
Franchthi	P 2227	9430 ± 160
Franchthi	P 2103	9300 ± 100
Franchthi	P 1522	9298 ± 130
Franchthi	P 2102	9290 ± 100
Franchthi	P 2230	9280 ± 110
Franchthi	P 2104	9270 ± 110
Franchthi	P 1519	9264 ± 144
Franchthi	P 2108	9250 ± 120
Franchthi	P 2229	9210 ± 110
Franchthi	P 2097	9150 ± 100
Franchthi	P 1398	9098 ± 139
Franchthi	P 2228	9060 ± 110
Franchthi	P 1517	9034 ± 108
Franchthi	P 1664	8941 ± 117
Franchthi	P 1518	8938 ± 100
Franchthi	P 1666	8742 ± 114
Franchthi	P 1518-A	8717 ± 110[1]
UPPER MESOLITHIC		
Franchthi	P 2097	9152 ± 97
Franchthi	P 2106	8730 ± 90
Franchthi	P 2096	8710 ± 100
Franchthi	P 2107	8530 ± 90
Franchthi	P 1536	8189 ± 78
Franchthi	P 1526	8022 ± 76
Franchthi	P 1527	7897 ± 88
Sidari	GXO 770	7770 ± 340
PRE POTTERY NEOLITHIC		
Argissa	UCLA 1657 A	8130 ± 100
Knossos X	BM 124	8050 ± 180
Argissa	UCLA 1657 B	7990 ± 90
Franchthi	P 2905	7981 ± 105
Franchthi	P 2095	7980 ± 110
Franchthi	P 2094	7930 ± 100
Knossos X	BM 278	7910 ± 140
Kythnos	GX 2837	7875 ± 500
Franchthi	P 1392	7794 ± 140

(contd)

Site	No	Date BP
Sesklo	P 1681	7755 ± 97
	EARLY NEOLITHIC I	
Knossos IX	BM 436	7740 ± 140
Franchthi	P 1525	7704 ± 81
Sidari	GXO 771	7670 ± 120
Sesklo	P 1679	7611 ± 83
Knossos IX	BM 272	7570 ± 150
Argissa	GrN 4145	7500 ± 90
Elateia	GrN 2973	7480 ± 70
Achilleion	P 2118	7470 ± 80
Sesklo	P 1678	7427 ± 78
Elateia	GrN 3037	7360 ± 90
Achilleion	LJ 3329	7360 ± 50
Achilleion	LJ 3184	7320 ± 50
	TRANSITIONAL EARLY NEOLITHIC I/II	
Nea Nikomedeia	Q 655	8180 ± 50[2]
Nea Nikomedeia	P 1202	7557 ± 91
Achilleion	LJ 3186	7290 ± 50
Nea Nikomedeia	P 1203 A	7281 ± 74
Achilleion	P 2117	7270 ± 80
	EARLY NEOLITHIC II	
Achilleion	LJ 3180	7550 ± 60[3]
Asfaka	(Higgs, 1966, p. 22)	7380 ± 240
Sidari	GXO 772	7340 ± 180
Franchthi	P 1667	7278 ± 86
Achilleion	LJ 3181	7240 ± 50
Elateia	GrN 3041	7190 ± 100
Achilleon	LJ 3325	7280 ± 50
Achilleion	LJ 3326	7260 ± 80
	EARLY NEOLITHIC III	
Elateia	GrN 3539	8240 ± 110[4]
Achilleion	P 2120	7340 ± 70
Achilleion	LJ 3328	7300 ± 50
Achilleion	LJ 3201	7210 ± 90
Franchthi	P 1399	7194 ± 112
Elateia	GrN 3502	7040 ± 130
Knossos V	BM 126	7000 ± 180
Franchthi	P 2093	6940 ± 90

(contd)

Site		No	Date BP
TRANSITIONAL EARLY NEOLITHIC III / MIDDLE NEOLITHIC			
Achilleion		LJ 2942	7200 ± 50
Achilleion		LJ 3327	7120 ± 60
Achilleion		LJ 2944	7020 ± 50
Achilleion		LJ 3182	6920 ± 50
(EARLY) NEOLITHIC			
Knossos VI		BM 273	6210 ± 150
Knossos V		BM 274	6140 ± 150
ANATOLIA			
Suberde II (lower)	PPN	P 1387	8276 ± 200
Suberde II (lower)	PPN	P 1391	8249 ± 91
Suberde II (lower)	PPN	P 1388	8176 ± 79
Suberde II (lower)	PPN	P 1389	7584 ± 85
Suberde II (upper)	PPN	P 1386	7995 ± 76
Suberde II (uuper)	PPN	P 1385	7905 ± 88
Hacilar	Aceramic	BM 127	8700 ± 180
Hacilar IX	Late Neo.	P 314	7340 ± 94
Hacilar VII	Late Neo.	BM 125	7770 ± 180[5]
Hacilar VI	Late Neo.	BM 48	7550 ± 180[6]
Hacilar VI	Late Neo.	P 313 A	7350 ± 85
Hacilar II	Early Chalc.	P 316	7170 ± 134
Hacilar I a	Early Chalc.	P 315	6990 ± 120
Can Hassan II	Early Chalc.E	P 795	6832 ± 78
Can Hassan II	Early Chalc.D	P 794	7033 ± 89
Can Hassan II	Early Chalc.C	P 793	6254 ± 78
Can Hassan II	Early Chalc.B	P 791	6755 ± 80
Can Hassan	Early Chalc.A	P 790	6830 ± 78
Can Hassan II	Early/Middle Chalcolithic	BM 153	7190 ± 150
Can Hassan II	Early/Middle Chalcolithic	BM 151	6880 ± 150
Catal Hüyük XII	Neolithic	P 1374	7757 ± 92[7]
Catal Hüyük X	Neolithic	P 782	8092 ± 98
Catal Hüyük X	Neolithic	P 1370	8036 ± 104
Catal Hüyük X	Neolithic	P 1369	7937 ± 109
Catal Hüyük X	Neolithic	P 1372	7915 ± 85
Catal Hüyük X	Neolithic	P 1371	7844 ± 102
Catal Hüyük IX	Neolithic	P 779	8190 ± 99[8]
Catal Hüyük VIII	Neolithic	P 1367	7853 ± 97
Catal Hüyük VIII	Neolithic	P 1366	7684 ± 90

(contd)

Site		No	Date BP
Catal Hüyük VII	Neolithic	P 778	7538 ± 89
Catal Hüyük VI B	Neolithic	P 777	7704 ± 91
Catal Hüyük VI B	Neolithic	P 797	7629 ± 90
Catal Hüyük VI B	Neolithic	P 781	7524 ± 90
Catal Hüyük VI A/B	Neolithic	P 827	7579 ± 86
Catal Hüyük VI A	Neolithic	P 1365	7729 ± 80
Catal Hüyük VI A	Neolithic	P 772	7572 ± 91
Catal Hüyük VI A	Neolithic	P 769	7505 ± 93
Catal Hüyük VI	Neolithic	P 1375	7661 ± 99
Catal Hüyük V	Neolithic	P 776	7640 ± 91
Catal Hüyük V	Neolithic	P 1361	7499 ± 93
Catal Hüyük II	Neolithic	P 796	7521 ± 77
		CYPRUS PRE-POTTERY NEOLITHIC	
Khirokitia		St 415	7710 ± 160
Khirokitia		St 414	7540 ± 125
Khirokitia		St 416	7500 ± 160
Khirokitia		BM 853	7451 ± 81
Khirokitia		BM 854	7442 ± 61
Khirokitia		BM 855	7308 ± 74
Khirokitia		BM 852	7294 ± 78
Kalavasos		P 2548	8350 ± 200[9]
Kalavasos		P 2555	7430 ± 90
Kalavasos		P 2552	7250 ± 100
Kalavasos		P 2550	7180 ± 90
Kalavasos		P 2551	7140 ± 90
Kalavasos		P 2553	7110 ± 90

NOTES

1. Same as P 1518, but without NaOH pretreatment.
2. This date is generally considered to be too high.
3. This date is probably too high. Derived from a beam, which possible had been reused.
4. This date is generally considered too high.
5. Compared to the preceding date (which seems a little low, but quite possible) and the following date, this seems too high.
6. This date is considered to be too high. It comes from a beam, which possibly had been reused.
7. This date we suppose to be too low (coming from intrusive material?). It should be around 8100 BP.
8. This date is considered to be too high.
9. Compared to the other dates from the same area this date is far too high.

TABLE 29: Colour, thickness and non-plastics of the sherds that were examined in thin section

	Sesklo								Achilleion		
indication of sherd	5	8	14	29	79	89	22	212	D3-L21	A1-L33	A5
colour of fresh fracture											
2.5 YR[1]	3/2-4/4[2]		6/6		6/4			4/6	5/6		
5 YR						6/4-5/3	5-6/4				
7 YR				6/4							
7.5 YR										5-6/2	5-6/2
10 YR		7/3									
Thickness of sherd in cm											
0.3					0.3						
0.5 - 0.9	0.9	0.7	0.6					0.5			
1.1									1.1		
1.4 - 1.8				1.8		1.8	1.4			1.5	1.5
Non-plastics											
rather fine grained quartz-biotite schist	-	++	-	++	++	++					
quartz-biotite-epidote-feldspar schist	-	-		+							
quartz-epidote-muscovite schist	++		++	-	-	-					
very fine grained mica schist							++				
amphibole-muscovite-quartz rockfragments										++	+
quartz-sericite schist with sparty calcite											+
quartz grains 0.1 - 1.0 mm	+	+	+	+	-	++		++	++	+	-
calcite {micrite			+			++		++			
calcite {sparite											++
sherd grit				-			-		-		

1. Munsell colour notation for hue
2. Munsell colour notation for value/chroma

\- few

\+ several

++ much

TABLE 30: Distribution of faunal sample from various Early Neolithic sites in Greece. Percentages

Site	Wild	Domestic	Cattle	Sheep/goat	Pig	Dog	
Lerna I	4.30	95.70	17.60	50.60	26.50	1.00	Gejvall
Aghios Petros	2.93	97.07	6.80	82.58	7.58	0.32	Schwartz
Sesklo (1972)	10.30	89.70	11.70	60.60	17.80	0.60	Schwartz
Achilleion	4.99	95.01	5.51	74.89	13.60	0.94	Bökönyi
Argissa	0.92	99.08	4.76	84.15	9.49	0.18	Boessneck
Nea Nikomedeia	7.00	93.00	14.55	70.45	14.77	0.23	Higgs

TABLE 31: Distribution of Faunal Sample from Early Neolithic Sesklo, excavated during the 1972 season

	B(I)E	B 1972	section C	Pre-Pottery	Total
Cattle	25/43.1%	15/25.9%	18/31.0%		58
Sheep/goat	70/23.4%	115/38.3%	106/35.9%	9/3.0%	300
Pig, dom.	16/18.1%	29/32.6%	40/45.0%	4/4.5%	89
Dog	1	1	1		3
Red deer	2	4	7		13
Roe deer		4	3		7
Pig, wild	3	2			5
Hare	5	8	4		17
Badger		1			1
Bird			1		1
Crab	1				1
Total	123	179	180	13	495

TABLE 32: Distribution of faunal sample from Early Ceramic Sesklo, excavated during the 1972, 1976 and 1977 seasons in section C and B(I)E

Cattle	92	13.8%		
Sheep/goat	427	64.1%		
Pig, dom.	144	21.6%	666 domesticates	92.4%
Dog	3	0.4%		
Red deer	14	1.9%		
Roe deer	7	1.0%		
Badger	2	0.3%		
Lynx	1	0.1%	56 wild	7.6%
Hare	30	4.2%		
Tortoise	1	0.1%		

TABLE 33: Distribution of Faunal Sample from the Pre-Pottery at Sesklo, excavated during the 1972 and 1977 seasons in section C.

Cattle	21	23.1%		
Sheep/goat	58	65.7%	89 domesticates	100.0%
Pig, dom.	10	11.2%		

BIBLIOGRAPHY

Anastassiades, P.A., 1949: General features on the soils of Greece. *Soil Science 67:* 347 - 363.

Andel, T.H. van, Th. W. Jacobsen, J.B. Jolly and N. Lianos, 1980: Late Quaternary History of the Coastal Zone near Franchthi Cave, Southern Argolid, Greece. *Journal of Field Archaeology 7:* 389 - 403.

Angel, J.L. 1971: Early Neolithic skeletons from Catal Hüyük. *Anatolian Studies 21:* 77 - 99.

Aubouin, J., 1959: Les confins de l'Epire et de la Thessalie. *Annales Géologiques des Pays Helléniques X:* 1 - 526.

Aupert, P., 1975: Chronique des Fouilles en 1974. Grotte de Franchti. *Bulletin de Correspondance Hellénique 99:* 618 - 621.

Biesantz, H., 1959: Bericht über die Ausgrabungen in Thessalien 1958 II: Die Ausgrabung bei der Soufli-Magula. *Archäologischer Anzeiger:* 56 - 74.

Bintliff, J.L., 1976: The plain of Western Macedonia and the Neolithic site of Nea Nikomedeia. *Proceedings of the Prehistoric Society 42:* 241 - 262.

Bintliff, J.L., 1977: *Natural Environment and Human Settlement in Prehistoric Greece*. British Archaeological Reports, Supplementary Series 28. Oxford.

Bittel, K., 1969-70: Bemerkungen über die prähistorische Ansiedlung auf dem Fikirtepe bei Kadiköy (Istanbul). *Instanbuler Mitteilungen 19/20.* 1 - 20.

Blegen, C.W., 1954: Excavations at Pylos. *American Journal of Archaeology 58:* 27 - 32.

Blegen, C.W., 1975: Neolithic Remains at Nemea. *Hesperia 44:* 224 - 227.

Boessneck, J., 1962: "Die Tierreste aus der Argissa-Magula von präkeramischen Neolithikum bis zur mittleren Bronzezeit." In: Milojčić, Boessneck und Hopf, 1962: 27 - 99.

Bokönyi, S., 1969: "Archeaological problems of recognizing animal domestication". In: Ucko and Dimbleby (eds.) 1969: 219 - 230.

Bökönyi, S., 1973 "Stockbreeding." In: Theocharis 1973a: 165 - 178.

Bökönyi, S., 1977: *Animal remains from the Kermanshah Valley, Iran*. British Archaeological Reports, Supplementary Series 34. Oxford.

Bottema, S., 1967: A Late Quaternary Pollen Diagram from Ioannina, Northwestern Greece. *Proceedings of the Prehistoric Society 33:* 26 - 29.

Bottema, S., 1974: *Late Quaternary Vegetation History of Northwestern Greece*. Thesis. Groningen.

Bottema, S., 1978: "The Late Glacial in the Eastern Mediterranean and the Near East." In: Brice (ed.) 1978: 15 - 28.

Bottema, S., 1980: Pollen analytical investigations in Thessaly (Greece). In press.

Braidwood, R.J., 1969: The earliest village communities of Southwest Asia reconsidered. *Prehistoric Agriculture 1971:* 236 - 251.

Braidwood, R.J. and B. Howe, 1960: *Prehistoric investigations in Iraqi Kurdistan*. Chicago: University of Chicago Press.

Brice, W.C., (ed.), 1978: *The environmental History of the Near and Middle East since the last Ice Age*. London: Academic Press.

Buchholz, H.G. and V. Karageorgis, 1971: *Altägäis und Altkypros*. Tübingen: Wasmuth.

Butzer, K.W., 1957: Late Glacial and Postglacial Climatic Variations. *Erdkunde 11:* 21 - 35.

Butzer, K.W., 1972: *Environment and Archaeology*. London: Methuen 2nd revised edn.

Cann, J.R. and C. Renfrew, 1964: The characterization of Obsidian and its application in the Mediterranean region. *Proceedings of the Prehistoric Society 30:* 111 - 133.

Caskey, J.L., 1954: Excavations at Lerna 1952/53. *Hesperia 23:* 3 - 30.

Caskey, J.L., 1955: Excavations at Lerna 1954. *Hesperia 24:* 25 - 49.

Caskey, J.L., 1956: Excavations at Lerna 1955. *Hesperia 25:* 147 - 173.

Caskey, J.L., 1957: Excavations at Lerna 1956. *Hesperia 26:* 142 - 162.

Caskey, J.L., 1958: Excavations at Lerna 1957. *Hesperia 27:* 125 - 140.

Caskey, J.L., 1959: Activities at Lerna 1958/59. *Hesperia 28:* 202 - 207.

Childe, V.G., 1925: *The dawn of European Civilization*. London: Routledge and Kegan Paul. (6th revd. edn. 1957).

Childe, V.G., 1950: *Prehistoric Migrations in Europe*. Oslo: Aschehaug.

Childe, V.G., 1958: *The prehistory of European Society*. Harmondsworth: Penguin.

Clark, J.G.D., 1965: Radiocarbon dating and the expansion of farming culture from the Near East over Europe. *Proceedings of the Prehistoric Society 31:* 58 - 73.

Clarke, D.L., 1978: *Mesolithic Europe, the Economic Base*. London: Duckworth. (originally in: G. de G. Sieveking et al. (eds.) 1976: Problems in Economic and Social Archaeology, London: Duckworth.)

Clason, A., 1977: Die Tierknochen. *Analecta Praehistorica Leidensia X:* 101 - 116.

Cornwall, I.W., 1958: *Soils for the Archaeologist*. London: Phoenix.

Crabtree, D.E., 1972: *An Introduction to Flintworking*. Pocatello, Idaho: Idaho State University Papers 28.

Dennell, R., 1978: *Early Farming in South Bulgaria from the 6th to the 3rd Millennia B.C.* British Archaeological Reports, Supplementary Series 45. Oxford.

Ehrich, R.W., (ed.), 1965: *Chronologies in Old World Archaeology*. Chicago: University of Chicago Press.

Eisma, D., 1978: "Stream deposition and erosion by the Eastern shore of the Aegean." In: Brice (ed.) 1978: 67 - 81.

Elsker, E., 1976: "The Chipped Stone Industry." In: Gimbutas 1976: 257 - 278.

Evans, Sir Arthur, 1921: *The Palace of Minos at Knossos I*. London: MacMillan and Co.

Evans, J.D., 1964: Excavations in the Neolithic settlement of Knossos, 1957 - 60, Part I. *British School Annual 59:* 132 - 240.

Evans, J.D., 1970: The significance of the Knossos Early Neolithic I culture for Aegean Prehistory. *Actes du 7e Congrès International des Sciences Préhistoriques et Protohistoriques (1966):* 381- 384.

Evans, J.D. 1971: Neolithic Knossos; the Growth of a Settlement. *Proceedings of the Prehistoric Society 37, part 2:* 95 - 118.

Flannery, K.V., 1969: "Origins and ecological effects of early domestication in Iran and the Near East." In: Ucko and Dimbleby (eds) 1969: 73 - 100.

French, D.H., 1965: Early Pottery sites from West Anatolia. *Bulletin of the Institute of Archaeology 5:* 15 - 25.

French, D.H., 1966: Some problems in Macedonian Prehistory. *Balkan Studies 7:* 103 - 110.

French, D.H., forthcoming: *A survey of prehistoric sites in Thessaly*.

French, D.H. et al., 1972: "Excavations at Can Hasan III, 1969 - 1970." In: E.S. Higgs (ed) 1972: *Papers in Economic Prehistory*. Cambridge: Cambridge University Press: 181 - 190.

Frost, G., 1978: *Geological structure of the Volos region, Greece*. Unpubl. thesis. Edinburgh.

Furness, A., 1953: The Neolithic Pottery of Knossos. *British School Annual 48:* 94 - 134.

Gallis, C.J., 1975: Cremation Burials since Early Neolithic Age in Thessaly. *Athens Annals of Archaeology 8:* 241 - 258.

Gejvall, N.G. 1969: *Lerna, a Preclassical site in the Argolid, Vol. I: The Fauna*. Princeton: Princeton University Press.

Gimbutas, M., 1974a: Achilleion: A Neolithic mound in Thessaly. Preliminary Report on the 1973/1974 excavations. *Journal of Field Archeology vol. 1:* 277 - 303.

Gimbutas, M., 1974b: *The Gods and Goddesses of Old Europe*. London: Methuen.

Gimbutas, M. (ed.), 1976: *Neolithic Macedonia*. Los Angeles: University of California Press.

Goldman, H., 1940: The Acropolis of Halae. *Hesperia 9:* 381 - 514.

Greig, J.R.A. and J. Turner, 1974: Some Pollen diagrams from Greece and their Archaeological Significance. *Journal of Archaeological Science 1:* 177 - 194.

Grundman, K., 1932: Aus neolithischen Siedlungen bei Larisa. *Athenische Mitteilungen 57:* 102 - 123.

Grundmann, K., 1937: Magula Hadzimissiotiki: Eine steinzeiltiche Siedlung im Karla-See. *Athenische Mitteillungen 62:* 56 - 69.

Halstead, P., 1981: "Counting sheep in Neolithic and Bronze Age Greece." In: I. Hodder, G. Isaac and N. Hammond (eds): Pattern of the past: Studies in honour of David Clarke: 307 - 339.

Halstead, P. and G. Jones, 1980: Early Neolithic economy in Thessaly. *Anthropologika 1:* 93 - 118.

Hansen, J. and J.M. Renfrew, 1978: Palaeolithic - Neolithic seed remains at Franchti Cave, Greece. *Nature 271:* 349 - 352.

Hanschmann, E., 1977: cf. Milojčić, V. und E. Hanschmann, 1977.

Helbaek, H., 1964: First Impressions of the Catal Hüyük Plant Husbandry. *Anatolian Studies 14:* 121 - 124.

Heurtley, W.A., 1939: *Prehistoric Macedonia*. Cambridge: University Press.

Higgs, E.S., 1978: "Environmental changes in Northern Greece." In: Brice (ed.) 1978: 41 - 50.

Higgs, E.S. S.I. Dakaris and R.W. Hey, 1964: The climate, environment and industries of Stone Age Greece, Part I. *Proceedings of the Prehistoric Society 30:* 199 - 245.

Higgs, E.S. and C. Vita-Finzi, 1966: The climate, environment and industries of Stone Age Greece, Part II. *Proceedings of the Prehistoric Society 32:* 1 - 29.

Hodges, H., 1964: *Artifacts, an introduction to early materials and technology*. London: J. Baker.

Hole, F. and K.V. Flannery, 1967: The Prehistory of Southwestern Iran: A Preliminary Report. *Proceedings of the Prehistoric Society 33:* 147 - 206.

Hole, F., K.V. Flannery and J.A. Neely, 1969: *Prehistory and Human Ecology of the Deh Luran plain*. Ann Arbor: University of Michigan Press.

Honea, K., 1975: Prehistoric remains on the island of Kythnos. *American Journal of Archaeology 79:* 277 - 279.

Hopf, M., 1962: "Bericht über die Untersuchung von Samen und Holzkohlenresten von der Argissa-Magula aus den präkeramischen bis mittelbronzezeitliche Schichten." In: Milojčić, Boessneck and Hopf, 1962: 101 - 110.

Hopf, M., 1962b: Nutzpflanzen vom Lernäischen Golf. *Jahrbuch Römisches und Germanisches Zentralmuseum Mainz 9:* 1 - 19.

Hourmouziades, G.Ch., 1969a: Newsletter from Thessaly. *Athens Annals of Archaeology 2:* 93 - 95. (In Greek, English summary).

Hourmouziades, G.Ch., 1969b: Newsletter from Thessaly. *Athens Annals of Archaeology 2:* 169 - 172. (In Greek, English summary).

Hourmouziades, G., 1971: Dio nee enkatastasis tis archaeoteras Neolithikis is tin Ditikin Thessalian. *Athens Annals of Archaeology 4:* 164 - 175. (In Greek, English summary).

Hourmouziades, G., 1972: Anaskaphe is ton Prodromon Karditsis. *Archaeologikon Deltion 27 B2:* 394 - 396. (In Greek).

Hourmouziades, G.Ch., 1973: *I anthropomorphi Idoloplastiki tis Neolithikis Thessalias*. Athens. (In Greek).

Hubbard, R.N.L., 1979: "Ancient Agriculture and Ecology at Servia." In: C.C. Ridley and K.A. Wardle, 1979: 226 - 228.

Jacobson, T.W., 1969: Excavations at Porto Cheli and vicinity. Preliminary Report II: The Franchti Cave 1967 - 1968. *Hesperia 38:* 343 - 381.

Jacobson, T.W., 1970: Excavations in the Franchti Cave. *Archeologikon Deltion 25 Chronika:* 169 - 172.

Jacobsen, T.W., 1973a: Excavations in the Franchti Cave 1969 - 1971, Part I. *Hesperia 42:* 45 - 89.

Jacobsen, T.W., 1973b: Excavations in the Franchti Cave 1969 - 1971, Part II. *Hesperia 42:* 253 - 283.

Jacobsen, T.W., 1974: New Radiocarbondates from Franchti Cave: A preliminary Note Regarding Collection of Samples by Means of Flotation. *Journal of Field Archaeology 1:* 303 - 304.

Jacobsen, T.W. and D.M. Van Horn, 1974: The Franchti Cave Flint Survey: Some Preliminary Results. *Journal of Field Archaeology 1:* 304 - 308.

Kraft, J.C., G.R. Rapp Jr. and S.E. Aschenbrenner, 1980: Late Holocene Palaeogeomorphic Reconstructions in the Area of the Bay of Navarino: Sandy Pylos. *Journal of Archeological Science 7:* 187 - 210.

Lamb, H.H., P.W. Lewis and A. Woodroffe, 1966: "Atmospheric circulation and the main climate variables between 8000 and 0 B.C.: meteorological evidence." In: World Climate from 8000 to 0 B.C. London: 174 - 217.

Lambert, N., 1974: Grotte de Kitsos (Lavrion.) *Bulletin de Correspondance Hellénique 98:* 723 - 758.

Lavezzi, John D., 1978: Prehistoric Investigations at Corinth. *Hesperia 47:* 402 - 451.

Leake, W.M., 1835: *Travels in Northern Greece IV*. London.

Limbrey, S., 1975: *Soil Science and Archaeology*. London.

Lolling, H.G., 1884: Mitteilungen aus Thessalien I. Ormenion und Aisoneia. *Athenische Mitteilungen 9:* 97 - 116.

Loy, W.G. and H.E. Wright Jr., 1972: "The physical setting." In: McDonald and Rapp (eds.) 1972: 37 - 46.

McDonald, W. and R. Hope Simpson, 1961: Prehistoric Habitation in the Southwestern Peleponnese. *American Journal of Archaeology 65:* 221 - 260.

McDonald, W. and G. Rapp (eds.) 1972: *The Minnesota Messenia Expedition: Reconstruction of a Bronze Age Environment*. Minneapolis: University of Minnesota Press.

Mackenzie, D., 1903: The pottery of Knossos. *Journal of Hellenic Studies 23:* 157 - 205.

Mellaart, J., 1959: Excavations at Hacilar, Second Preliminary Report 1959. *Anatolian Studies IX:* 51 - 66.

Mellaart, J., 1960: Excavations at Hacilar, Third Preliminary Report 1959. *Anatolian Studies X:* 83 - 105.

Mellaart, J., 1961a: Early Cultures of the South Anatolian Plateau. *Anatolian Studies XI:* 159 - 185.

Mellaart, J., 1961b: Excavations at Hacilar. Fourth Preliminary Report 1960. *Anatolian Studies XI:* 39 - 75.

Mellaart, J., 1962: Excavations at Catal Hüyük, First Preliminary Report 1961. *Anatolian Studies XII:* 41 - 65.

Mellaart, J., 1963: Excavations at Catal Hüyük, Second Preliminary Report 1962. *Anatolian Studies XIII:*43 - 104.

Mellaart, J., 1964: Excavations at Catal Hüyük, Third Preliminary Report 1963. *Anatolian Studies XIV:* 39 - 121.

Mellaart, J., 1966: Excavations at Catal Hüyük 1965; Fourth Preliminary Report. *Anatolian Studies XVI:* 165 - 191.

Mellaart, J., 1967: *Catal Hüyük, A Neolithic Town in Anatolia*. London: Thames and Hudson.

Mellaart, J., 1970a: *Excavations at Hacilar*. Edinburgh: Edinburgh University Press.

Mellaart, J., 1970b: "(a)The earliest settlements in Western Asia, from the ninth to the end of the fifth millennium B.C. (b) Anatolia before 4000 B.C." In: The Cambridge Ancient History, Vol. I, Part 1: Chapter VII 248 - 326.

Mellaart, J., 1975: *The Neolithic of the Near East*. London: Thames and Hudson.

Mellink, M., 1970: Archaeology in Asia Minor. *American Journal of Archaeology 74:* 157 - 178.

Mellink, M., 1972: Archaeology in Asia Minor. *American Journal of Archaeology 76:* 165 - 188.

Michaud, J.P., 1974: Chronique des fouilles en 1973; Grotte de Franchti. *Bulletin de Correspondance Hellénique 98:* 610 - 612.

Miller, S.G., 1975: Excavations at Nemea. *Hesperia 44:* 143 - 172.

Milojčić, V., 1949: *Chronologie der jüngeren Steinzeit Mittel- und Südosteuropas.* Berlin.

Milojčić, V., 1950/51: Zur Chronologie der jüngeren Steinzeit Griechenlands. *Jahrbuch des deutschen archäologischen Instituts 65/66:* 1 -90.

Milojčić, V., 1954: Vorbericht über die Versuchungen an der Otzaki-Magula bei Larisa. *Archäologischer Anzeiger: 1 - 28.*

Milojčić, V., 1955a: Vorbericht über die Ausgrabung auf der Otzaki-Magula *Archäologischer Anzeiger: 157 - 181.*

Milojčić, V., 1955b: Vorbericht über die Ausgrabungen auf den Magulen von Otzaki, Arapi und Gremnos bei Larisa. *Archäologischer Anzeiger:* 182 - 231.

Milojčić, V., 1956: Die erste präkeramische bäuerliche Siedlung der Jungsteinzeit in Europa. *Germania 34:* 208 - 210.

Milojčić, V., 1959: Ergebnisse der deutschen Ausgrabungen in Thessalien, 1953 - 1958. *Jahrbuch Römisches und Germanisches Zentralmuseum Mainz 6:* 10 - 56.

Milojčić, V., 1960: Präkeramisches Neolithikum auf der Balkanhalbinsel. *Germania 38:* 320 - 335.

Milojčić, V., 1965: "Ausgrabungen in Thessalien." In: Neue deutsche Ausgrabungen im Mittelmeergebiet und im Vorderen Orient: 225 - 236.

Milojčić, V., J. Boessneck and M. Hopf, 1962: *Die deutschen Ausgrabungen auf der Argissa-Magula in Thessalien I. Das präkeramischen Neolithikum, sowie Tier- und Pflanzenreste.* Bonn: Habelt.

Milojčić, V., J. Boessneck, D. Jung and H. Schneider, 1965: *Paläolithikum um Larisa in Thessalien.* Bonn: Habelt.

Milojčić, V. and J. Milojčić-von Zumbusch, 1971: *Die deutschen Ausgrabungen auf der Otzaki-Magula in Thessalien I. Das frühe Neolithikum.* Bonn: Habelt.

Milojčić, V., A. van den Driesch, K. Enderle, J. Milojčić-von Zumbusch and K. Kilian, 1976: *Magulen um Larisa 1966.* Bonn: Habelt.

Milojčić, V. and E. Hanschmann, 1977: *Die deutschen Ausgrabungen auf der Arissa-Magula in Thessalien II. Frühe und beginnende mittlere Bronzezeit.* Bonn: Habelt.

Murray, J., 1970: *The first European Agriculture.* Edinburgh: Edinburgh University Press.

Nandris, J., 1970: The development and relationships of the earlier Greek Neolithic. *Man V:* 192 - 213.

Papadopoulou, M.G., 1958: Magoulitsa, Neolithikos Synikismos para tin Karditsan. *Thessalika 1:* 39 - 49.

Payne, S., 1972: "Can Hasan III, The Anatolian Aceramic and the Greek Neolithic." In: E.S. Higgs, 1972: *Papers in Economic Prehistory.* Cambridge: Cambridge University Press: 191 - 194.

Perkins, D., 1969: Fauna of Catal Hüyük: Evidence for early Cattle Domestication in Anatolia. *Science N.Y. 144:* 177 - 179.

Philippson, A., 1950/59: *Die griechische Landschaften. 5 Vols.* Ed. E. Kirsten, Frankfurt: Vittorio Klostermann.

Quitta, H., 1971: "Der Balkan als Mittler zwischen Vorderem Orient und Europa." In: F. Schlette (ed.) 1971: Evolution und Revolution im Alten Orient und in Europa. Berlin: Akademie Verlag: 38 - 63.

Read, C.A., 1969: "The pattern of Animal Domestication in the Prehistoric Near East." In: Ucko and Dimbleby (eds.) 1969: 361 - 380.

Renfrew, C., 1972: *The emergence of Civilization.* London: Methuen.

Renfrew, C., 1973: "Trade and Craft Specialization." In: Theocharis 1973a 179 - 200.

Renfrew, C., J.R. Cann and J.E. Dixon, 1965: Obsidian in the Aegean. *British School Annual 60:* 225 - 247.

Renfrew, C., J.E. Dixon and J.R. Cann, 1968: Further analysis of Near Eastern Obsidians. *Proceedings of the Prehistoric Society 34:* 319 - 331.

Renfrew, J., 1966: A report on recent finds of carbonized cereal grains and seeds from Prehistoric Thessaly. *Thessalika 5:* 21 - 36.

Renfrew, J.M., 1960: "The archaeological evidence for the domestication of plants: methods and problems." In: Ucko and Dimbleby (eds.) 1969: 149 - 172.

NeolithicRenfrew, J.M., 1973: "Agriculture." In: Theocharis 1973a: 147 - 163.

Ridley, C. and K.A. Wardle, 1979: Rescue excavations at Servia 1971 - 1973, a preliminary Report. *British School Annual 74:* 185 - 230.

Rhomniopoulou, K. and C. Ridley, 1973: Excavations at Servia 1972. *Athens Annals of Archaeology 6:* 419 - 426.

Rhomniopoulou, K. and C. Ridley, 1974: Excavations at Servia 1973. *Athens Annals of Archaeology 7:* 351 - 360.

Robinson, H.S., 1976: Excavations at Corinth: Temple Hill 1968 - 1972. *Hesperia 45:* 203 - 239.

Rodden, R.J., 1962: Excavations at the Early Neolithic site at Nea Nikomedeia, Greek Macedonia (1961 season). *Proceedings of the Prehistoric Society 28:* 267 - 288.

Rodden, R.J., 1964: Recent discoveries from Prehistoric Macedonia: An interim Report. *Balkan Studies 5:* 109 - 124.

Rodden, R.J., 1965: "An Early Neolithic Village in Greece." In: C.C. Lamberg-Karlovsky (ed.), 1972 *Old World Archaology: Foundations of Civilisation.* San Francisco: Freeman and Co: 95 - 103.

Schachermeyr, F., 1955: *Die ältesten Kulturen Griechenlands.* Stuttgart: Kohlhammer Verlag.

Schmandt-Besserat, D., 1974: The use of clay before pottery in the Zagros. *Expedition 16:* 11 - 18.

Schmandt-Besserat, D., 1977a: The earliest uses of clay in Syria. *Expedition 19:* 28 - 43.

Schmandt-Besserat, D., 1977b: The invention of writing. *Discovery 1:* 4 -9.

Schmandt-Besserat, D., 1977c: The beginning of the use of clay in Turkey. *Anatolian Studies XXVII:* 133 - 150.

Schmandt-Besserat, D., 1978: The earliest precursor of writing. *Scientific American (June):* 38 - 48.

Schneider, H.J., 1968: *Quartärgeologische Entwicklungsgeschichte Thessaliens.* Bonn: Habelt.

Semenov, S.A., 1973 *Prehistoric Technology.* (third ed.). London: Cory, Adams and Mackay.

Shepard, A.O., 1976: *Ceramics for the Archaeologist* (ninth printing). Washington D.C.: Carnegie Institution.

Singh, P., 1974: *Neolithic Cultures of Western Asia.* London: Seminar Press.

Smoor, B., 1976: "(a) Polished Stone Tools. (b) Bone Tools." In: Gimbutas (ed.) 1976: 177 - 197.

Sordinas, A., 1968: *The Prehistory of the Ionean Islands – the Flint and the Pottery.* Thesis, unpubl. MS. Harvard.

Sordinas, A., 1969: Investigations of the Prehistory of Corfu, 1964 - 1966. *Balkan Studies 10:* 393 - 424.

Soteriades, G., 1912: Fouilles préhistoriques en Phocide. *Revue des Etudes Greques 25:* 253 - 299.

Srejovič, D., 1969: *Lepenski Vir.* Beograd.

Stählin, F., 1924: *Das Hellenische Thessalien.* Stuttgart.

Starkel, L., 1966: "The moulding of European Relief." In: Word Climate from 8000 to 0 B.C. London: 15 - 33.

Theocharis, D.R., 1956: Nea Makri, eine grosze neolithische Siedlung in der Nähe von Marathon. *Athenische Mitteilungen 71:* 1 - 29.

Theocharis, D.R., 1957: E Archè tou Politismou en Seskloï. *Praktika tis Akademias Athinon 32:* 151 - 159. (in Greek).

Theocharis, D.R., 1958: Ek tis Prokeramikís Thessalías. *Thessalika 1:* 70 - 86. (in Greek).

Theocharis, D.R., 1959: Pyrasos. *Thessalika 2:* 29 - 68. (in Greek).
Theocharis, D.R., 1960: Topografike Erevne. *Archeologikon Deltion 16, Chronika:* 185 - 186. (in Greek).
Theocharis, D.R., 1961: Tycheia Erevmata. 9: Magoula Demerli. *Archeologikon Deltion 17, Chronika:* 178 - 179 (in Greek).
Theocharis, D.R., 1962a: Anaskafè en Seskloï. *Praktika tis Archeologikis Eterías:* 24 - 35. (in Greek).
Theocharis, D.R., 1962b: Apo ti Neolithikì Thessalía. I. *Thessalika 4:* 63 - 83. (in Greek).
Theocharis, D.R., 1963: Anaskafè en Seskloï. *Praktika tis Archeologikis Eterías:* 40 - 44. (in Greek).
Theocharis, D.R., 1964: Bournarbasi. *Archeologikon Deltion 19, Chronika:* 262. (in Greek).
Theocharis, D.R., 1965a: Anaskafè en Seskloï. *Praktika tis Archeologikis Eterías:* 5 - 10. (in Greek).
Theocharis, D.R., 1965b: Proïstorike Synikismì ke Evrímata. *Archeologikon Deltion 20, Chronika:* 319. (in Greek).
Theocharis, D.R., 1966: Anaskafè en Seskloï. *Praktika tis Archeologikis Eterías:* 5 - 8. (in Greek).
Theocharis, D.R., 1967: *I Avghi tis Thessalikis Proïstorías: Archì ke proïmì Exelíxi tis Neolithikís.* Volos: Philarcheos Etería; Bonn: Habelt. (in Greek, English Summary).
Theocharis, D.R., 1968: Anaskafè en Seskloï. *Praktika tis Archeologikis Eterías:* 24 - 31. (in Greek).
Theocharis, D.R., 1970: Anaskafì epi tis Nisidos tou Agiou Petrou. *Archeologikon Deltion 25 Chronika:* 271 - 277.
Theocharis, D.R., 1971a: Anaskafè en Seskloï. *Praktika tis Archeologikis Eterías:* 15 - 19 (in Greek).
Theocharis, D.R., 1971b: Prehistory of Eastern Macedonia and Thrace. *Ancient Greek Cities 9.*
Theocharis, D.R., 1972: Anaskafì en Seskloï. *Praktika tis Archeologikis Eterías:* 8 - 11. (in Greek).
Theocharis, D.R., 1973a: *Neolithic Greece.* Athens: National Bank of Greece.
Theocharis, D.R., 1973b: Anaskafì en Seskloï. *Praktika tis Archeologikis Eterías:* 22 - 25.
Theocharis, D.R., 1974: "Prehistory and Protohistory." *History of the Hellenic World I.* Athene: Edoktiki Athinon: 18 - 28; 32 - 79.
Theocharis, D.R., 1976: Anaskafì en Seskloï. *Praktika tis Archeologikis Eterías:* 154 - 162 (in Greek).
Todd. I.A. 1966: Asikli Hüyük, a Protoneolithic site in Central Anatolia. *Anatolian Studies 16:* 139 - 164.
Tringham, R., 1971: *Hunters, Fishers and Farmers of Eastern Europe.* London: Hutchinson University Library.
Turner, J. and J.R.A. Greig, 1975: Some Holocene Pollen diagrams from Greece. *Review of Paleobotany and Palynology 20:* 171 - 204.
Ucko, P.J. and G.W. Dimbleby (eds.) 1969: *The Domestication and Exploitation of Plants and Animals.* London: Duckworth.
Vita-Finzi, C., 1969: *The Mediterranean Valleys.* Cambridge: Cambridge University Press.
Vitelli, K.D., 1977: Neolithic Potter's Marks from Lerna and the Franchti Cave, *Journal of Walters Art Gallery 36:* 17 - 30.
Voliotis, D., 1973: Beziehungen zwischen Klima, Boden und Vegetation und Vegetations-zonen in Griechenland. *Scientific Annals. Fac. Phys. and Mathem. Univ. Thessaloniki 13.*
Vriezen, K.J.H., 1977: Die Gefäsze der Chamergruppe. *Analecta Praehistorica Leidensia X:* 77 - 100.
Wace, A.J.B. and M.S. Thompson, 1912: *Prehistoric Thessaly.* Cambridge: University Press.
Walker-Kosmopoulos, L., 1948: *The Prehistoric inhabitation of Corinth.* (3 vols). München: Münchner Verlag.
Walther, H. und H. Lieth, 1964: *Klimadiagramm-Weltatlas.* 1e Lieferung 1960. 2e Lieferung 1964, Jena.
Warren, P., M.R. and H.N. Jarman, N.J. Shackleton and J.D. Evans, 1968: Knossos Neolithic, Part II. *British School Annual 63:* 239 - 276.
Waterbolk, H.T. 1971: Working with Radiocarbon Dates. *Proceedings of the Prehistoric Society 37, part II:* 15 - 33.

Watson, J.P. N., 1979: "Faunal remains." In: C.C. Ridley and K.A. Wardle 1979: 228 - 29.

Weinberg, S.S., 1937: Remains from Prehistoric Corinth. *Hesperia 6:* 487 - 52.

Weinberg, S.S., 1942: The Cronology of the Neolithic Period and the Early Bronze Age in the Aegean. *American Journal of Archaeology 46:* 121.

Weinberg, S.S., 1947: Aegean Cronology: Neolithic Period and Early Bronze Age. *American Journal of Archaeology 51:* 165 - 182.

Weinberg, S.S., 1948: A cross-section of Corinthian Antiquities. *Hesperia 17:* 197 - 241.

Weinberg, S.S., 1962: Excavations at Prehistoric Elateia, 1959. *Hesperia 31:* 158 - 209.

Weinberg, S.S., 1965: "The Relative Chronology of the Aegean in the Neolithic Period and the Early Bronze Age." In: Ehrich 1965: 86 - 107.

Weinberg, S.S., 1970 "The Stone Age in the Aegean." In: Cambridge Ancient History, Vol. I, Part 1: Chapter X 557 - 618.

Weinberg, S.S. and H. Robinson, 1960: Excavations at Corinth 1959. *Hesperia 29:* 225 - 253.

Williams II, C.K., J. MacIntosh and J.E. Fisher, 1974: Excavations at Corinth 1973. *Hesperia 43:* 1 - 76.

Wright, G.A., 1969: *Obsidian analysis and Prehistoric Near Eastern Trade 7500 - 3500 B.C.* Ann Arbor: University of Michigan Press.

Zeist, W. van, 1967: Late Quaternary Vegetation History of Western Iran. *Review of Palaeobotany and Palynology 2:* 301 - 311.

Zeist, W. van and S. Bottema, 1971: Plant husbandry in Early Neolithic Nea Nikomedeia, Greece. *Acta Bot. Neerl. 20 (5):* 524 - 38.

Zohary, D., 1969: "The progenitors of wheat and barley in relation to domestication and agricultural dispersal in the Old World." In: Ucko and Dimbleby (eds.) 1969: 47 - 66.

LIST OF FIGURES

LIST OF TABLES